

Oakland University
Rochester, Michigan

OAKLAND UNIVERSITY



Graduate
Catalog
1987-89



Rochester, Michigan

OAKLAND UNIVERSITY

Graduate Catalog 1987-89

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Rochester, MI 48063
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Dean of the School of Business Administration, 370-3282
Dean of the School of Engineering and Computer Science, 370-2217
Dean of the School of Health Sciences, 370-3562
Dean of the School of Human and Educational Services, 370-3050
Dean of the School of Nursing, 370-4081

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Dean of Graduate Study, 370-3168
Graduate Admissions Officer, 370-3166

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Director, Placement and Cooperative Programs, 370-3250

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Registrar, 370-3452

Loans and On-campus Employment

Financial Aid Officer, 370-3370

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Graduate Student Affairs and Services

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Student Housing

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Oakland University, as an equal opportunity and affirmative action institution, is committed to compliance with federal and state laws prohibiting discrimination, including Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. It is the policy of Oakland University that there shall be no discrimination on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, veteran status or other prohibited factors in employment, admissions, educational programs or activities. Inquiries or complaints may be addressed to:

Director
Office of Equal Opportunity
148 North Foundation Hall
Oakland University
Rochester, MI 48063

Contents

University Officers	4
Graduate Council	5
Academic Calendar	6
General Information	9
Policies and Procedures	17
College of Arts and Sciences	29
Biomedical Sciences	29
Department of Biological Sciences	32
Department of Chemistry	38
Department of English	43
Department of History	49
Department of Linguistics	55
Department of Mathematical Sciences	60
Department of Music, Theatre and Dance	69
Department of Physics	76
Department of Political Science	81
Department of Sociology and Anthropology	85
Special Courses	89
School of Business Administration	91
School of Engineering and Computer Science	109
School of Health Sciences	134
School of Human and Educational Services	140
Department of Counseling	144
Department of Curriculum, Instruction and Leadership	149
Department of Human Development and Child Studies	155
Department of Reading and Language Arts	167
Education Specialist in School Administration	176
Special Courses	179
School of Nursing	181
Index	186
Campus Map	190

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Graduate Council 1986-87

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**ex officio*

Academic Calendar

Winter 1987

Registration	Mon	January 5
Classes begin	7:30 a.m., Tue	January 6
Winter recess begins	10 p.m., Sat	February 21
Classes resume	7:30 a.m., Mon	March 2
Classes end	5:30 p.m., Mon	April 20
Exams begin	6 p.m., Mon	April 20
Exams end	12 noon, Sat	April 25

Spring 1987

Registration	Mon	May 4
Classes begin	6 p.m., Mon	May 4
Memorial Day holiday	Mon	May 25
Spring commencement	Sunday	June 7
Classes end	10 p.m., Mon	June 22
Final exams	Wed, Thu	June 24, 25

Summer 1987

Registration	Mon	June 29
Classes begin	7:30 a.m., Tue	June 30
Independence Day recess	10 p.m., Thu	July 2
Classes resume	7:30 a.m., Mon	July 6
Classes end	10 p.m., Tue	August 18
Final exams	Thu, Fri	August 20, 21

Fall 1987

Registration	Tue, Wed, Thu	August 25, 26, 27
Classes begin	7:30 a.m., Wed	September 2
Labor Day holiday	Mon	September 7
Fall commencement	Sunday	September 20
Thanksgiving recess begins	10 p.m., Wed	November 25
Classes resume	7:30 a.m., Mon	November 30
Classes end	5:30 p.m., Fri	December 11
Exams begin	7 a.m., Sat	December 12
Exams end	5:30 p.m., Fri	December 18

Winter 1988

Registration	Mon	January 4
Classes begin	7:30 a.m., Tue	January 5
Winter recess begins	10 p.m., Sat	February 27
Classes resume	7:30 a.m., Mon	March 7
Classes end	10 p.m., Mon	April 18
Exams begin	7 a.m., Thu	April 21
Exams end	10 p.m., Wed	April 27

Spring 1988

Registration	Mon	May 2
Classes begin	6 p.m., Mon	May 2
Memorial Day holiday	Mon	May 30
Spring commencement	Saturday	June 4
Classes end	10 p.m., Tue	June 21
Final exams	Wed, Thu	June 22, 23

Summer 1988

Registration	Tue	June 28
Classes begin	7:30 a.m., Wed	June 29
Independence Day recess	12 Noon, Sat	July 2
Classes resume	7:30 a.m., Tue	July 5
Classes end	10 p.m., Wed	August 17
Final exams	Thu, Fri	August 18, 19

Fall 1988

Registration	Mon, Tue, Wed	August 29, 30, 31
Classes begin	7:30 a.m., Thu	September 1
Labor Day holiday	Mon	September 5
Fall commencement	Sunday	September 18
Thanksgiving recess begins	10 p.m., Wed	November 23
Classes resume	7:30 a.m., Mon	November 28
Classes end	5:30 p.m., Fri	December 9
Exams begin	7 a.m., Sat	December 10
Exams end	5:30 p.m., Fri	December 16

Winter 1989

Registration	Tue	January 3
Classes begin	7:30 a.m., Wed	January 4
Winter recess begins	10 p.m., Sat	February 25
Classes resume	7:30 a.m., Mon	March 6
Classes end	10 p.m., Tue	April 18
Exams begin	7 a.m., Fri	April 21
Exams end	10 p.m., Thu	April 27

Spring 1989

Registration	Mon	May 1
Classes begin	6 p.m., Mon	May 1
Memorial Day holiday	Mon	May 29
Spring commencement	Sunday	June 4
Classes end	10 p.m., Tue	June 20
Final exams	Wed, Thu	June 21, 22

Summer 1989

Registration	Mon	June 26
Classes begin	7:30 a.m., Tue	June 27
Independence Day recess	10 p.m., Sat	July 1
Classes resume	7:30 a.m., Wed	July 5
Classes end	10 p.m., Wed	August 16
Final exams	Thu, Fri	August 17, 18

Admission Schedule

This is a general guide for submission of application material. Some programs have earlier closing dates for admission. Applicants should check the specific admission requirements for the program they wish to enter. If no dates are given, the following schedule will apply.

Term for which admission is requested:	For admission to a graduate program, <i>all</i> application material must be in the Office of Admissions by:	For special graduate or post-master's admission (guests) application must be in the Office of Admissions by:
Spring 1987	March 23, 1987	April 13, 1987
Summer 1987	May 18, 1987	June 8, 1987
Fall 1987	July 14, 1987	August 4, 1987
Winter 1988	November 23, 1987	December 14, 1987
Spring 1988	March 21, 1988	April 11, 1988
Summer 1988	May 17, 1988	June 7, 1988
Fall 1988	July 18, 1988	August 6, 1988
Winter 1989	November 22, 1988	December 13, 1988
Spring 1989	March 20, 1989	April 10, 1989
Summer 1989	May 15, 1989	June 5, 1989
Fall 1989	July 17, 1989	August 7, 1989

Prospective students whose applications for program admission are incomplete on the designated date may be considered for special graduate or post-master admission if the program area permits admission in such status. Applications received after the date designated for receipt of special graduate or post-master admission requests may be processed in time for late registration if the applicants wish. However, they should be aware that a \$25 late registration fee will be assessed.

GENERAL INFORMATION

Oakland University is a comprehensive, state-assisted institution of approximately 12,500 students, offering a diverse set of academic offerings from baccalaureate to doctoral levels. In all its activities, it strives to exemplify educational leadership. Anchored by a strong liberal arts program, the university is organized into a College of Arts and Sciences, schools of Business Administration, Engineering and Computer Science, Health Sciences, Human and Educational Services, and Nursing, the Division of Continuing Education, and the Office of Graduate Study. All academic programs of the university are accredited by the North Central Association of Colleges and Schools.

The university faculty, which now numbers more than 400, has a distinguished record of research and scholarship. Faculty members have won some of the prestigious awards made by government agencies and private foundations. External funding support for research now totals nearly \$3.9 million annually. Studies in biological and physical sciences, robotics, and energy attract national and international attention to the university, and the Eye Research Institute has become a widely recognized center for research on diseases of the eye. This institution takes pride in the many scholarly books and articles written by its faculty and in their contributions to pedagogy and the creative arts. Wherever possible, students are involved in research projects, and the results of research and scholarship are integrated into related courses of instruction.

The Kresge and Performing Arts libraries serve as primary scholarly resources for students and faculty. They are supported in this function by a network of computing facilities: two mainframe computers, several minicomputers, and hundreds of microcomputers for student and faculty use.

Complementing its academic program, Oakland University collaborates actively with business and industry to foster economic development in southeastern Michigan and provides major public service offerings with emphasis on the professional performing arts. Meadow Brook Theatre, a professional theatre, is located in Wilson Hall. Meadow Brook Music Festival is the summer home of the Detroit Symphony Orchestra. Meadow Brook Hall, the former home of the university's benefactors, now serves as a major conference and cultural center; the Meadow Brook Art Gallery houses the university's permanent collection of African art and presents a variety of special exhibits annually.

The university was founded in 1957 when the late Alfred G. and Matilda R. Wilson donated their 1,500-acre estate and \$2 million to Michigan State University to begin a new college in Oakland County. Named Michigan State University-Oakland, the new campus enrolled its first students in 1959. In 1963 the name was changed to Oakland University, and in 1970 the state legislature recognized the maturity and stature of Oakland University by granting the institution its autonomy. The governor appointed Oakland University's first Board of Trustees in fall 1970.

Located between the cities of Pontiac and Rochester Hills, Oakland University is easily accessible to millions of residents in the metropolitan Detroit area. The natural beauty of the campus, much of it still wooded and undeveloped, is enhanced by comprehensive recreational facilities and modern buildings that house the university's many academic and public service programs as well as some 1,900 residential students. Adjacent to the campus is the Oakland Technology Park, a research park where private-sector companies work hand-in-hand with higher education.

Role and Mission

The following role and mission statement for the university was adopted by the Oakland University Board of Trustees on July 21, 1982. It emphasizes four essential ingredients for the direction of the university: excellent and relevant instruction; high quality basic and applied research and scholarship; responsive and effective public and community service; and a comprehensive schedule of student development activities.

As a state-supported institution of higher education, Oakland University has a three-fold mission. It offers instructional programs of high quality that lead to degrees at the baccalaureate, master's, and doctoral levels as well as programs in continuing education; it advances knowledge through research and scholarship; and it renders significant public service. In all of its activities, the university strives to exemplify educational leadership.

Instruction

Oakland University provides rigorous educational programs. A strong core of liberal arts is the basis on which undergraduates develop the skills, knowledge, and attitudes essential for successful living and active, concerned citizenship. A variety of majors and specialized curricula prepare students for post-baccalaureate education, professional schools, or careers directly after graduation. Each program provides a variety of courses and curricular experiences to ensure an enriched life along with superior career preparation or enhancement.

The university offers master's programs that meet demonstrable needs of Michigan residents and that maintain a superior quality. Doctoral programs are offered which are innovative and serve needs that are not adequately met elsewhere in the state.

Offerings in continuing education provide Michigan residents with high quality course work for professional development and personal enrichment.

Oakland University is selective in its admission standards and seeks both traditional and nontraditional students who can profit from its offerings. While serving principally Michigan residents, it welcomes qualified applicants from other states and countries. A special effort is made to locate and admit disadvantaged students with strong potential for academic success and to provide the support conducive to the realization of that potential. The faculty and staff cooperate with nearby community colleges to ensure that their students who seek to transfer to Oakland University are well prepared for work at a senior college. In recruiting and admitting students, enrollments are not permitted to exceed numbers consistent with preserving the high quality of instruction.

The university strives to remain current and relevant through an adequate program of continuing faculty development and the exploration of innovative schedules, methods, and curricular design in keeping with the various needs of a diverse student body, many of whom commute, work, or are older than the traditional college-age student.

Oakland University offers, and will continue to offer, only those programs for which adequate resources and well-prepared faculty are available and for which a demonstrable need, expressed through the attraction of qualified students, exists.

Research and scholarship

Oakland University assumes an obligation to advance knowledge through the research and scholarship of its faculty and students. The university's research and scholarship mission takes expression in a variety of forms ranging from basic studies

on the nature of things to applied research directed at particular problems to contributions to literature and the arts. Within its means the university provides internal financial support for research and scholarship. Simultaneously, it pursues with vigor external sources of support. Research institutes, financed primarily by outside grants, make an important contribution to this mission.

In addition to their intrinsic value, research and scholarship reinforce the instructional mission of the university. Wherever possible, students are involved in research projects, and the results of research and scholarship are integrated into related courses of instruction.

In carrying out its research and scholarship mission the university seeks especially to be responsive to the needs of Michigan, particularly those of the populous southeastern sector. The application of research and scholarship to problems and concerns of the state's business and industry and scientific, government, and health and human-service agencies serves also to reinforce the public service role of the university.

Public service

Oakland University serves its constituents through a philosophy and program of public service that are consistent with its instructional and research and scholarship missions. It cooperates with businesses, governmental units, community groups, and other organizations on research, technical development, and problem-solving enterprises in an attempt to apply the expertise of the university to the issues of society in general or the region in specific so as to further enhance the quality of life in the service areas of the university. It attempts to maintain the degree of flexibility necessary to respond with innovative instruction, research, and other service to rapidly changing needs. Its facilities are made available to a multitude of activities of agencies and community groups whose purposes are compatible with the mission of the university. Recreational and physical enrichment for citizens of the area is provided by program and campus accessibility insofar as it is consistent with the role and scope of the institution. Cultural enrichment is provided for the community through the Meadow Brook enterprises, other campus events, and off-campus presentations by faculty and students.

Above all, the university aims to provide a model of socially responsible decision making and ethical institutional behavior within a diverse ethnic environment, recognizing that institutional strength derives from an effective interaction with the institution's external environs.

Student development

In direct support of its academic mission, Oakland University provides basic services and experiences which integrate cognitive learning with the personal growth of the individual student in the emotional, social, physical, cultural, ethical, and interpersonal domains. In so doing, the university seeks to facilitate the development of life-management skills which will contribute to informed decision making and productive citizenship. This objective is accomplished through a variety of student enterprises including campus organizations, athletics, and other sponsored activities and events. Key to its achievement is the provision of a governance system in which students play a meaningful role in institutional decision-making processes.

The university takes particular cognizance of its considerable enrollment of older and nontraditional students and provides advising, counseling, and other services of special value to such students in effecting career changes and developing additional personal competencies.

Through the maintenance of complementary academic and extracurricular environments, Oakland University assists students in the realization that life is a continuum of growth, change, and adaptation and provides them with the skills essential to the achievement of their fullest potential.

Graduate Programs

The College of Arts and Sciences offers programs leading to the degrees of Doctor of Philosophy in Biomedical Sciences (cellular biology of aging, medical physics, and health and environmental chemistry); Master of Arts in English, history, linguistics and sociology; Master of Science in biology, chemistry, applied mathematics, applied statistics and physics; Master of Public Administration and Master of Music. The School of Health Sciences offers a Master of Science degree in exercise science. The School of Human and Educational Services offers programs leading to the Doctor of Philosophy degree in reading, the Education Specialist degree, the Master of Arts in counseling, the Master of Arts in Teaching degree in early childhood, curriculum, instruction and leadership, reading, and special education. The College of Arts and Sciences and the School of Human and Educational Services jointly offer programs leading to the degree of Master of Arts in Teaching in English and in mathematics. The School of Engineering and Computer Science offers the Doctor of Philosophy degree in systems engineering and the Master of Science degree in computer science and engineering, electrical and computer engineering, mechanical engineering, and systems engineering. The School of Nursing offers a Master of Science degree and the School of Business Administration offers the degree of Master of Business Administration.

Graduate programs exist within the framework of the university's role and mission statement and have their philosophical underpinning in it. They are linked closely to the research, scholarship, and public service activities of the university. The programs and activities reinforce each other. Through the graduate programs the intellectual and educational needs of students are served in relation to specific careers, cultural heritage is preserved and extended, and new knowledge is produced which is directed toward the extension of frontiers and/or the solution of technological, social, economic and political problems and issues. Programmatic balance is sought to assist in the achievement of these varied outcomes. Students are assumed to be full partners in the implementation of the programs. In the process they are educated in the methods of intellectual inquiry and critical analysis and trained in the skills needed for their chosen fields. Through this partnership the goals and purposes of graduate education are fulfilled.

Development and Review of Graduate Programs

New programs are developed along established guidelines and within the framework of the university's role and mission statement. The painstaking approval process is monitored throughout by the Graduate Study Office. It includes evaluation by and endorsement from several designated internal and external bodies. Once in place, graduate programs are reviewed by the faculty involved with the program and the Graduate Study Office on a regularly scheduled basis. At the time of publication of this catalog, several programs are in various stages of review. Program or course changes resulting from these reviews will be announced in full detail in timely fashion. Other changes will occur as a result of the dynamic, rather than static nature of the curricula. Thus, students should maintain contact with their advisers and the Graduate Study

Office to be fully aware of the current status of programs to which they have been admitted.

Equality of Opportunity

Oakland University, as an equal opportunity and affirmative action institution, is committed to compliance with federal and state laws prohibiting discrimination, including Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. It is the policy of Oakland University that there shall be no discrimination on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, veteran status or other factors in employment, admissions, educational programs or activities. Inquiries or complaints may be addressed to the Office of Equal Opportunity, Oakland University, Rochester, MI 48063.

Family Educational Rights and Privacy Act, 1974

The federal Family Educational Rights and Privacy Act, 1974, pertains to confidential student educational records. This legislation allows students the right to view upon request their own confidential educational records and restricts the use of these records by others. Copies of the Family Educational Rights and Privacy Act, 1974, may be obtained from the Dean of Students, 144 Oakland Center (370-3352), or from the U.S. Department of Health, Education, and Welfare.

Notification of Oakland University compliance with this legislation may be found in the Oakland University Policy Statement on the Family Educational Rights and Privacy Act (available at the office of the dean of students), in the appropriate *Schedule of Classes*, and the undergraduate and graduate Oakland University catalogs. The dean of students is the university compliance officer for the Family Educational Rights and Privacy Act. Any questions, grievances, complaints, or other related problems may be addressed to the compliance officer and/or filed with the U.S. Department of Health, Education, and Welfare.

Accreditation and Affiliations

All Oakland University graduate programs are accredited by the North Central Association of Colleges and Schools.

The university is an institutional member of the following associations: American Anthropological Association; American Assembly of Collegiate Schools of Business; American Association of Colleges for Teacher Education; American Chemical Society; American Council on Education; American Institute of Physics; American Mathematical Society; American Society for Engineering Education; American Sociological Association; Association of Departments of English; Council of Graduate Schools in the United States; Engineering Society of Detroit; Institute of International Education, Incorporated; International City Managers Association; Midwestern Association of Graduate Schools; Municipal Finance Officers Association; Society for Public Administration; and Society of the Sigma Xi.

Michigan Intercollegiate Graduate Studies (MIGS)

The MIGS program is a cooperative inter-institutional arrangement which permits graduate students to take advantage of educational offerings available at another par-

icipating institution but not available at their own. It is open to any student in good standing in a graduate program at a member institution. Courses must be approved in advance by the student's graduate adviser and the MIGS liaison officer at both the home institution and the host institution. Admission by the host university is contingent on the availability of space and resources. The member institutions are Central Michigan University, Eastern Michigan University, Michigan State University, Michigan Technological University, Northern Michigan University, Oakland University, University of Michigan, Wayne State University, and Western Michigan University. Additional information is available in the Graduate Study Office and from program directors.

Centralized and Specialized Research Facilities

Eye Research Institute

The Eye Research Institute is a major research center of the university with laboratories and offices on the fourth floor of Dodge Hall of Engineering. Research related to studies on the eye in health and disease is extensively funded by grants from the National Eye Institute of the National Institutes of Health. The Eye Research Institute's programs are regularly reviewed by a scientific advisory board. The board members, who are national leaders in eye research and distinguished ophthalmologists, are appointed by the president of the university.

The facilities of the institute include seven main research units, each with an office and a laboratory for each principal investigator, and central facilities such as two cold rooms, a computer terminal, a radioisotope laboratory, an animal room, an animal surgery room, an instrument room, a machine shop, a photography room, and a library-conference room.

Current research involves disciplines such as biochemistry, biophysics, cell biology, physiology, pharmacology and photobiology.

The institute offers qualified graduate students opportunities for research experiences which may be credited for BIO 690. Students should contact the director's office for further information.

Library facilities

Most university library materials and services are housed in Kresge Library. Magazines are on the third level with circulating books on the second level, reference works and major library services on the main level, and the microforms and government documents on the lower level.

The Instructional Technology Center located in Varner Hall provides media services for the university's faculty and staff. The center designs and produces instructional visual aids ranging from slide presentations to video tape and film presentations. The center also maintains a collection of books, journals, acting editions of plays, musical scores, and recordings related specifically to the study of the performing arts.

Library collections

The university's Kresge Library holds 1,276,845 pieces of library material, plus unprocessed manuscripts, memorabilia, and museum pieces. Included are 745,546 microforms, 13,362 records and phonotapes, 51,735 periodical volumes, and 283,793 cataloged circulating and reference books.

In the late 1960s, a \$100,000 fund was established by Oakland University students in memory of Matilda R. Wilson to develop the reference collection. Student support

of this collection continues with the \$1 per semester donation that students can designate for the library. These gifts are matched each year by the Oakland University Foundation. The reference collection includes atlases, bibliographies, dictionaries, encyclopedias, indexes, and yearbooks.

The library receives some 2,068 journals and newspapers. Journals are generally uncataloged and shelved alphabetically by title on the third floor of the library. Newspapers are shelved separately in the newspaper section of the same floor. Science journals include publications in biology, chemistry, computer science, engineering, mathematics, nursing, and physics. Current issues are displayed near the mini-lounge area.

Since 1964 the library has been a U.S. Government depository and receives about 60 percent of the depository items published each year. The library is also a depository for Michigan documents. These collections are indexed, respectively, by the *Monthly Catalog of U.S. Government Publications* and *Michigan Documents*.

Library services

Periodicals, which are alphabetically arranged on shelves, are not cataloged. Most other types of library materials are classified under the Library of Congress system and indexed through the public card catalog.

The reserved book collection is a collection of materials that faculty members have reserved for use by specific classes.

Reference librarians help students find materials or use the library. Bibliographic instruction and data-base services supplement these traditional reference services. As part of some regular credit courses, teaching and library faculty collaborate on lectures and demonstrations for using the library. The library's on-line literature search service aids in retrieval of citations of published articles in the fields of education, engineering, medicine, psychology, and natural and social sciences.

Through interlibrary lending, members of the university community may obtain materials that are unavailable in the university library. Interloan systems share books, periodicals, and newspaper articles, theses and dissertations, films and documents in microform, music scores, and research reports.

Office of Computer Services

The Office of Computer Services (OCS) provides centralized computing resources to support the instructional, research, and administrative activities at Oakland University. An academic services staff develops and maintains a comprehensive scientific and technical program library and offers consulting services to faculty and students.

OCS also maintains a public terminal room at the central facility, which contains terminals, user work space, reference material, and an information desk. Faculty and students are encouraged to avail themselves of these services throughout the development and implementation of their computing assignments.

Office of Institutional Research

The Office of Institutional Research maintains research-oriented student information files and analyzes these data to aid the university in planning and program development. It also assists faculty and students in organizing, systematizing, and carrying out research on student behavior and learning. The staff is available for consultation on problems in social research.

SHES Resource Center

The Resource Center of the School of Human and Educational Services (SHES) contains a variety of printed materials, such as pamphlets, curriculum guides, and

manuals for research and instructional purposes. Multi-media instructional devices are also concentrated here. In addition to the simpler equipment, such as film strips, tapes, and overhead projectors, the center has facilities to produce and make available video tapes and educational television materials. Students have the opportunity to acquaint themselves with new developments in the instructional techniques, and educational researchers have at their disposal the technological and recording facilities needed for their investigations.

Psychology Clinic

The counseling center is staffed with clinical and counseling psychologists who provide specialized counseling, consultation, and psychotherapy to Oakland students with personal and interpersonal problems. Marriage counseling, child therapy, and family therapy also are provided. Use of the center is voluntary and is available by appointment at a minimal charge.

The center also provides psychological testing and career counseling. The career counseling program involves a set of in-depth interviews and testing, with focus on personal issues in career development. The psychological testing services are aimed at assessing developmental growth as well as the nature of personal problems.

All of these services are intended to support students in taking full advantage of their education. All personal material is held in strict confidentiality and does not become part of the student's academic record.

Services of the center are also available to the public at a higher fee. Fees are based on family income, and many insurance policies reimburse these services.

Special Advising

The Department of Special Advising provides services to students with special needs or entitlements: specifically, foreign students and scholars, disabled students, and eligible veterans.

The office assists foreign students and scholars with necessary Immigration and Naturalization Service procedures and, in the case of exchange visitors, with U.S. Information Agency procedures. The office also assists disabled students, including those with temporary disabilities, with registration for classes and with individual needs and concerns. In addition, the Special Advising office certifies eligible veterans for education benefits. The office provides a variety of services to these three special groups.

The department also provides testing services. These include the administration of the ACT, MCAT, GRE, LSAT, PPST, and Miller Analogies Test.

POLICIES AND PROCEDURES

Admission

Requirements for admission to a degree program

The graduate admissions policy of Oakland University is selective. Degree program applicants must have official transcripts and letters of recommendation sent directly by their originators to the admissions office. Detailed instructions are included in the "Application for Admission to Graduate Study," available from this office. Additional admission information may be found in the sections of this catalog describing the programs offered by the various schools and departments. Admission will be granted by the dean of Graduate Study on recommendation by the department or school concerned and is based on the applicant's undergraduate record, letters of recommendation, and other evidence that may be required. All transcripts, recommendations, and other documents received by the university become the property of the university and will not be released. Copies will be made only for university use.

An applicant must hold a baccalaureate or its equivalent from an accredited undergraduate institution. Scores from the Graduate Record Examination are required from those students who graduated from non-accredited schools, including advanced (subject) tests when available. Some graduate departments offer Oakland undergraduate students the opportunity to take their bachelor's and master's degrees concurrently, but this is done only with written permission of the department involved and the dean of Graduate Study. A planned course of study to satisfy the requirements for both degrees is necessary, and a copy of the plan will be included in the student's official graduate file.

Conditional admission

If an applicant is judged insufficiently prepared, or the grade point average is below program requirements, a conditional admission may be authorized by the department or school involved, with the concurrence of the graduate dean. These students may be required to complete additional course work, specified by the program area involved, without credit toward a degree. Students who do not meet the conditional requirements stipulated on admission are subject to dismissal. While in a conditional status students will not be eligible to receive their degrees or to transfer credit from other institutions.

Certificate status

Admission into this status is confined, at the present time, to students in the mathematical sciences working for a graduate certificate in statistics and to students in the School of Human and Educational Services who are seeking continuing certification, additional endorsements, or are working for a graduate certificate in microcomputer applications in education. Descriptions of these certificate programs will be found in the Department of Mathematical Sciences and School of Human and Educational Services sections of this catalog.

Special graduate status

Special graduate status may be granted by some departments to students who wish to take graduate courses but not work toward a degree. Students will be allowed

to take no more than a total of 12 credits while in this status. There may also be constraints placed on their times of registration because students admitted to programs are given enrollment priority. The admission schedule on page 8 of this catalog and the *Schedule of Classes* published by the registrar each semester should be consulted for information pertaining to particular semesters.

Credit earned at Oakland University under special graduate status — but none that has been earned at another institution — will be officially recorded. This credit may be applied toward degree requirements if a student later is admitted to a degree program and if the credit is appropriate to the degree objective. However, admission as a special graduate student in no way assures subsequent admission to a degree program. If students in this status wish to apply for admission to a program, they must apply at the admissions office, provide official transcripts, recommendations, and any additional credentials specified by the program area. A decision on admission is then made by the academic department or school with concurrence of the dean of Graduate Study. Requirements and regulations prevailing for the semester of formal admission to a graduate program will govern the student's program.

Post-master's status

Post-master's status may be granted by some departments to a student who holds a master's degree and wishes to take additional graduate courses but not toward a second degree. The post-master's status is similar to that of the special graduate student, and the same rules and procedures apply. Subsequent admission to a program for a second master's degree, the Education Specialist degree or a doctoral degree requires applying at the admissions office and providing the application material required by the particular program.

Post-baccalaureate status

Post-baccalaureate status may be granted applicants who have a bachelor's degree from an accredited college or university and who wish to enroll in undergraduate courses, either to develop an additional major or to prepare for admission to a degree program. Application for this type of admission should be made through the undergraduate admissions office.

Application for admission by international students

International applicants should submit applications at least one year before the date they hope to enter the university. An application will require the application fee, recommendations, official test scores and a statement attesting to the applicant's financial standing. If this application is approved, students will receive a certificate of admission to the university. International students are required to submit scores from the Graduate Record Examination General Test (GRE), including scores from subject tests in the area of interest, prior to admission. The Test of English as a Foreign Language (TOEFL) is also required. The Graduate Management Admission Test (GMAT) is required for admission to the M.B.A. program in lieu of the GRE.

International applicants who are presently in the United States on a student status may be required to provide statements from the International Student Advisers of their current institutions.

Academic Procedures

Inactive status and readmission

A student who has not registered for an Oakland University graduate course for one to five years is considered inactive. After five years all application material and

correspondence in the graduate folder is destroyed. A student who wishes to take classes subsequently must follow the regular admission procedures. This does not affect Oakland University transcripts which remain available in the Office of the Registrar.

Students who have been admitted to a graduate program but have not registered for a class at Oakland University for a year must apply for readmission. Readmission is not automatic. The application is reviewed by the appropriate admission's committee and each request evaluated in terms of the time limit for completing degree requirements, performance in course work and progress toward the degree. Students may not be readmitted to programs that have been suspended or discontinued. The catalog current at the time a student is readmitted will govern program requirements, policies and procedures.

Transcripts

The Office of the Registrar maintains academic records and sends a standing report to an enrolled student's address of record at the end of each academic period. Transcripts of academic records may be obtained by completing a transcript request form at the Office of the Registrar, or by writing Transcript Request, Office of the Registrar, Oakland University, Rochester, MI 48063. Requests should include the name under which the student attended, the Oakland University student number, the date of last attendance and date of degree (if applicable), the level of last course work, and the address to which the transcript is to be sent. A check or money order for \$3 for each transcript ordered must accompany the request.

Petition of exception

Students may request waivers or modifications of specific academic requirements by filing a petition of exception form with their advisers or advising committees. The advisers or committees will make recommendations to the graduate dean, who will review the petition and notify students of any action taken.

Restriction of student records

Students may not register for classes or apply for a degree if their records have been restricted because they failed to pay fees, to submit complete application forms, or to satisfy admission or retention conditions. Transcripts of work done at Oakland and information to prospective employers may also be withheld until the restriction is lifted.

Time limit

Credit earned more than six years before a master's degree is to be granted may not be used to fulfill the degree requirements. This means, for example, that a course taken in fall 1982 may be used toward a degree only until the end of the fall 1988 semester. Time limits for doctoral programs will be found within the program descriptions.

Transfer credit

Students who are in good standing (not probationary or conditional) in a degree program and wish to transfer from other accredited colleges or universities must have such credit approved by their academic advisers and the dean of Graduate Study. The credit must be earned at the graduate level with a grade of at least 3.0 (or B), it must be applicable to the student's program and may not have been previously used to satisfy degree requirements at this or another institution. Applications should be filed after the first semester is completed at Oakland and, in any event, not later than the first week of the semester in which the student expects to graduate. It will be necessary to

numbers (500 and above) → courses graduate level, GRE or GRE MC all not transf.

have official transcripts of the work on file in the Graduate Study Office. Transfer of credit applications are available in the academic offices.

A maximum of nine semester hours of credit is acceptable toward a graduate degree for students admitted or readmitted to programs in fall 1981 and thereafter. Approved transfer credit will appear on the student's official transcript in the Office of the Registrar. Transfer credit earned more than six years before the degree is awarded will not be applied toward master's degree requirements.

Courses taken as an undergraduate

Up to 12 credits taken while a student is an Oakland undergraduate may be applied to a graduate program if the courses have not been used to fulfill the bachelor's degree requirements. They must be applicable to the student's graduate program, approved by the student's adviser or program committee and the dean of Graduate Study, and graduate fees paid. Transfer request forms are available in the Graduate Study Office.

Course competency credit

Competency examinations are offered by some departments and can be used to update Oakland University credit which is beyond the six-year time limit. Students should consult their advisers for specific information and must register and pay fees during the normal registration period. University legislation stipulates that the examination must be taken not more than six weeks after the close of registration.

Changes in enrollments (add/drop)

Graduate students wishing to add or drop a course may secure the appropriate form from the Office of the Registrar or from the academic office of the area in which they are enrolled. A student adding a course will need the signature of the instructor of the new course. The add/drop form is then presented to the registrar for processing. If a refund is involved it will be mailed to the student. The first two weeks of a semester (one week in spring or summer sessions) are a no-grade period for dropping courses.

Withdrawal

A graduate student wishing to withdraw from the university may do so by notifying the Graduate Office which will initiate a withdrawal form and process it through the Office of the Registrar. If this is done by telephone, a written confirmation is needed from the student. The withdrawal is recorded by the registrar and the amount of refund, if any, determined. If a refund is due it will be mailed to the student. Students registered for only one class should drop that class by following this procedure. See grading policy, page 23.

Academic probation

Students who are not making satisfactory progress in their programs, as determined by their advisers and program chairperson, may be placed in probationary status with conditions imposed for retention in the program.

Academic conduct of graduate students

All members of the academic community at Oakland are expected to practice and uphold standards of academic integrity and honesty. An instructor must inform and instruct students about the procedures and standards of research and documentation required of students in fulfilling course work. A student is required to follow such instructions and is charged with the responsibility of assuring that the rules and procedures are understood in order to avoid inadvertent misrepresentation of the student's work. Students must assume that individual (unaided) work on examinations and

laboratory reports and documentation of sources is expected unless the instructor specifically makes an exception to this policy. Students must also assume that if the instructor assigns as part of the course requirements a special project other than or in addition to the examinations, such as a research paper, an original essay or a book review, the instructor intends that work be completed for that course only. Any work which a student may have completed for a course taken in the past, or is completing for another present course, must not be submitted in that instructor's course, unless the student receives the instructor's specific permission.

Academic integrity means representing one's self and one's work honestly. Misrepresentation by words or conduct regarding the source of a student's work is characterized as cheating since it means a student is claiming credit for ideas or work that is not actually his or hers and the student is thereby attempting to obtain a grade that is not actually earned. Students would be well advised to avoid compromising situations or the appearance of cheating through their conduct. The following are some examples of misrepresentation:

1. Cheating on examinations by:
 - a. using materials such as books and/or notes when not authorized by the instructor.
 - b. taking advantage of prior information not authorized by the instructor regarding questions to be asked on the exam.
 - c. copying from another student's work or paper.
 - d. helping someone else copy work.
 - e. substituting another person or that person's work during an examination.
2. Plagiarizing from the work of others. "Plagiarism" is using another person's work or ideas without giving the other person credit; by plagiarizing, a student is, in effect, claiming credit for another individual's thinking and expression. Whether the student has read or heard the information used, the student must document the source of information. When utilizing written sources, a clear distinction should be made between quotations (which reproduce information from the source word-for-word within quotation marks) and paraphrases (which are a restatement of the source information produced in the student's own words). Both direct quotations and paraphrases must be documented. Even though a student rephrases, condenses or selects from another person's work, the ideas are still the other person's and failure to give credit constitutes misrepresentation of the student's actual work and plagiarism of another person's ideas. Purchasing a paper or copying another person's work and handing it in as the student's personal work is plagiarism and misrepresentation.
3. Cheating on lab reports by:
 - a. falsifying data, or
 - b. submitting data not based on student's personal work.
4. Falsifying records or providing misinformation regarding one's credentials.

If a student is of the opinion that practices by the instructor are conducive to cheating, the student may express this concern either directly to the instructor or to the Office of Graduate Study.

Instructors are required to report evidence of plagiarism, cheating on exams or lab reports, falsification of records or other forms of academic misconduct to the Office of Graduate Study for referral to the Graduate Academic Conduct Committee. If academic misconduct is determined to exist, the committee may assess the following penalties: academic disciplinary reprimand, academic probation, suspension, or dismissal from the university.

A statement describing the procedures to be followed in cases of graduate student violation of the academic conduct policy may be obtained from the Office of Graduate Study.

Dismissal from the university

Dismissal is effected by the dean of Graduate Study based on a recommendation from the faculty of a program. It is an action taken only after thorough evaluation of the student's progress toward a degree by both the faculty and the dean.

Appeal procedures for dismissals and denial of admission

Responsibility for dismissal for cases relating to academic performance and admission denial rests with the dean of Graduate Study. The dean, in deciding to dismiss or to deny admission, is guided in the first instance by the recommendations from the faculty of the program involved.

These procedures provide an orderly process for an applicant or student to appeal a decision which has denied them admission or dismissed them from a program.

1. The person making the appeal (henceforth called "student") should request that the program area reconsider its recommendation within thirty days of receipt of the denial or dismissal decision. This request should be directed to the program chair or the chair of its admission committee.
2. If the student is dissatisfied with the response received from the program area, a request may be made for an interview with the graduate dean to discuss the decision.
3. After these initial steps have been taken, and if the student continues to believe that there has been a violation of university procedures or if the student has evidence which was not considered, a written appeal of the decision may be made to the Graduate Council. The appeal should contain a full statement of the problem and should present any new evidence the student considers pertinent to the case.
4. Within thirty days, a three-member ad hoc committee will be appointed by the graduate dean from the Graduate Council to review the student's statement. The council members from the program area concerned may not be appointed to the committee.
5. The committee will obtain a written statement from the program area and may request additional information from the graduate dean. It may also interview the student and program representatives.
6. The committee recommendation will be either to sustain the denial or dismissal or to admit or reinstate the student. Conditions may be imposed on admission or reinstatement. The recommendation will be forwarded to the dean who may accept or reject the recommendation. The dean's decision will be final.

Credit system

The unit of credit is the semester hour. No graduate students may register for more than 12 credits in fall or winter semester, or 8 credits in spring or summer, without written authorization of their advisers.

Course numbering system

Courses numbered 100-299 are introductory or intermediate undergraduate courses and cannot be used toward a master's degree. Courses numbered 300-499 are advanced courses primarily for undergraduates. In some programs, authorized advanced courses may count toward graduate degrees. The authorized courses are listed in the graduate catalog under departmental programs. A graduate student, with the approval of a departmental adviser, may use a maximum of 12 credits in authorized 300-499 level courses toward a master's degree. Courses numbered 500 and above are primarily for graduate students. Qualified undergraduates may enroll in a class numbered 500-599 provided they have obtained prior written permission to do so from the department chair and the course instructor.

Grading

To qualify for a master's degree a student must have an average of at least 3.00 in all courses taken at Oakland University as a graduate student. No grade below 2.0 may be applied toward a graduate degree. Many programs have grade criteria for credit and retention. Specific information may be found under the appropriate program area of this catalog. The graduate grading system, starting fall 1984, is described below.

1. The basic graduate grading system at Oakland University is a 32-point system of numerical grades of 0.0 and 1.0 through 4.0 by tenths and nonnumerical grades of W, I, P, U, S, R, and Z.
2. The first two weeks of a semester are a "no-grade" period for dropping and adding full semester courses. (For "first-half" or "second-half" courses, this period is the first week of the appropriate "half-term.") Courses dropped during these periods are not indicated on the student's transcript.
3. The meanings of non-numeric grades are as follows:
 - a. "W" is assigned by the registrar if a student withdraws officially from a course or all courses between the end of the no-grade period and date specified in the *Schedule of Classes* each semester.
 - b. After the end of the "W" grade period specified in the *Semester Schedule of Classes*, the instructor will assign a numerical grade or a grade of "I" (Incomplete). The "I" grade will be given in the case of severe hardship, beyond the control of the student and which prevents the student from completing course requirements within the semester. A grade of "I" will remain on a transcript permanently unless replaced by a numerical or "S" grade during the appropriate period. "I" grades must be changed within the first eight weeks of the next semester (fall or winter) in which a student registers. If course requirements are not completed within one year and no semester has been registered for, the "I" grade shall become permanent. Extensions are permitted on request of the instructor to the graduate dean.
 - c. The grade of "P" (progress) is a temporary grade that may be given only in a course that could not be completed in one semester. Prior approval must be obtained from the appropriate committee on instruction and the graduate dean for each course in which "P" grades are to be assigned. The "P" grade is given only for satisfactory work. "P" grades must be removed within two calendar years of the date of assignment; otherwise the "P" converts to an "I" which remains on the transcript. This rule does not apply to doctoral thesis work.
 - d. The grade of "S" is given in certain selected courses and is meant to imply 3.0 or better. Courses in which S/U grading is used must be approved by the appropriate committee on instruction and the graduate dean, who will notify the registrar.
 - e. The grade of "U" is given to graduate students only when a course is graded S/U.
 - f. The grade of "R" is a temporary grade assigned by the registrar in the absence of a grade from the instructor or in the case of the award of an inappropriate grade.
 - g. The final grade of "Z" is assigned upon registration for a course as an auditor. The student's declaration of intention to audit is required at the time of registration, and it is understood that no credit for the course is intended that term. An audit registration for a course is permitted only during the late registration period each term. Permission of the instructor to audit and admission to the university are both required before such a registration will be permitted.
4. All grades and marks assigned will appear on a student's transcript. However,

only numerical grades are used in the determination of student's grade point average.

Repeating courses

With the permission of the program area, graduate students may repeat a course up to two times. The last numerical grade earned in the course will be used in computing the grade point average. At the time of registration for a course taken previously, the student must file a "repeat card." Filing of this form is the responsibility of the student and will insure that proper adjustments to grade point average and degree credits are made.

Master's theses and doctoral dissertations

Copies will be sent to the Office of Graduate Study after the documents have been approved by the adviser or committee. They will be available to students and other interested members of the university community. "A Guide to the Preparation of Graduate Theses and Dissertations" is available in the Office of Graduate Study.

Application for degree

Students who intend to graduate at the end of a semester (or session) must fill out an application for degree and pay a nonrefundable \$20 processing fee either when registering for the last semester or by the dates listed below. A candidate who does not graduate in that semester must reapply.

Expected term of graduation	Last date for applying for degree
Spring 1987	May 18, 1987
Summer 1987	July 13, 1987
Fall 1987	October 7, 1987
Winter 1988	February 5, 1988
Spring 1988	May 16, 1988
Summer 1988	July 13, 1988
Fall 1988	October 4, 1988
Winter 1989	February 6, 1989
Spring 1989	May 15, 1989
Summer 1989	July 11, 1989
Fall 1989	October 5, 1989

Commencement ceremonies are held twice a year, in September and June. June and August graduates participate in the September ceremony, and December and April graduates participate in the June ceremony. Each semester's *Schedule of Classes* contains additional information.

Fees

General policy

The Oakland University Board of Trustees reserves the right to change any and all rates of charge when circumstances make change necessary. All charges are assessed and payable in U.S. dollars. Checks and money orders should be made payable to Oakland University. The university urges students to use checks or money orders instead of cash to pay fees. If the checks or money orders exceed the required payments, the balance will be given to the student.

Application fee

A fee of \$20 must accompany an application for admission. This is a nonrefundable processing fee.

Enrollment fee

All students are charged a \$40 enrollment fee each semester or session in which they are registered.

Course fees

Course fees for each semester are assessed on the basis of the credit value of the course. One credit is the equivalent of one semester hour. On-campus graduate course fees for Michigan residents are \$86 per credit while nonresidents are assessed \$182 per credit. The fee for off-campus courses is \$91 per credit. Some courses have additional special fees which are published in the semester class schedule. All fees are subject to change by the board of trustees.

Special fees

Graduate students who register for 8 or more credits are charged an additional \$42.50 (\$6 health service allocation, \$25 Oakland Center fee, \$6 transportation use fee, \$2.50 activities fee, and \$3 student athletics fee). Those who register for 4 to 7 credits are assessed a total of \$23 and for 1 to 3 credits are assessed \$21.

Late registration fee

Students who register or pay fees after the regular registration date are required to pay a nonrefundable \$25 late fee.

Late penalty payment

Late payment of outstanding balances due for tuition, fees, and/or housing will result in assessment of a late payment fee of \$5 per billing. Balances due paid by checks that are returned by the bank are considered nonpayment and will result in assessment of the \$5 fee.

Resident housing: Reservations, deposits, fees

The residence halls are financially self-supporting. Room and board fees reflect the annual cost of operation and are established by the university's board of trustees. The 1986-87 rate for room and board is \$2,755 for the academic year. Special options such as an area for international students and a limited number of single rooms are available to graduate students. If a student signs a housing contract before or during fall semester, that contract is binding for both the fall and winter semesters. If the contract is signed during the winter semester or spring or summer session, it is binding for the single semester or session. The room and board fee is due at registration or may be paid in four installments, the first of which is due at registration. The second, third, and fourth installments are due on the first day of the three months following registration. If a student withdraws from the university, housing funds are refunded on a prorated basis.

A limited number of apartments are available on campus for students with families. Applications and information are available from the Residence Halls Office, Oakland University, Rochester, Michigan 48063.

Refund of fees

A student who withdraws from the university or drops a course that reduces his/her credit load may receive a refund of fees upon application to the appropriate office. Failure to drop or withdraw formally will result in forfeiture of any refund. Graduate students withdrawing from the university apply to the Graduate Study Office. Changes in enrollment are processed in the Office of the Registrar. The amount of

refund is specified in each *Schedule of Classes*. If a student living in the residence halls withdraws from the university, room and board fees are refunded on a prorated basis less an early withdrawal assessment. Formal notice of withdrawal must be given to the residence halls office.

Out-of-state tuition regulations

Students enrolling at Oakland University shall be classified at the time of admission as in-state or out-of-state students for purposes of assessing tuition charges. It is the student's responsibility to register and make full payment each semester or session under the proper in-state or out-of-state classification. For the purpose of these regulations, an in-state resident shall be defined as a person who has a Michigan domicile and has resided in Michigan 12 months immediately preceding his/her enrollment.

A student who was originally classified as an out-of-state student may be reclassified as an in-state student only if he/she has become a bona fide domiciliary of Michigan for at least 12 consecutive months, primarily as a permanent resident and not merely as a student. A student shall not be considered domiciled in Michigan unless he/she is in continuous physical residence in this state and intends to make Michigan his/her permanent home, not only while in attendance at the university, but indefinitely thereafter.

An alien who has been lawfully admitted for permanent residence in the United States shall not, by reason of that status alone, be disqualified from classification as a resident, provided, however, that aliens who are present in the United States on a temporary or student visa shall not be eligible for classification as a resident.

Any student who has acquired a bona fide domicile in Michigan subsequent to being classified as an out-of-state student may apply for reclassification to in-state status by obtaining an application for reclassification from the university registrar. The student shall complete the application and list in detail the reason(s) he/she is a bona fide domiciliary of Michigan, primarily as a permanent resident and not merely as a student, and attach documentary data in support thereof, and return the application to the university registrar 30 days prior to the beginning of classes of the semester or session for which the reclassification shall be effective. The following facts and circumstances, although not necessarily conclusive, have probative value in support of a claim of a residence reclassification:

1. Continuous presence in Michigan when not enrolled as a student.
2. Reliance upon Michigan sources for financial support.
3. Domicile in Michigan of family, guardian, or other relative or persons legally responsible for the student.
4. Former domicile in the state and maintenance of significant connections therein while absent.
5. Ownership of a home.
6. Long-term military commitments in Michigan.
7. Acceptance of offer of permanent employment in Michigan.
8. Other factors indicating an intent to make Michigan the student's permanent domicile will be considered by the university in reclassifying a student.

The following circumstances, standing alone, shall not constitute sufficient evidence of domicile to effect reclassification of a student as a resident under these regulations:

1. Voting or registering for voting.
2. Employment in any position normally filled by a student.
3. The lease of living quarters.
4. A statement of intention to acquire a domicile in Michigan.
5. Domicile in Michigan of student's spouse.

6. Automobile registration.
7. Other public records such as birth and marriage records.

Any student desiring to challenge his/her classification under the foregoing regulations of the board of trustees shall have the right to petition an appeal of the determination. Petitions of appeal and inquiries regarding these out-of-state regulations shall be addressed to chairperson, Out-of-State Tuition Committee.

Financial Aid, Assistantships, and Scholarships

Student loans

Federal Student Assistance Programs: National Direct Student Loans and College Work Study Program employment are offered on the basis of need. Loans have a low interest rate with a long repayment period. To be eligible for these programs a student must be able to prove need and must be (1) a U.S. citizen, or (2) have the status of an immigrant, or (3) possess a permanent visa. Application for federal student assistance should be made through the financial aid office after admission to a program.

Federally Insured Guaranteed Loan Program: This is a low-interest loan program with a long repayment period. Only U.S. citizens or those in immigrant or permanent visa status are eligible. Information may be obtained by writing the financial aid office.

Part-time employment

Although demand usually exceeds supply, on-campus jobs of varying kinds and durations are provided for full-time students who wish to work during the school year. Students seeking employment should register in the financial aid office. Most students who have part-time jobs work 10 to 20 hours each week. The student employment office also assists with part-time off-campus jobs.

Graduate assistantships and scholarships

A limited number of graduate assistants are appointed in schools and departments offering graduate degree programs. Stipends depend on assignments, hours of work required, and qualifications of the assistant. Scholarships in the amount of tuition are available on a competitive basis. Both assistantship and scholarship nominations are made by the individual departments offering graduate programs. International students are eligible to apply. Graduate assistants must be registered each fall and winter semester in which they hold assistantships. The assistantship and the program of study constitute a full-time commitment; therefore, no additional employment may be undertaken without the permission of the graduate dean.

Extremely well-qualified students are invited to apply to the Office of Graduate Study for consideration for the Bennett Scholarship in Chemistry, and for the Dean's Scholarship in Engineering. These awards will be granted to full-time students whose undergraduate records not only give evidence of exceptional past academic achievement, but promise future high accomplishment as well. All decisions will be based on a student's complete record, including grades, courses taken, test scores, letters of recommendation, and a personal interview.

Assistants are paid one-fourth of the semester stipend at the end of each month. The first payment in the fall semester is on September 30, the first in the winter semester is on January 31. International students should be aware that they will need approximately \$800 to cover their expenses until the end of the first month.

Placement and career services

The Department of Placement and Career Services provides individual career counseling to all juniors, seniors, graduate students and alumni. Special seminars are conducted by staff members to assist all students in developing job search skills. The department provides a variety of career day programs throughout the academic year. During the fall and winter semesters, the department hosts employers who interview and recruit seniors on campus. Career-related job vacancy announcements are maintained on an ongoing basis.

Occupational guidance and counseling materials, and an extensive library of graduate and professional school catalogs are available to students in the department's career libraries. Forms for the following examinations are provided: Graduate Record Exam, Law School Admission Test, Medical College Admission Test, and Graduate Management Admission Test.

The Department of Placement and Career Services administers the Fulbright-Hayes Grants for Graduate Study Abroad Program and the Rhodes Scholarship Program.

COLLEGE OF ARTS AND SCIENCES

Dean: *Brian P. Copenhaver*

Office of the Dean: *Isaac Eliezer, associate dean*

The Doctor of Philosophy in Biomedical Sciences

Biomedical Sciences Doctoral Program Committee: *Isaac Eliezer, associate dean, chair; Frank M. Butterworth, Professor of Biological Sciences; Michael D. Sevilla, Professor of Chemistry; Norman Tepley, Professor of Physics and Medical Physics*

The College of Arts and Sciences offers a doctoral program in the biomedical sciences with specializations in cellular biology of aging, health and environmental chemistry, and medical physics.

Specialization in cellular biology of aging

Graduates of the biomedical sciences doctoral program with a specialization in cellular biology of aging will be capable of investigating research problems in this broad area using modern techniques of cellular and molecular biology. They will have training to conduct research on the causes and mechanisms of the aging process and diseases and other problems of the aged. No other doctoral program in the state of Michigan specifically focuses on these areas of the aging process. Training of doctoral level scientists to conduct research on the problems associated with aging and the process of aging is critical since in the near future a large proportion of the American population will consist of individuals in their seventies and eighties.

Specialization in health and environmental chemistry

The health and environmental chemistry specialization of the biomedical sciences doctoral program requires a strong academic background in the physical sciences. Graduates will have completed a unified program of formal course work as well as independent research. Graduates will possess the theoretical background and practical skills necessary for successful contribution to the solution of environmental and health-related chemical problems. Scientists who graduate with this specialization will be capable of applying state-of-the-art methods to the detection, quantification, and management of a wide variety of naturally occurring and synthetic chemical substances and the related chemical processes. No other doctoral program in Michigan focuses on these particular areas of chemistry, yet the contribution of highly trained doctoral-level scientists is essential to the resolution of major problems facing the nation in these areas.

Specialization in medical physics

Medical physicists are providing primary contributions to advances in diagnostic and therapeutic medicine. Laser surgery, ultrasonics, nuclear medicine, radio-therapy, and nuclear magnetic resonance imaging are examples of medical modalities developed and implemented by medical physicists. The medical physics specialization of the biomedical sciences doctoral program is designed for students who plan careers in medical research in industrial, hospital, and academic settings. The curriculum is designed to prepare the student to engage in research in areas of physics applied

to medicine. Ph.D. candidates may elect to do their research either with one of a number of Oakland University faculty currently involved in biomedical research or with one of the scientists in area hospitals which collaborate closely with the university. Among these are Henry Ford Hospital, Detroit; Sinai Hospital, Detroit; and William Beaumont Hospital, Royal Oak.

Biomedical sciences doctoral program committee

The program committee appointed by the dean of Graduate Study on recommendation from the dean of the College of Arts and Sciences, consists of one faculty member from each of the specialization areas as well as the coordinator of graduate programs in the College of Arts and Sciences who serves as chair of the program committee. The program committee advises the dean of Graduate Study on admission of students, selection of student committees, proposals for changes in degree requirements, and approval of doctoral dissertations.

Specialization committees

Three specialization committees, appointed by the dean of Graduate Study on recommendations from the chairs of the Biological Sciences, Chemistry, and Physics departments, are responsible for preliminary screening of applications for admission, preliminary approval of dissertation committees, approval of course selections by each student, certification of fulfillment of proficiency requirements by each student, administration and grading of preliminary examinations for each student, and proposal of any modifications in degree requirements for students in that specialization. Each specialization committee appoints specific faculty members to advise each incoming student selecting that specialization until the student's dissertation committee is established.

Dissertation committee

A dissertation committee consisting of at least three members, one of whom will serve as thesis adviser, will be chosen by the specialization committee and the student in question and approved by the dean of Graduate Study. The student's adviser will be chairperson of the committee. The committee is charged with the guidance of the student in course selection, review of thesis proposals before initiation of a project, and approval of the completed dissertation.

Admissions

Students will be considered for admission if they hold baccalaureates in biology, chemistry, mathematics, physics, engineering, or other disciplines related to a program specialization. Admission is highly selective; the prospective student should submit a graduate application, official transcripts from all colleges and universities previously attended, letters of recommendation from three faculty members capable of evaluating scholarly achievements and potential for independent research, and results of the Graduate Record Examination including the subject test appropriate to the desired specialization.

Requirements for the degree

The basic requirements for the Ph.D. in biomedical sciences are completion of a unified program of formal course work and independent research approved by the candidate's dissertation committee and the appropriate specialization committee. All requirements for the degree must be completed within seven years from the time of admission to the program.

Proficiency of entering students: Each student entering the program must dem-

onstrate proficiency in specific areas of course work. Upon entering the program the student must consult with the appropriate specialization adviser who will plan a program of course work to eliminate any deficiencies in the student's preparation. Proficiency is defined as satisfactory knowledge of course work equivalent to the following Oakland University courses: For students in Cellular Biology of Aging, Physiology (BIO 321), biochemistry (BIO 407, BCM 453 or 454), genetics (BIO 341), developmental biology (BIO 323), and statistics (STA 226). Students in the Health and Environmental chemistry specialization must establish proficiency in computer programming and in analytical chemistry (CHM 426), biochemistry (CHM 454), inorganic chemistry (CHM 463), organic chemistry (CHM 235), and physical chemistry (CHM 343). Students in the Medical Physics specialization must establish proficiency in modern physics (PHY 371), physical chemistry (CHM 343), and in at least three of the following: computer programming, differential equations (APM 257), electronics (PHY 341, 347), electricity and magnetism (PHY 381), physiology (BIO 207 or BIO 321), and statistics (STA 226).

In every case the appropriate specialization committee will approve course programs and will certify the student's proficiency in these subject areas.

Preliminary examination: Within two years after admission into the program the student must pass a comprehensive written and oral examination. The examination is intended to determine the extent of the student's knowledge and fitness for the doctoral degree and will be designed and evaluated by the specialization committee. If the student does not pass the examination, the specialization committee may allow the student to retake the examination in the next semester. Failure to pass the examination within two attempts shall constitute failure in the Ph.D. program.

Research and dissertation: An integral and major component of the program is the successful completion of original research utilizing state-of-the-art experimental or theoretical methods to study a problem of current interest. Each student shall, in consultation with his/her adviser, prepare: a dissertation proposal outlining the problem to be studied, a survey of the appropriate literature, a description of the appropriate techniques, and an outline of the experiments to be performed. The student shall, at the request of the dissertation committee, orally defend the proposal or elaborate on the methods for data collection and analysis. Approval of the proposal by the committee is required prior to commencing research. The project shall be deemed ready for preparation of dissertation at such time as the student's committee agrees that the student has completed the project and that the student is an expert in the use of the specific methods required by the project. At that time, the student shall prepare a doctoral dissertation for submission to the committee and shall defend the dissertation in a public oral examination conducted by the committee and attended by the specialization committee. Acceptance of the dissertation by the dean of Graduate Study requires favorable recommendations by the dissertation and specialization committees.

Residence: All students are required to fulfill a residency requirement for this program. Although students may complete some of the program on a part-time basis, continuous full-time enrollment is highly preferred. The minimal residency requirement shall be full-time residency (12 credits per semester) for at least three consecutive full semesters (spring-summer terms are considered a full semester), with at least two of these devoted primarily to the student's research project.

Credit requirement: A minimum of 90 credits beyond the baccalaureate is required including at least 30 credits of dissertation research. Transfer credits must meet graduate level requirements and receive approval by the appropriate specialization committee and the dean of Graduate Study. All courses taken by each student must be approved by a specialization committee. Each specialization has a set of required areas of graduate level proficiency and may also require a minimum number of hours of elective courses. Specific requirements for each specialization are shown under the departmental sections.

DEPARTMENT OF BIOLOGICAL SCIENCES

Chairperson: Nalin J. Unakar

Professors:

Frank M. Butterworth, Ph.D., *Northwestern University*
 Egbert W. Henry, Ph.D., *The City University of New York*
 John R. Reddan, Ph.D., *University of Vermont*
 Arun K. Roy, Ph.D., *Wayne State University*
 Nalin J. Unakar, Ph.D., *Brown University*

Associate professors:

John D. Cowlshaw, Ph.D., *Pennsylvania State University*
 Esther M. Goudsmit, Ph.D., *University of Michigan*
 Robert D. Hunter, Ph.D., *Syracuse University*
 Paul A. Ketchum, Ph.D., *University of Massachusetts*
 Charles B. Lindemann, Ph.D., *State University of New York at Albany*
 Virinder K. Moudgil, Ph.D., *Banaras Hindu University*
 Asish C. Nag, Ph.D., *University of Alberta*

Assistant professors:

Keith A. Berven, Ph.D., *University of Maryland*
 George J. Gamboa, Ph.D., *University of Kansas*
 Sheldon R. Gordon, Ph.D., *University of Vermont*
 Thaddeus A. Grudzein, Jr., Ph.D., *Virginia Polytechnic Institute and State University*
 Fay M. Hansen-Smith, Ph.D., *Medical College of Wisconsin*
 Satish K. Walia, Ph.D., *Mahrishi Dayanand University*
 Jon A. Yates, Ph.D., *Tulane University*

Adjunct professors:

Clifford V. Harding, Ph.D., *University of Pennsylvania*
 James R. Wells, Ph.D., *Ohio State University*

Adjunct assistant professor:

Naomi Eliezer, Ph.D., *Hebrew University (Jerusalem)*

Consulting professor:

Julius Rutzky, M.D., *New York University*

The Doctor of Philosophy in Biomedical Sciences: Cellular Biology of Aging

Coordinator: Frank M. Butterworth

The College of Arts and Sciences offers a biomedical sciences doctoral program with a specialization in cellular biology of aging which is centered in the Department of Biological Sciences.

Graduates of the program will be capable of investigating research problems in this broad area using modern techniques of cellular and molecular biology. They will have training to conduct research on the causes and mechanisms of the aging process, and diseases and other problems of the aged. No other doctoral program in the state of Michigan specifically focuses on these areas of the aging process. Training of doctoral

level scientists to conduct research on the problems associated with aging and the process of aging is critical since in the near future a large proportion of the American population will consist of individuals in their seventies and eighties.

Required areas of graduate level proficiency

Areas of graduate level proficiency required for the cellular biology of aging specialization are cellular biochemistry, cell physiology, developmental biology and morphology, aging and gerontology, and genetics. Students will typically meet these proficiencies by completing BIO 511, 513, 515, 517, 721, 722, 723, and 751. Six credits of doctoral seminar and eight credits of advanced course work related to the dissertation are required.

For information on admission criteria, procedures and general degree requirements see page 30.

The Master of Science in Biology

The program leading to a Master of Science provides advanced training to students seeking employment in biological disciplines or teaching. The Master of Science also prepares students for entrance into Ph.D. programs.

The Master of Science program consists of two tracks, the cellular molecular biology track for those students interested in organ systems or lower levels of biological organization and the ecology, evolution, and behavior track for students interested in whole organisms or higher levels of biological organization. The graduate program affords students the uncommon opportunity to interact closely with the biology faculty during their master's preparation.

Admission

Admission to the program requires a bachelor's degree or its equivalent from an accredited institution and an undergraduate grade point average of 3.00 or better (on a 4.00 scale). Exceptions to this requirement may be made if evidence of the capacity for graduate study is provided. Students should have completed at least 20 credits in biology, 8 credits in mathematics, 8 credits in physics, and 15 credits in chemistry. Students with deficiencies in these areas may be conditionally admitted with the understanding that the deficiencies will be corrected. Applicants must send, together with their application, a biographical sketch stating career goals and have sent transcripts of all college-level work, two letters of reference, and scores on the Graduate Record Examination (including the subject test in biology) to the admission office.

Requirements for the degree

The candidate for the cellular/molecular biology track must complete 36 credits (16 of which must be in courses numbered 500 and above) including at least 4 credits in each of the four areas (developmental biology-morphology, bio-chemistry-biophysics, cell physiology, and genetics). At least 8 credits must be a combination of credits received in graduate laboratory courses and credits received in graduate research (BIO 690).

The candidate for the ecology, evolution, and behavior track must complete 36 credits: 8 credits of graduate research (BIO 690), four 3-credit topics courses (BIO 581, 582, 583, 584) or their equivalents as approved by the student's thesis committee, 4 credits of a 500-level biology course (not BIO 581-584) or its equivalent as determined by the student's thesis committee, and 12 credits of biology courses and cognates. Students, with the advice and consent of their committee, may select cognate courses

in statistics, computer science, chemistry, mathematics, psychology, education, and environmental science.

A thesis proposal and a thesis are required for both the cellular/molecular biology track and the ecology, evolution, and behavior track and must be approved by a thesis committee and the department graduate committee. The thesis proposal must be approved by both committees before the end of the student's second semester. Students of both tracks must attend department seminars each semester.

Research areas and facilities

The department, housed in Dodge Hall of Engineering, is engaged in a variety of research programs including cellular aging, sperm motility, aquatic biology, hormone action, microbiology, insect behavior, vertebrate ecology, plant ecology, physiology of the eye, cell physiology, and gene regulation. Available facilities include a largely natural 1,500-acre campus, electron microscopy laboratory, isotope laboratory, dark rooms, x-ray facilities, herbarium collection, greenhouse, animal facilities, cold rooms, tissue culture rooms, environmental growth chambers, and gene cloning facilities. Available equipment includes scintillation counters, field sampling and testing equipment, recording spectrophotometers, amino acid analyser, clinical and ultracentrifuges, high speed cine camera and motion analyser, Honeywell multics time-sharing computer, marine aquaria, telethermometers, autoclaves, and electrophoresis apparatus. In addition, facilities at the Cranbrook Institute of Science may be utilized by Oakland graduate students. These facilities include systematic collections of plants, birds, mammals, and insects as well as laboratory equipment and space for ecological research.

Course Offerings

Selected 300-level courses recommended to the student by the departmental graduate committee may carry graduate level credit.

BIO 401 Advanced Human Physiology (4)

Lectures and discussion emphasizing the human organism and the experimental basis for current concepts and techniques. Topics include: reproduction, circulation, respiration, electrophysiology, and cellular mechanisms in physiological processes.
Prerequisite: BIO 207 or 321.

BIO 407 Cellular Biochemistry (4)

Advanced discussion on cellular control mechanisms emphasizing recent developments in the biochemistry of proteins and nucleic acids.
Prerequisite: BIO 325, CHM 304, and PHY 102.

BIO 408 Cellular Biochemistry Laboratory (1)

Introduction to modern research techniques in biochemistry. Laboratory work will include different chromatographic techniques (paper, column, thin layers, etc.), electrophoresis and immunoelectrophoresis, ultracentrifugation and cell fractionation, isolation and density gradient analysis of proteins and nucleic acids, etc.
Corequisite: BIO 407.

BIO 421 Medical Microbiology (4)

Biology of microorganisms in major infectious diseases. Topics include the etiology, epidemiology, physiology, pathogenesis, diagnosis, and control of these microorganisms.
Prerequisite: BIO 319.

BIO 422 Medical Microbiology Laboratory (2)

To accompany BIO 421.

BIO 423 Immunology (3)

An introduction to immunology with emphasis on practical applications. Topics include (but are not limited to) immunobiology, immunochemistry, serology, hypersensitivity (allergy), autoimmune disease, transplantation, and tumor immunology.

BIO 425 Biophysics (4)

The physical basis of biological phenomena, and the nature of biophysical theories. Biological structure and function are studied in the context of hierarchical, cybernetic systems theory. Offered winter semester of alternate years.

Prerequisite: BIO 325 or equivalent, calculus, and general physics.

BIO 426 Biophysics Laboratory (1)

To accompany BIO 425.

BIO 429 Cytochemistry (4)

A survey of techniques currently used in microscopy to analyze the distribution and quantity of specific chemicals within cells and their organelles. Techniques include: specific staining reactions, enzyme digestion, metabolic inhibition, and autoradiography.

Prerequisite: BIO 305 and 306. Corequisite: BIO 430.

BIO 430 Cytochemistry Laboratory (2)

Individual research projects employing cytochemical techniques to study and compare the chemical compositions of several types of cells.

Corequisite: BIO 429.

BIO 433 Advanced Microbiology (4)

A study of the classification, morphology, and physiology of microorganisms.

Prerequisite: BIO 319 and CHM 303. Corequisite: BIO 434.

BIO 434 Advanced Microbiology Laboratory (2)

Selective enrichment, isolation, and characterization of microorganisms from natural sources.

Corequisite: BIO 433.

BIO 435 Developmental Genetics (4)

An integrated discussion of the concepts of modern aspects of genetics derived from molecular and microbial systems, and their application to problems of development in multicellular organisms. Offered fall semester.

Prerequisite: BIO 325 and 341 or equivalent.

BIO 436 Developmental Genetics Laboratory (1)

To accompany BIO 435.

BIO 439 Biochemistry of the Gene (4)

Biochemistry and expression of the eukaryotic gene with emphasis on recent developments in gene cloning, expression of cloned genes, and applications of recombinant DNA technology in biology and medicine.

Prerequisite: BIO 407 or CHM 453.

BIO 440 Biochemistry of the Gene Laboratory (2)

Laboratory exercises and short projects involving nucleic acids and protein synthesis. Specific experiments include isolation and characterization of RNA and DNA, translation of mRNA and enzymology of nucleic acids.

Corequisite: BIO 439.

BIO 445 Ultrastructure (4)

A consideration of the fine structure of cells and cell products as revealed by electron microscopy and other procedures. Offered winter semester.

Prerequisite: BIO 305 and permission of instructor.

BIO 446 Ultrastructure Laboratory (2)

To accompany BIO 445.

BIO 460 Neuroanatomy (4)

The brain, brain stem, spinal cord and their associated structures are considered with respect to their gross external and internal morphology, development, function, and the integration of these functions in motor activity. Certain lesions and their clinical significance will be discussed.
Prerequisite: BIO 205 or 381 or permission of instructor.

BIO 463 Cell Biology (4)

Prerequisite: BIO 305 and permission of instructor.

BIO 464 Cell Biology Laboratory (1)

To accompany BIO 463.

BIO 511 Advanced Topics in Cellular Biochemistry and Biophysics (4)

A discussion and lecture course offered by faculty members with research interests in biophysics and biochemistry. Topics will be announced.

BIO 512 Graduate Tutorial Lab in Cellular Biochemistry and Biophysics (2)

Techniques course offered to small groups of students in faculty research laboratories.
Corequisite: BIO 511.

BIO 513 Advanced Topics in Cell Physiology (4)

A discussion and lecture course offered by faculty members with research interests in cell physiology. Topics will be announced.

BIO 514 Graduate Tutorial Lab in Cell Physiology (2)

Techniques course offered to small groups of students in faculty research laboratories.
Corequisite: BIO 513.

BIO 515 Advanced Topics in Developmental Biology and Morphology (4)

A discussion and lecture course offered by faculty members with research interests in developmental biology and morphology. Topics will be announced.

BIO 516 Graduate Tutorial Lab in Developmental Biology and Morphology (2)

Techniques course offered to small groups of students in faculty research laboratories.
Corequisite: BIO 515.

BIO 517 Advanced Topics in Genetics (4)

A discussion and lecture course offered by faculty members with research interests in genetics. Topics will be announced.

BIO 518 Graduate Tutorial Lab in Genetics (2)

Techniques course offered to small groups of students in faculty research laboratories.
Corequisite: BIO 517.

BIO 581 Topics in Physiological Ecology (3)

Physiological responses of individual organisms and populations to their environment including nutrition, growth, regulation of internal environment, adaptations, bioenergetics, and chemical ecology.

BIO 582 Topics in Evolutionary Biology (3)

Advanced topics in evolutionary biology including evolutionary rates, the nature of selection, adaptation, macroevolution, the application of molecular biology to evolution, and philosophical issues of evolution.

BIO 583 Topics in Community and Population Biology (3)

Analytic and synthetic approaches to the biology of populations and communities utilizing both plant and animal studies. Topics will include population genetics, growth and regulation, inter- and intraspecific competition, predator-prey interactions, community structure and species diversity.

Prerequisite: One course in ecology or evolution.

BIO 584 Topics in Behavioral Biology (3)

The ecology, evolution, genetics and physiology of behavior, especially social behavior. Topics will include kin recognition, mate choice, dominance hierarchies, and the mechanisms by which societies are organized.

Prerequisite: BIO 353.

BIO 690 Graduate Research (1 to 8)

Research credits limited to graduate students in the biological sciences. This research will serve as the basic course leading to the preparation of a thesis.

BIO 721 Cellular Biology of Aging (4)

An advanced-level discussion of cellular aging. The specific areas to be covered include: theories of cellular aging, age-related changes in the subcellular structures; genetic basis of cellular aging; aging and immune response; hormones and aging.

Prerequisite: BIO 407 or equivalent.

BIO 722, 723 Techniques in Cellular and Molecular Biology (4 each)

Laboratory exercises in the state-of-the-art techniques which are commonly used to study cell and molecular biology. Two-session continuing courses will be held during the spring and summer sessions, respectively. The courses will deal with theory and practice of various electrophoretic and chromatographic techniques; high speed centrifugation; cell culture and immunofluorescence; electron microscopy and ultrastructural analysis; and cultivation, isolation, and characterization of plasmids and bacteriophages.

Prerequisite: Two-semester undergraduate laboratory work in biochemistry and/or molecular biology.

BIO 751 Biology of Aging and Gerontology (4)

A discussion of the various biological aspects of the process of aging and senescence. The topics to be covered include origin, evolution, nature and causes of aging; theories of aging; organismic, organic and cellular death; role of environment and nutritional factors in aging; changes in the reproductive and circulatory systems in the aging human; exercise and aging; pathological changes in the brain and other vital organs during senescence.

Prerequisite: BIO 321 or equivalent.

BIO 781 Seminar on Aging (2)

Discussion of recent developments in the field of aging research.

Prerequisite: Permission of the instructor.

BIO 799 Doctoral Research (1, 2, 4, 6, 8)

DEPARTMENT OF CHEMISTRY

Chairperson: Paul Tombouliau

Professors:

Gottfried Brieger, Ph.D., University of Wisconsin
 Denis M. Callewaert, Ph.D., Wayne State University
 George Dahlgren, Ph.D., University of Wyoming
 Isaac Eliezer, Ph.D., Hebrew University (Jerusalem)
 Kenneth M. Harmon, Ph.D., University of Washington
 Joel W. Russell, Ph.D., University of California (Berkeley)
 Parbury P. Schmidt, Ph.D., University of Michigan
 Michael D. Sevilla, Ph.D., University of Washington
 R. Craig Taylor, Ph.D., Princeton University
 Paul Tombouliau, Ph.D., University of Illinois

Associate professors:

Bandana Chatterjee, Ph.D., University of Nebraska (Lincoln)
 Julien Gendell, Ph.D., Cornell University
 Tadeusz Malinski, Ph.D., University of Poznan (Poland)
 Steven R. Miller, Ph.D., Massachusetts Institute of Technology
 Kathleen Moore, Ph.D., Wayne State University
 Robert L. Stern, Ph.D., Johns Hopkins University

Assistant professors:

Mark W. Severson, Ph.D., University of Minnesota
 Paul Pappalardo, Ph.D., Indiana University

Adjunct professor:

Philip Weiss, Ph.D., New York University

Adjunct associate professor:

David Becker, Ph.D., University of Washington

The Doctor of Philosophy in Biomedical Sciences: Health and Environmental Chemistry

Coordinator: Michael D. Sevilla

The College of Arts and Sciences offers a biomedical sciences doctoral program with a specialization in health and environmental chemistry which is centered in the Department of Chemistry. The program requires a strong academic background in the physical sciences. Graduates will have completed a unified program of formal course work as well as independent thesis research and will possess the theoretical background and practical skills necessary for successful contribution to the solution of environmental and health-related chemical problems. Scientists who graduate with this specialization will be capable of applying state-of-the-art methods to the determination, quantification, and management of a wide variety of naturally occurring and synthetic chemical substances and the related chemical processes. No other doctoral program in Michigan focuses on these particular areas of chemistry; yet the contribution of highly trained doctoral-level scientists is essential to the resolution of major problems facing the nation in these areas.

Required areas of graduate level proficiency

Areas of graduate level proficiency required for the health and environmental chemistry specialization are analytical chemistry, biochemistry, instrumentation, and toxicology. Students will typically meet these proficiencies by taking CHM 521, 522, 553, 581, and ENV 484 and 486. Four credits of doctoral seminar and twelve credits of advanced course work related to the thesis topic are required.

For information on admission criteria, procedures and general degree requirements see page 30.

The Master of Science in Chemistry

The Master of Science in chemistry can be viewed as either a terminal or an intermediate degree. By itself it serves as preparation for employment in chemical and related industries, a wide range of government agencies, and two-year college teaching. It also prepares the student for further study toward advanced degrees in chemistry, oceanography, medicine, environmental sciences, and related fields. The program is designed for full-time students, but provision is made for part-time students who can arrange to include the research component during the daytime. Courses taken without the program adviser's approval may be excluded from those to be applied toward the degree.

Admission

An applicant for admission to regular status in the Master of Science program should have received a bachelor's degree within the past five years from an accredited institution. Students should have completed at least 36 credits in chemistry, 12 credits in mathematics (8 credits in calculus and 4 credits in an approved mathematics course), and 8 credits in physics. Students with deficiencies in these areas may be asked to correct those deficiencies. A grade point average of at least 3.00 (on a 4.00 scale) in these courses is usually required, but applicants will be considered on their individual merits upon recommendation of persons familiar with each applicant's academic background. The Graduate Record Examination may be required, especially if the applicant does not hold an American degree.

Applicants who do not meet the above requirements may be admitted with probationary status, into special graduate status, or into post-baccalaureate status.

Requirements for the degree

The candidate for the degree of Master of Science in chemistry must complete the following requirements: 32 credits in courses carrying graduate credit, of which 26 credits must be in chemistry. Of these 26 credits, 16 to 18 must be from four of the following areas: biochemistry, inorganic chemistry, organic chemistry, physical chemistry, and analytical chemistry. At least 8 credits must be in CHM 690. Participation in departmental seminars is expected. The candidate must have demonstrated accomplishment in research and must complete a thesis approved by a departmental thesis committee before receiving the degree. Since the degree is awarded for attaining a level of proficiency and maturity, no minimum amount of time can be specified for the degree program. Students working on a continuing research project should be registered concurrently for at least one credit of CHM 690.

Research fields

Because graduate work in chemistry involves research and presentation of a master's thesis, the programs, facilities, and staff available are important. The various cur-

rent research activities of the staff include high-resolution infrared spectroscopy, photochemistry of natural products, biochemistry, electron spin resonance of solid-state and biological systems, quantum mechanical models, organoboranes, ionic aromatic polymers, gas reaction kinetics, molecular structure and dynamics, limnological chemistry, instrumentation design, theoretical quantum mechanics, non-equilibrium statistical mechanics, lanthanide shift reagents, organophosphorus chemistry, coordination chemistry, kinetics and thermodynamics of rearrangement processes in solution, electrochemistry, and relaxation techniques for slow proton transfers.

Course Offerings

(400-level courses may count for credit in a graduate program only with permission of the program adviser.)

CHEMISTRY

CHM 400 Seminar (0)

Discussions of recent advances and topics of current interest; reports. Graded S/U.

CHM 426 Instrumental Analysis (3)

Theory and application of modern instrumental techniques including spectroscopy, radiochemical methods, x-ray methods, surface analysis, NMR, mass spectrometry, electroanalytical methods, gas and liquid chromatography, and hyphenated methods.

Prerequisite: CHM 225 and CHM 343.

CHM 427 Electrochemistry (3)

Survey of electroanalytical and spectroelectrochemical methods. Includes microelectrodes and selective electrodes in bioelectrochemistry as well as electrical phenomena of the biological membrane level.

Prerequisite: CHM 225.

CHM 444 Physical Chemistry III (3)

Introduction to statistical mechanics. Applications of quantum and statistical mechanics to chemical bonding, molecular structure, and spectroscopy.

Prerequisite: CHM 343 and an approved APM course.

CHM 453-454 Biochemistry (3 each)

A comprehensive introduction to molecular biology and biochemistry, including the structure and function of nucleic acids, proteins, enzymes, carbohydrates and lipids, enzyme kinetics, metabolism, and metabolic controls.

Prerequisite: CHM 204 or 235.

CHM 457 Biochemistry Laboratory (1 or 2)

Techniques of extraction, separation, identification, and quantification of biomolecules, including electrophoresis, chromatography, and radioisotope techniques, with emphasis on mathematical treatment of experimental data.

Prerequisite or corequisite: CHM 453.

CHM 458 Biochemistry Projects (2)

Advanced project-oriented instruction in biochemical laboratory techniques.

Prerequisite: CHM 457 and permission of instructor.

CHM 462-463 Inorganic Chemistry (2 each)

Structure, bonding, and reactivity of inorganic compounds, with emphasis on transition metals and selected main group elements.

Prerequisite: CHM 342.

CHM 466 Inorganic Synthesis Laboratory (2)

Synthesis, analysis and characterization of inorganic and organometallic compounds.

Prerequisite: CHM 238; Corequisite: CHM 462.

CHM 470 Industrial Chemistry (3)

Survey of the major sources and uses of chemicals, industrial chemical processes, and fundamental raw materials. Includes discussion of organization, economics, communication, patents, and governmental regulation in the chemical industry.

Prerequisite: CHM 235.

CHM 471 Macromolecular Chemistry (3)

Preparation, properties, and structure of selected inorganic and organic polymers. Both chemical theory and technological applications will be discussed.

Prerequisite: CHM 204 or 235.

CHM 472 Mechanical Properties of Polymers (3)

Relationship between structure and mechanical behavior for polymeric, polymer-reinforced, and composite materials.

Prerequisite: CHM 204 or 235, and 471.

CHM 477 Macromolecular Laboratory (2)

Introduction to the synthesis and physical characterization of synthetic polymers.

Prerequisite: CHM 238.

CHM 480 Selected Topics (1, 2, 3, or 4)

Advanced study in selected areas; normally involves preparation of a term paper or presentation of a seminar. May be repeated for credit.

Prerequisite: Permission of instructor.

CHM 486 Physical-Analytical Projects (1 or 2)

Advanced experimentation in physical or analytical chemistry, with at least four hours per week per credit.

Prerequisite: Permission of instructor.

CHM 487 Synthesis Projects (1 or 2)

Advanced synthesis work emphasizing modern techniques, with at least four hours per week per credit.

CHM 521 Advanced Analytical Chemistry (3)

Detailed treatment of theory and applications of modern analytical methods.

Prerequisite: CHM 225 and 342.

CHM 522 Topics in Analytical Chemistry (3)

Selected subjects chosen from current analytical chemical areas, such as separation methods, instrumentation, and electrochemistry.

Prerequisite: CHM 225 and 342.

CHM 534 Advanced Organic Chemistry (3)

Detailed discussion of aspects of modern synthetic methods, stereochemistry, and reaction mechanisms.

Prerequisite: CHM 235.

CHM 535 Topics in Organic Chemistry (3)

Selected subjects drawn from modern research fields.

Prerequisite: CHM 235.

CHM 540 Symmetry in Chemistry (3)

Detailed treatment of point group symmetry. Chemical applications of group theory with special emphasis on MO and VB theory, ligand field theory, and vibrational and electronic spectroscopy.

Prerequisite: CHM 343.

CHM 541 Advanced Physical Chemistry (3)

Application of quantum mechanics and statistical mechanics to chemical kinetics, molecular structure, and molecular spectroscopy.

Prerequisite: CHM 444.

CHM 542 Topics in Physical Chemistry (3)

Selected topics drawn from current areas of interest, such as quantum mechanics, statistical mechanics, thermodynamics, spectroscopy, kinetics, and group theory.

Prerequisite: CHM 343.

CHM 553 Advanced Biochemistry (3)

Detailed treatment of aspects of biochemistry.

Prerequisite: CHM 454.

CHM 554 Topics in Biochemistry (3)

Selected subjects drawn from the current fields of interest.

Prerequisite: CHM 454.

CHM 563 Advanced Inorganic Chemistry (3)

Detailed treatment of the chemistry of the elements.

Prerequisite: CHM 462.

CHM 564 Topics in Inorganic Chemistry (3)

Selected topics chosen from current areas of interest, such as transition metal chemistry, boron chemistry, ligand field theory, and organometallic chemistry.

Prerequisite: CHM 462.

CHM 581 Biochemical Toxicology (3)

Systematic treatment of toxicological principles at cellular and biochemical levels. Emphasis is on mammalian toxicology, including: uptake and distribution; activation and metabolism; modes of action; theories of carcinogenesis and mutagenesis.

Prerequisite: ENV 484 or 486; CHM 454; physiology desirable.

CHM 685 Seminar in Health and Environmental Chemistry (1)

Weekly seminars dealing with current issues and literature in health and environmental areas. Graded S/U.

CHM 690 Master's Thesis Research (1, 2, 3, 4, 5, 6, or 8)

Prerequisite: Permission of department. Graded S/U.

CHM 799 Doctoral Research in Chemistry (1, 2, 3, 4, 5, 6, or 8)

Prerequisite: Permission of department. Graded S/U.

ENVIRONMENTAL STUDIES**ENV 484 Environmental Toxicology (3)**

Principles of toxicology applied to a variety of biological systems: exposure, toxokinetic, and toxicodynamic phases; dose-effect relationships; factors influencing toxicity. Environmental partitioning, pathways, transformations, and fate.

Prerequisite: BIO 190, BIO 200; CHM 204 or 234.

ENV 486 Toxic Substance Control (3)

Quantification and management of toxic substances, including production, use, distribution, exposure, and control. Risk assessment and regulatory strategies will be emphasized.

Prerequisite: BIO 190, BIO 200; CHM 204 or 234.

DEPARTMENT OF ENGLISH

Chairperson: Robert T. Eberwein

Professor Emerita:

Gertrude M. White, Ph.D., University of Chicago

Professors:

Joseph W. DeMent, Ph.D., Indiana University

Jane D. Eberwein, Ph.D., Brown University

Robert T. Eberwein, Ph.D., Wayne State University

Thomas Fitzsimmons, M.A., Columbia University

James F. Hoyle, Ph.D., Princeton University

Donald E. Morse, Ph.D., University of Connecticut

William Schwab (Linguistics and English), Ph.D., University of Wisconsin

Helen J. Schwartz, Ph.D., University of Washington

Associate professors:

Robert L. Donald, M.A., University of Detroit

Daniel H. Fullmer (Linguistics and English), Ph.D., University of Michigan

Nigel Hampton, Ph.D., University of Connecticut

David W. Mascitelli, Ph.D., Duke University

Brian F. Murphy, Ph.D., University of London

Joan G. Rosen, M.A., Wayne State University

Mark E. Workman, Ph.D., University of Pennsylvania

Assistant professors:

Susan E. Hawkins, Ph.D., University of Oregon

Bruce J. Mann, Ph.D., University of Michigan

Melodie Monahan, Ph.D., University of Rochester

Laurie E. Osborne, Ph.D., Syracuse University

The Department of English offers programs leading to the degrees of Master of Arts in English and Master of Arts in Teaching in English. The latter program is jointly sponsored by the College of Arts and Sciences and the School of Human and Educational Services.

Admission

Admission to the department's advanced degree programs is selective. Chief qualifications are a Bachelor of Arts degree from an accredited institution and academic ability as indicated by the applicant's past record. Applicants must also explain in a brief statement their reasons for wishing to pursue the advanced study of literature and language. An English major, as such, is not regarded as indispensable background, but a substantial number of undergraduate English courses will normally be expected to appear in the applicant's record. Evidence of additional reading in the literature of history, philosophy, and theology is welcome; prior study in linguistics and philology is also recommended.

All entering graduate students must meet minimal university graduate admission standards. All will be enrolled conditionally until they are admitted by the department to degree candidacy. Consideration for candidacy comes after the student has successfully completed 16 credits of graduate work at Oakland University including at least 8 credits in the Department of English. Normally, all courses offered toward candidacy

must be completed with grades of 3.0 or better. Two grades below 3.0 will automatically render a student subject to evaluation and possible dismissal, as will one grade below 2.5. The Master of Arts in Teaching candidate must also receive the approval of the School of Human and Educational Services before candidacy is granted. A maximum of 8 credits earned at Oakland University while a student is in special graduate status will be accepted toward the degree. No transfer credits will be evaluated until a student is admitted to degree candidacy.

When students of specially recommended ability, but with insufficient background — in extent or balance of previous studies — are admitted, they will be advised to improve their preparation and will usually be asked to take an appropriate number of departmental undergraduate courses before commencing graduate work. Accordingly, their degree programs may require a proportionately longer period to complete.

Students in either the M.A. or M.A.T. program whose undergraduate records show no course in English language or linguistics may be asked to include one such course among their graduate undertakings.

Enrollment for all courses is subject to the written approval of the chairperson or a graduate adviser.

The Master of Arts in English

The program leading to the degree of Master of Arts in English provides training for students interested in increasing their proficiency in the study of English and American literature and language.

The basic curriculum emphasizes major critical approaches rather than specialization within historical periods. Opportunity is offered for scholarly, pedagogical, and creative application of such approaches to literature and language. The program serves the needs of those whose eventual goal is the Ph.D. degree; those who teach in secondary schools and who are preparing to teach in junior and community colleges; and those seeking an opportunity to enhance their analytical skills as they study literature from multiple perspectives.

Requirements for the degree

Nine courses are required (36 credits), five of which must be ENG 533, a course in literary history (ENG 543, 544, 545, or 546), a course in literary kinds (ENG 563, 564, 565, or 566), and two courses at the 600 level. The four additional courses are to be chosen in consultation with the student's program adviser. Within the 36 credits required for the degree, a student may be permitted to take one course in a cognate liberal arts field, or ENG 510 in lieu of a cognate, but only with specific approval of the adviser. Students planning on obtaining a Ph.D. should become proficient in at least one foreign language.

In addition, at the completion of course work, students are required to select one scholarly, critical or pedagogical paper written for any of the nine courses, including ENG 690, and to use it as the basis of an oral presentation which will be delivered to members of the English department graduate committee, and interested faculty and students.

The English language concentration

This is not a separate degree program but a concentration within the Master of Arts in English program and is provided for students who wish to study linguistic theory and the structure and history of the English language on the graduate level. A prerequisite for this program is any one of the following three courses: ENG 376, History of

the English Language; ENG 377, Modern English Grammar; or ENG 354, British Medieval Literature. The equivalent of any one of these will be accepted.

Nine courses (36 credits) are required: ENG 533, a course in literary history, and a course in literary kinds; two undergraduate courses from those mentioned above (ENG 376, 377, 354) which were not taken as prerequisites; ENG 534, Language History; ENG 642, Studies in Old and Middle English Literature; ENG 647, Studies in the Structure of English; and ENG 690, The Master's Project. The standard program may be modified for an individual student depending on background and interests.

In addition, at the completion of course work, students are required to select one scholarly, critical or pedagogical paper written for any of the nine courses, including ENG 690, and to use it as the basis of an oral presentation which will be delivered to members of the English Department graduate committee, and interested faculty and students.

The Master of Arts in Teaching in English

The program leading to the degree of Master of Arts in Teaching in English is designed particularly for students who wish to pursue graduate study to improve their competence as teachers of English and American literature and language. It is sponsored jointly by the College of Arts and Sciences and the School of Human and Educational Services.

Requirements for the degree

Nine courses (36 credits) are required, distributed as follows. **The Teaching Core** (12 credits): ENG 510; one course chosen from among these six alternatives: RDG 538, FE 601, 602, 603, 604, or 605; and either PSY 510 or FE 606. **The Literary Studies Core** (12 credits): ENG 533, a course in the methods of literary history (ENG 543, 544, 545, or 546); and a course in literary kinds (ENG 563, 564, 565, or 566). Three additional courses in English (12 credits) are to be chosen in consultation with the student's program adviser; two of these must be at the 600 level.

In addition, at the completion of course work, students are required to select one scholarly, critical or pedagogical paper written for any of the nine courses, including ENG 690, and to use it as the basis of an oral presentation which will be delivered to members of the English department graduate committee, and interested faculty and students.

Classification of Course Offerings

The graduate program of the Department of English offers four kinds of courses.

1. Undergraduate courses (300 and 400 levels)

The student may take up to two undergraduate courses from regular departmental 300- and 400-level offerings. Such courses are useful preparation for seminars in areas of language and literature for which a student is not adequately trained. No more than five graduate students may enroll in any 300- or 400-level course. ENG 499 is not open to graduate students. ENG 498 is not normally acceptable for graduate credit. Students must have prior written permission of a graduate adviser to register in an undergraduate course.

2. Core courses (500 level)

500-level courses are designed to familiarize the student with the principal approaches to literature and language and with methods and tools appropriate to those approaches. These courses (ENG 533, 543, 544, 545, 546, 563, 564, 565, 566)

are central to the graduate program and help prepare the student for the more specialized work of the seminars. (ENG 500, 510, 534 and 597 are not core courses.)

3. Seminars and the master's project (600 level)

The graduate seminar allows the student to do independent work in an area in which the instructor has special sophistication, and at the same time to gain criticism and support from other students working in the same area. The instructor will prescribe the subject matter of each course during any given semester. No student may register for a 600-level course until successfully completing two 500-level courses. Seminars are limited to 12 students.

ENG 690, The Master's Project (optional), involves completion of a project of creative, scholarly, or pedagogical nature, proposed initially by the candidate. Any written work to be submitted in partial or total fulfillment of a project should not exceed 7,500 words. Projects normally arise out of graduate course work. The course is open only to students who can propose an independent project and who have made arrangements with a member of the department interested in supervising it. Students seeking approval to proceed should submit an application for ENG 690 (available in the department office) and a prospectus of the project.

4. Summer institutes

Concentrated four-week institutes on literature, language, writing, and other topics of interest to high school teachers and post-baccalaureate students are offered in summer session. They are designed as refresher courses or as introductions to topics of particular contemporary concern. Institutes grant four hours of graduate credit. Students may not offer more than 4 credits of work in institutes toward fulfillment of requirements for advanced degrees except by permission of the graduate committee of the department. Candidates for degrees must consult with their advisers before electing summer institutes.

Cognate courses (M.A. program)

Students in the M.A. program may, with written approval of the chairperson of the Graduate Programs Committee, offer one course from another department for credit toward their degrees. Such courses should be advanced work in a field relevant to the students' special interests and needs.

Course Offerings

ENG 500 Advanced Topics in Literature and Language (1 to 4)

Special topics and problems selected by the instructor. Not a core course.

ENG 510 Literature and Composition (4)

Form and style in prose and poetry. Exploration of relationships among the study of literature, the study of language, and composition. Experience in writing and criticism of writing. Designed for the teacher of English language and literature. Required of M.A.T. candidates. Not a core course.

ENG 515 Summer Institute (1 to 4)

Concentrated four-week institutes on literature, language, writing, and other topics of interest to high school teachers and post-baccalaureate students. See listing above on "Summer Institutes."

ENG 533 Practical Criticism (4)

An intensive study of approaches to specific works of literature in and of themselves and an examination of techniques appropriate to those approaches. Required of all students.

ENG 534 Language History (4)

An intensive study of the development of standard English through an examination of texts that are representative of Early Modern English, Middle English, and Old English.

LITERARY HISTORY

ENG 543 Early British (4)

The course will concentrate on some period of British literary history before the eighteenth century. Emphasis on concepts, approaches, methodology appropriate to the literary historian. Literature in historical perspective and in cultural and social contexts.

ENG 544 Later British (4)

The course will concentrate on some period of literary history from the eighteenth century to the present. Emphasis on concepts, approaches, methodology appropriate to the literary historian. Literature in historical perspective and in cultural and social contexts.

ENG 545 American (4)

The course will concentrate on some period of American literary history. Emphasis on concepts, approaches, methodology appropriate to the literary historian. Literature in historical perspective and in cultural and social contexts.

ENG 546 Special Topics (4)

As designated by instructor.

LITERARY KINDS

ENG 563 Fiction (4)

Studies of the novel and/or shorter fiction, including definitions of the form and attention to variations among different examples of the form.

ENG 564 Drama (4)

Studies of drama including definitions of the form and attention to variations among different examples of the form.

ENG 565 Poetry (4)

Studies of poetry including definitions of the form and attention to variations among different examples of the form.

ENG 566 Modes or Special Forms (4)

Studies of a particular mode (such as comedy, tragedy, satire, romance) or of an approach to literature through modes; or studies of another form such as film, biography, nonfictional prose, and folklore.

ENG 597 Apprentice College Teaching (4)

An introduction to teaching English at the college level. Internship with assigned professor in a course offered at Oakland University or a cooperating community college. To be arranged in the semester preceding that in which the course is taken. By permission only. Not a core course.

SEMINARS (Prerequisite: two 500-level courses)

ENG 600 Studies in Language and Literature (4)

Special topics and problems as selected by instructor.

ENG 640 Studies in American Literature: Focus Pre-Civil War (4)

ENG 641 Studies in American Literature: Focus Post-Civil War (4)

ENG 642 Studies in Old and Middle English Literature (4)

ENG 643 Studies in Renaissance Literature (4)

ENG 644 Studies in Eighteenth Century Literature (4)

ENG 645 Studies in Nineteenth Century Literature (4)

ENG 646 Studies in Modern Literature (4)

ENG 647 Studies in the Structure of English (4)

ENG 648 Studies in Literary Theory (4)

ENG 690 The Master's Project (4)

Completion of a modest project of a creative, scholarly, or pedagogical nature proposed by the degree candidate.

Prerequisite: Permission of the Committee on Graduate Programs.

Related courses

(Descriptions of the following courses can be found in the education and Special Courses section of this catalog).

RDG 538	Guiding Reading-Learning in Content Subjects (4)
FE 601	History in Education (4)
FE 602	Philosophy in Education (4)
FE 603	Cross-Cultural Studies in Education (4)
FE 604	Sociology in Education (4)
FE 605	Politics in Education (4)
FE 606	Psychology in Education
PSY 510	Developmental Psychology (4)

DEPARTMENT OF HISTORY

Chairperson: *S. Bernard Thomas*

Professors Emeriti:

Robert C. Howes, Ph.D., Cornell University

George T. Matthews, Ph.D., Columbia University

Professors:

Charles W. Akers, Ph.D., Boston University

John Barnard, Ph.D., University of Chicago

Brian P. Copenhaver, Ph.D., University of Kansas

W. Patrick Strauss, Ph.D., Columbia University

S. Bernard Thomas, Ph.D., Columbia University

Richard P. Tucker, Ph.D., Harvard University

Associate professors:

De Witt S. Dykes, Jr., M.A., University of Michigan

Leonardas V. Gerulaitis, Ph.D., University of Michigan

James D. Graham, Ph.D., Northwestern University

Gerald C. Heberle, Ph.D., Ohio State University

Mary C. Karasch, Ph.D., University of Wisconsin

Joseph A. Klaitis, Ph.D., University of Minnesota

Roy A. Kotynek, Ph.D., Northwestern University

Paul M. Michaud, Ph.D., University of Chicago

Lawrence D. Orton, Ph.D., Indiana University

Carl R. Osthaus, Ph.D., University of Chicago

Anne H. Tripp, Ph.D., University of Michigan

Assistant professor:

Whitney Walton, Ph.D., University of Wisconsin

The Master of Arts in History

This program may serve either as a terminal degree or as a bridge to more advanced study and is designed to accommodate both full- and part-time students. In addition to a complete daytime schedule, late afternoon and evening courses are also available.

Admission

The department will consider applicants who hold the degree of Bachelor of Arts or Bachelor of Science from an accredited institution and whose credentials, including transcripts and letters of recommendation, give evidence of academic distinction. An undergraduate major in history is not an absolute requirement for admission, but a significant number of undergraduate history courses should appear on the applicant's record.

A grade point average of 3.00 (on a 4.00 scale) in undergraduate history courses and a GPA of 2.80 in all undergraduate work will ordinarily be considered the minimum standards for admission. These minima may be waived in individual cases; at its discretion, the department may recommend admission of students of superior promise but with deficient preparation if such students correct their deficiencies before commencing graduate work.

Students may be admitted at four different times: fall semester, winter semester, spring session, or summer session.

Requirements for the degree

Candidates for the degree of Master of Arts in history must complete 38 graduate-level credits in history (in special cases the Department of History graduate committee may permit a candidate to substitute up to 12 graduate credits in related fields for history credits). All candidates must complete at least one colloquium (HST 610), two research seminars (HST 680), and the comprehensive examination (HST 600). Students may not enroll for graduate courses (HST 500-590) corresponding in title and/or coverage with undergraduate history courses (HST 300-390) for which they have previously gained credit at Oakland University.

At the time of admission, each candidate will choose a major field from the following three areas: United States; Europe (including Great Britain and Russia); Africa, East and South Asia, and Latin America. The candidate must take at least 20 credits in the major field.

Candidates who elect to offer a thesis in partial fulfillment of the degree requirements will fulfill all the requirements listed above; they will take both research seminars in the major field as thesis-writing courses, and their comprehensive oral examination will concentrate on the thesis and historical problems related to it. Candidates must have sponsorship of a faculty adviser before beginning thesis work.

Candidates who do not elect to offer a thesis will fulfill all the requirements listed above; they must take at least one colloquium and one seminar in the major field, and their comprehensive examination will be devoted to the history of the major field, as described below under HST 600.

There is no general foreign language requirement for the M.A. in history, but to study certain fields the candidate may need a reading knowledge of a foreign language. Candidates must consult their advisers for the language requirements of specific courses and programs.

Course Offerings

HST 502 American Labor History (4)

The economic, social, and political history of the American work force and labor movement with emphasis on the twentieth century.

HST 503 American Constitutional History (4)

Origins and development of American constitutional doctrine and interpretation from the colonial period to the present, emphasizing constitutional controversy and change.

HST 504 History of the American Industrial Economy and Society (4)

The development of the American industrial system and its impact on business organization, labor, government, and the international economy.

HST 506 Colonial and Revolutionary America (4)

The transplantation of European society to continental North America; the subsequent development of political, economic, and social institutions in the colonies; the Anglo-French struggle for the continent, and the American Revolution.

HST 507 American Religious History (4)

A study of American religious history, including religious elements in immigration, separation of church and state, denominationalism and sectarianism, religion and nationalism, religious leadership, and religion as a social force.

HST 510 The Young Republic and the Age of Jackson, 1787-1850 (4)

The making of the Constitution, the social, political, and economic development of the new nation, and the subsequent forces affecting expansion, social protest, and sectionalism to 1850.

HST 512 The Civil War and Reconstruction, 1850-1876 (4)

The origins of secession, the wartime problems of the Union and the Confederacy, the principal military campaigns, the Reconstruction Era and the creation of a new Union, and the significance of the Civil War and Reconstruction in American history.

HST 513 American History, 1876-1900 (4)

The New South, industrial consolidation, the origins of the modern labor movement, the rise of the city, immigration, agrarian protest movements, the businessman's philosophy, and the challenge to *laissez faire*.

HST 514 American History, 1900-1928 (4)

The social, political, and economic developments in the U.S. during the progressive era and the decade of the 1920s.

HST 515 American History since 1928 (4)

The myth of the New Era, the social and political impact of the Great Depression, New Deal programs and radical alternatives, the isolationist-internationalist debate, modern Republicanism, and the New Frontier.

HST 516 The American Mind to 1860 (4)

The history of American thought from the colonial period to the Civil War, emphasizing New England Puritanism, the transition from colonies to provinces, the era of the American Revolution, and the origins of modern America.

HST 517 The American Mind since 1860 (4)

Major intellectual trends in the U.S. from the Civil War to the present, including ideological conflict during the Civil War and Reconstruction, the impact of evolutionary thought, and responses to industrialization and urbanization.

HST 518 Topics in American Social History (4)

Selected topics in the history of popular beliefs, social structure and organization, and the process of social change, including movements of reform.

HST 519 History of the American South (4)

The South from colonial times to the 1960s, emphasizing the transition from the agrarian, slave South of the antebellum period to the modern South of the twentieth century.

HST 521 American Diplomatic History in the Twentieth Century (4)

American foreign policy and diplomacy from the Spanish-American War to the present, including such topics as American imperialism, Caribbean and Far Eastern policies, involvement in the world wars and the Cold War, and nuclear diplomacy.

HST 523 Topics in Afro-American History (4)

The economic, social, and political activities, status, organizations, and institutions of Afro-American people, emphasizing the twentieth century.

HST 525 Medieval Europe (4)

The European Middle Ages from about A.D. 400 to 1300, with special emphasis on intellectual developments.

HST 526 The Italian Renaissance (4)

The European Renaissance period, with emphasis on the Italian experience.

HST 527 The Northern Renaissance (4)

European humanism, with emphasis on the Lowlands, France, and Germany.

HST 529 Europe in the Seventeenth Century (4)

A comparative analysis of European societies: the articulation of absolutism and constitutionalism, the emergence of the European states system, the origins and impact of modern science, the culture of the baroque, and the development of commercial capitalism.

HST 534 Victorian and Edwardian England (4)

Political, cultural, and intellectual life of England from 1837 to the outbreak of World War I.

HST 535 Twentieth Century Britain (4)

The British adjustment to global wars, the later industrial revolution, mass democracy, and social change.

HST 541 Europe since 1914 (4)

An analysis of Europe in world perspective since World War I.

HST 543 Germany since 1848 (4)

The history of the German nation-state, concentrating on constitutional and political developments in their social context.

HST 545 France since 1789 (4)

The political development of modern France as a nation-state and the cultural and economic movements connected with French public life.

HST 546 European Witchcraft (4)

A scholarly investigation of witch beliefs and witch trials in Europe, England, and New England. The social and intellectual foundations of witchcraft prosecutions from the Middle Ages to the end of the seventeenth century. Offered in alternate years.

HST 548 Europe in the Eighteenth Century (4)

A comparative analysis of European societies: the old regime in Europe, beginnings of industrial development, the Enlightenment as a political and social movement, reform under monarchy and the emergence of democratic ideologies, and the French Revolution.

HST 549 France in the Age of Absolutism and Enlightenment (4)

The *ancien régime* in France from the end of the wars of religion to the beginning of the Revolution (1589-1789).

HST 550 The European Mind to 1700 (4)

Major developments in European thought from the God-oriented world views of the Middle Ages to the development of scientific concepts in the seventeenth century. Emphasis is on reading original materials.

HST 551 The European Mind since 1700 (4)

European intellectual movements since the eighteenth century Enlightenment, emphasizing the impact of evolutionary, utilitarian, and existentialist theories and the criticism of traditional rationalist assumptions. Emphasis is on reading original materials.

HST 553 Imperial Russia (4)

Russian history from Peter the Great to the Bolshevik Revolution: the growth of Russian national power, westernization, serfdom, reform, and revolution.

HST 554 Soviet Russia (4)

Russia and the Soviet Union from 1917 to the present: revolution and civil war, collectivization and industrialization, Stalinism, World War II, de-Stalinization, the Soviet Union, and the world communist movement.

HST 560 Russian Intellectual History since Peter the Great (4)

Main intellectual and cultural developments since Peter the Great, with emphasis on the nineteenth century. Particular attention is devoted to the slavophiles, the westernizers, the populists and socialists, and several of the great realistic writers.

HST 563 History of Southern South America (4)

The social, political, and economic history of Argentina, Brazil, and Chile in the nineteenth and twentieth centuries; frontier expansion and Indian warfare, slavery and Empire in Brazil, regionalism and nationalism, industrialization and urbanization, and international relations.

HST 565 Colonialism and Nationalism in the Modern World (4)

A comparative survey of selected European colonial systems and the responses of colonized peoples in Latin America, Africa, and Asia. Emphasis on such themes as economic expansion, acculturation, resistance movements, and state formation.

HST 566 Slavery and Race Relations in the New World (4)

A comparative study of slavery in North America, Latin America, and the Caribbean, and the present state of race relations in these areas.

HST 567 History of Mexico (4)

The scope and achievements of pre-Columbian civilizations, the Spanish Conquest, the emergence of a multiracial society, the achievement of political independence and nation-building in the twentieth century.

HST 570 China: Beginnings through Han, to 220 A.D. (4)

The history of China from most ancient times to the downfall of the Han Dynasty in 220 A.D.

HST 571 China: From the Three Kingdoms through Ming, 220-1644 (4)

The history of China to the eve of the Manchu conquest in 1644.

HST 573 China: The Final (Ch'ing) Imperial Phase, 1644-1912 (4)

China under Manchu rule, from the conquest to the collapse of the Confucian imperial order in the early twentieth century.

HST 574 China: The Nationalist Republican Period, 1912-1949 (4)

Revolutionary nationalism and political, social, and cultural change under the Chinese Republic from the warlord era to the establishment of the Communist-led People's Republic in 1949, and post-1949 developments in Nationalist-ruled Taiwan.

HST 576 History of Chinese Communism: 1921 to the Present (4)

The revolutionary history of the Chinese Communist movement from its beginning in 1921 to its accession to power in 1949, and the major lines of development under the Chinese People's Republic since 1949.

HST 581 History of Early India (4)

The history of India from the most ancient times to the coming of the Mughals in the early sixteenth century.

HST 586 Contemporary African History (4)

Colonial and postcolonial economic development, political ideologies, and social problems of contemporary Africa. Topics include resistance and revolutionary movements, styles of leadership, and building of nations.

HST 591 Directed Readings for Graduate Students (4)

Directed individual readings on specific topics.

HST 592 Summer Institute in History (4)

A four-week course offering intensive study of selected topics. May be repeated once for credit, with the approval of the departmental graduate coordinator.

HST 600 Comprehensive Examination (2)

Examination taken in the last semester of the student's program; student must secure permission of the faculty adviser before registering. Candidates who submit a thesis will be examined orally for up to one hour on the thesis and historical problems related to it. The thesis comprehensive examination may not be retaken. Candidates who do not submit a thesis will be examined on the major field; the examination will be adapted to the student's individual program, and the examining committee may assign special readings to be completed for the comprehensive examination. Candidates taking the field comprehensive examination will be allowed one week to write take-home essays responding to the committee's questions; if the essays are acceptable, the candidate will be tested in a one-hour oral examination. Satisfactory performance on both written and oral sections is required for graduation. A student who fails may retake the field comprehensive examination in any succeeding semester.

Prerequisite: Permission of faculty adviser.

Graduate colloquium

HST 610 Colloquium in History (4)

Intensive reading and discussion on a significant period or broad topic in history. Students will present the results of study for group discussion. May be repeated for credit.

Research seminar

HST 680 Seminar in History (4)

Research seminars are designed to develop skills in historical investigation and exposition; usually involve writing a major paper on a carefully selected topic. May be repeated for credit.

Prerequisite: Permission of supervising instructor.

DEPARTMENT OF LINGUISTICS

Chairperson: William Schwab

Professors:

Peter J. Binkert (*Linguistics and Classics*), Ph.D., *University of Michigan*
Carlo Coppola (*Hindi-Urdu and Linguistics*), Ph.D., *University of Chicago*
Donald C. Hildum (*Communication Arts and Linguistics*), Ph.D., *Harvard University*
William Schwab (*Linguistics and English*), Ph.D., *University of Wisconsin*

Associate professors:

John W. Barthel (*German and Linguistics*), Ph.D., *University of Illinois*
Daniel H. Fullmer (*Linguistics and English*), Ph.D., *University of Michigan*
Alice S. Horning (*Rhetoric and Linguistics*), Ph.D., *Michigan State University*
Don R. Iodice (*French and Linguistics*), M.A.T., *Yale University*

Assistant professor:

Lucinda Hart-Gonzalez (*Linguistics and Sociology and Anthropology*), Ph.D.,
Georgetown University

The Master of Arts in Linguistics

The Master of Arts degree in linguistics provides post-baccalaureate instruction in current linguistic theory and in applying general linguistics to the teaching of language arts or of English to either native or non-native speakers. The degree is intended to accommodate students who have done previous work in linguistics as well as those who have had little exposure to the subject.

Admission

The department will consider applicants who hold a baccalaureate degree from an accredited institution and whose credentials, including transcripts and letters of recommendation, give evidence of academic distinction. Although an undergraduate major in linguistics is not a requirement for admission, students must demonstrate a knowledge of the basic principles of linguistics, as would be encountered in a course such as ALS 176.

A grade point average of 3.00 (on a 4.00 scale) in undergraduate work is ordinarily the minimum standard for admission. At its discretion, the department may admit students of superior promise but deficient preparation, provided that such students correct their deficiencies before commencing graduate work.

Students may be admitted during any semester or session of the university calendar. Applicants to the program must have all their credentials in the Graduate School no later than six weeks before the beginning of their initial semester of registration. After that time, and until the beginning of classes, they may apply for admission as special graduate students. However, not more than 12 credits earned as a special graduate can be applied toward the degree; therefore, the application should be completed as soon as possible.

Upon completion of 12 credits, including LIN 501, students will be evaluated for admission to candidacy and will choose an area of specialization. Students intending to specialize in curricula 1 and 2 (below) must: either 1) demonstrate knowledge of a foreign language, or of American Sign Language, normally equivalent to completion

of the 114-115 sequence at Oakland University (first year proficiency); or 2) have completed two semesters of studying the structures of particular languages, one Indo-European, and one non-Indo-European (LIN 410).

The M.A. program in linguistics requires that students frequently write papers and offer presentations orally in classes. National test scores do not normally indicate how well students will do in these areas. Therefore, we wish to alert prospective students to these necessary skills before they embark on their graduate programs at Oakland University.

Requirements for the degree

The Master of Arts degree in linguistics will be awarded to the student who earns 36 credits in nine courses as specified below. An additional two credits are required for students specializing in teaching English to speakers of other languages.

Upon admission to candidacy, the student will choose an area of specialization from among the following three: linguistic theory, teaching English to speakers of other languages, and teaching language arts. At least 16 credits (four courses) of work must be in the area of specialization.

All students must complete LIN 501 (Linguistic Structures) and LIN 580 (Proseminar in Linguistics). All students must also complete LIN 680 (Graduate Seminar in Linguistics) or LIN 690 (The Master's Thesis). The requirements for LIN 690 will be a thesis of considerable detail in which students must present the results of their independent research. LIN 690 may be elected only with departmental approval.

General requirements

1. nine courses (36 credits); students specializing in teaching English to speakers of other languages must also take ALS 429, Practicum, for an additional 2 credits)
2. no more than 8 credits in cognates
3. no more than 8 credits (10 credits in specialization 2) in 400-level LIN or ALS courses

Core program (12 credits)

1. LIN 501 Linguistic Structures
2. LIN 580 Proseminar in Linguistics
3. LIN 680 Seminar in Linguistics
or LIN 690 The Master's Thesis

Specializations (typical curricula)

1. Linguistic Theory (24 credits)

- LIN 502 Historical Linguistics
- LIN 403 Phonological Theory
- or LIN 603 Advanced Phonology
- LIN 404 Syntactic Theory
- or LIN 604 Advanced Syntax
- LIN 601 The History of Linguistic Theory
- Two (2) electives
(Foreign language competency)

2. Teaching English to Speakers of Other Languages (26 credits)

- LIN 401 Phonetics
- or LIN 503 Sound Patterns of American English
- ALS 428 The Teaching of English as a Second Language
- ALS 429 Practicum (2 credits)

ALS 528 Theory and Practice in Language Testing

ALS 574 Cross-Cultural Communication

or LIN 610 Contrastive Analysis

Two (2) electives

(Foreign language competency)

3. Teaching Language Arts (24 Credits)

ALS 420 Linguistics and Reading

or ALS 528 Theory and Practice in Language Testing

LIN 503 Sound Patterns of American English

ALS 534 Language Development in Children

or ALS 535 Psycholinguistics

Course Offerings

APPLIED LANGUAGE STUDIES

ALS 420 Linguistics and Reading (4)

A study of the English writing system, with close examination of spelling and morphology, ambiguity, dialect interference, and derivational vocabulary.

Prerequisite: LIN 301.

ALS 428 The Teaching of English as a Second Language (4)

A study of modern techniques of teaching pronunciation, grammar, and vocabulary. The preparation and use of language tests and laboratory techniques.

Prerequisite: LIN 301.

ALS 429 Practicum (2 or 4)

Supervised experience in some area of applied linguistics, such as working with non-native speakers of English, tutoring, or other appropriate field work or internship.

Prerequisite: Permission of department.

ALS 528 Theory and Practice in Language Testing (4)

A study of the different types of aptitude and achievement tests used in different language settings, including research and educational situations. Brief introduction to test statistics and computerized analysis of test scores. Practical aspects of testing: design, scoring and administration.

Prerequisite: LIN 501. Required for students in specialization 2.

ALS 534 Language Development in Children (4)

Language acquisition in normal and abnormal children: stages of the acquisition process, the role of the environment, the relationship between language and the development of other skills, language acquisition in children with sensory and psychological disorders, and the relationship between language, reading, and writing.

Prerequisite: One course in ALS or LIN.

ALS 535 Psycholinguistics (4)

A study of the psychology of language, the accommodation between the cognitive and physical structure of human beings and the structure of language, the nature of the language learning process, and the consequences of language use.

Prerequisite: One course in ALS or LIN and one course in PSY.

ALS 540 The Biology of Language (4)

Animal communication and the evolution of man's capacity for language, development of language in normal and abnormal children, disorders of speech, hearing and language, language and the brain, and genetic aspects of language.

Prerequisite: One course in ALS or LIN.

ALS 560 Neurolinguistics (4)

The neurology of language: essentials of neuroanatomy; neurological mechanisms underlying language; aphasia and kindred disorders of speech; the relationship of language to memory, intelligence, and cognition; language and mental retardation and psychological disorders.

Prerequisite: One course in ALS or LIN.

ALS 573 Ethnography of Communication (4)

The systematic description of the interaction of linguistic form, participants, setting, and modes of interaction. Comparison of similar communicative events in simple and complex societies. Readings and guided student research.

Prerequisite: One course in ALS or LIN.

ALS 574 Cross-Cultural Communication (4)

A theoretical and practical examination of the role of language and nonverbal modes in cross-cultural communication. Problems and strategies for developing awareness of and operational skills in cross-cultural processes.

Prerequisite: One course in ALS or LIN.

ALS 575 Language in Culture (4)

Language viewed as cultural behavior, its system, acquisition, and use; its relation to history, attitudes, and behavior; standard languages; social dialects; pidgins; and creoles.

Prerequisite: One course in ALS, LIN, or AN 102.

ALS 576 Sociolinguistics (4)

Language in its social context: intrasocietal variation; social evaluation of language varieties (style, dialect) as an influence in language change; and the choice of a language variety as an index of group solidarity, social ideology, and individual attitudes.

Prerequisite: One course in ALS, LIN, or SOC.

LINGUISTICS**LIN 401 Phonetics (4)**

Introduction to articulatory and acoustic descriptions of spoken language, and training in the recognition and production of sounds found in languages other than English.

LIN 403 Phonological Theory (4)

Theory and application of phonological analysis, with emphasis on original work.

Prerequisite: LIN 301.

LIN 404 Syntactic Theory (4)

Theory and application of morphological and syntactic analysis, with emphasis on original work.

Prerequisite: LIN 301.

LIN 407 Semantic Theory (4)

Inquiry into contemporary efforts to formulate and articulate a theory of meaning adequate for the analysis of natural language, with emphasis on the relation between syntactic and semantic analysis.

Prerequisite: LIN 301.

LIN 410 Studies in the Structure of a Language (4)

Study of the structural aspects of an individual language to be determined by the instructor. Among the languages for study are French, German, Hindi-Urdu, and Sanskrit.

Prerequisite: LIN 301.

LIN 480 Seminar in Linguistics (4)

Topics and problems selected by the instructor.

Prerequisite: LIN 301.

LIN 490 Independent Study (2 or 4)

Special research projects in linguistics.

Prerequisite: Permission of department.

LIN 500 Studies in Linguistics and Language (4)

Designed to introduce students with or without previous formal study in linguistics to topics selected by instructor.

LIN 501 Linguistic Structures (4)

Introduction to synchronic linguistic analysis, with structural problems in natural languages.

LIN 502 Historical Linguistics (4)

Diachronic linguistic analysis: language change, dialect geography, establishment of genealogical relationships, the reconstruction of earlier stages of languages, and the relationship of language change to synchronic analysis.

Prerequisite: LIN 501.

LIN 503 Sound Patterns of American English (4)

The fundamentals of articulatory phonetics with studies in American social and geographic dialects.

Prerequisite: LIN 501.

LIN 580 Proseminar in Linguistics (4)

Overview of current major issues and research in theoretical and applied linguistics.

Prerequisite: LIN 501 or equivalent.

LIN 590 Directed Readings (4)

Directed individual research on specific topics.

LIN 600 Special Topics in Linguistics (4)

Topics and problems selected by the instructor.

Prerequisite: Permission of instructor.

LIN 601 The History of Linguistic Theory (4)

Study of the development of linguistic sciences from ancient grammatical explanation to the nineteenth century Indo-European scholars and twentieth century structuralism and transformational grammar.

Prerequisite: LIN 501.

LIN 603 Advanced Phonology (4)

An advanced course in generative phonology with emphasis on current issues in phonological theory.

Prerequisite: LIN 501.

LIN 604 Advanced Syntax (4)

An advanced course in generative syntax with emphasis on current issues in syntactic theory.

Prerequisite: LIN 501.

LIN 610 Contrastive Analysis (4)

A comparative structural analysis of individual languages and/or language groups.

Prerequisite: LIN 501.

LIN 680 Seminar in Linguistics (4)

A research seminar designed to develop a student's skill in linguistic investigation and exposition. Students must complete a research paper.

Prerequisite: LIN 580.

LIN 690 The Master's Thesis (4)

Completion of a project proposed by a degree candidate in consultation with his/her adviser.

Prerequisite: LIN 580.

DEPARTMENT OF MATHEMATICAL SCIENCES

Chairperson: Donald G. Malm

Professors:

Harvey J. Arnold, Ph.D., Princeton University
 Louis R. Bragg, Ph.D., University of Wisconsin
 John W. Dettman, Ph.D., Carnegie Institute of Technology
 George F. Feeman, Ph.D., Lehigh University
 G. Philip Johnson, Ph.D., University of Minnesota
 Donald G. Malm, Ph.D., Brown University
 James H. McKay, Ph.D., University of Washington
 Louis J. Nachman, Ph.D., Ohio State University
 Irwin E. Schochetman, Ph.D., University of Maryland

Associate professors:

Baruch Cahlon, Ph.D., Tel Aviv University
 Charles Ching-an Cheng, Ph.D., Rutgers University
 J. Curtis Chipman, Ph.D., Dartmouth College
 David J. Downing, Ph.D., University of Iowa
 Jerrold W. Grossman, Ph.D., Massachusetts Institute of Technology
 Jon Froemke, Ph.D., University of California (Berkeley)
 Eli Maor, Ph.D., Technion, Israel
 Subbaiah Perla, Ph.D., University of Rochester
 Darrell P. Schmidt, Ph.D., Montana State University
 Sze-kai Tsui, Ph.D., University of Pennsylvania
 J. Barry Turett, Ph.D., University of Illinois
 Stuart Wang, Ph.D., Cornell University
 Stephen J. Wright, Ph.D., Indiana University

Assistant professors:

Asuman Aksoy, Ph.D., University of Michigan
 Kevin T. Andrews, Ph.D., University of Illinois
 Mary P. Coffey, Ph.D., University of Michigan
 Devadatta Kulkarni, Ph.D., Purdue University
 Marcia Feingold, Ph.D., University of Michigan
 Miguel Villalobos, Ph.D., University of Wisconsin
 T.N. Subramaniam, Ph.D., Brandeis University

Adjunct professors:

Joseph R. Assenzo, Ph.D., Oklahoma University
 Seth Bonder, Ph.D., Ohio State University
 Gary McDonald, Ph.D., Purdue University
 Edward F. Moylan, M.A., University of Detroit
 John Scott, M.S., Cornell University

The Department of Mathematical Sciences offers programs leading to the degrees of Master of Arts in Teaching in mathematics, Master of Science in applied mathematics, and Master of Science in applied statistics. The department also offers a graduate certificate program in statistical methods. The Master of Arts in Teaching program is jointly sponsored by the College of Arts and Sciences and the School of Human and Educational Services.

The Master of Arts in Teaching in Mathematics — Secondary Education

The program leading to the Master of Arts in Teaching in mathematics serves teachers in secondary schools or community colleges in southeast Michigan and is designed to accommodate those who are not only primarily interested in teaching mathematics but also wish to complete a program with substantial mathematical content. The program prepares participants for leadership positions in teaching advanced mathematics courses and determining directions of curriculum development. The courses are designed to provide the student with not only a sound knowledge of modern mathematics but also the opportunity to learn about the applications of mathematics, the construction of mathematical models, and the art of problem-solving. An important part of the program is an in-depth study of problems of the secondary mathematics curriculum.

Requirements for the degree

A background of at least 30 credits in undergraduate mathematics is normally required of the applicants. A special one-semester transitional course will be offered occasionally for those interested in the program but who have not studied mathematics recently. To complete requirements for the M.A.T. degree, students will need 36 credits of graduate work. In general, they will take seven 4-credit courses arranged by the department's Committee on Graduate Programs, one 4-credit course in education, and one in psychology. Among the courses arranged by the committee there must be 4 credits in independent reading, either in mathematics or in an interdisciplinary area involving mathematics. Candidates must prepare a written report based on their readings. In addition to the 4 credits in independent reading and the accompanying report, each candidate must take MTS 517 and MTS 514. At least one of these courses will be offered each fall so that candidates can complete requirements for the degree in approximately two and one-half years, if summer courses are taken. The other four mathematics courses may be chosen from courses with MTS prefixes.

As soon as possible after completion of the six mathematics courses arranged by the committee, and before the independent reading assignment, M.A.T. candidates must take a special examination. The examination consists of approximately 10 problems, selected by the committee, which vary in context and difficulty. Candidates will have one month to work on these problems, after which they will give a verbal presentation on the solutions of some subset of the problems selected by the adviser.

Maximum flexibility is allowed in the choice of required courses in education and psychology. Normally a candidate will choose the education course from among FE 601, 602, 603, 604, or 605. However, a course in the teaching of reading (RDG 538) would be appropriate and would be required for teachers who have not previously taken a reading course. In general, a course in developmental psychology (PSY 510) or in psychology in education (FE 606), is selected to fulfill the psychology requirement.

A student's progress will be reviewed after each 12 credits attempted and after the special examination. If these reviews reveal unsatisfactory progress toward completion of the degree requirements, the student's dismissal will be recommended to the dean of Graduate Study.

The Master of Science in Applied Mathematics

By offering this program, the department seeks to increase the number of individuals with broad training in mathematics which is suitable for application in an industrial

setting. The program's primary goal is to provide the basis for the skilled and competent application of existing mathematical techniques. All courses required for the program are offered in the late afternoon or evening to accommodate the part-time student who is engaged in professional development. Teaching and research assistantships are available to well qualified full-time students.

Admission

All applicants who have received a baccalaureate from an accredited institution with a cumulative grade point average of 3.00 or more will be considered. Preference will be given to those students with a major in mathematical science, computer science, engineering, physics, or chemistry. All students should have satisfactorily completed courses in single and multivariate calculus, linear algebra, differential equations, and vector calculus. They also should have received eight credits in computer science or have otherwise obtained comparable competence in computer usage.

Requirements for the degree

To fulfill the requirements for a Master of Science degree in applied mathematics a student must:

1. have successfully completed, with at least a 2.0 in each course and an overall average of 3.00 in all courses, the standard graduate program in applied mathematics or either of its approved alternatives.

Standard program (32 credits)

APM 535-536, APM 563-564, STA 427-428, CIS 542, and CIS 511

Alternative 1. (32 credits)

APM 535-536, APM 563-564, STA 525-526, CIS 542, and CIS 511

Alternative 2. (32 credits)

This alternative consists of either the standard program or Alternative 1 with the approved substitution of either APM 536, APM 564, STA 428, STA 526, or CIS 542 by two 2-credit independent study courses (MTH 590, APM 590, STA 590, or CIS 594);

2. have successfully completed the master's project in applied mathematics (APM 590, four credits). This project consists of the submission of a written report and an oral presentation on a particular problem constructed for the candidate by the department's graduate committee. Both the written report and the oral presentation must be judged satisfactory by the committee for successful completion of the project.

A student's progress will be reviewed after each 12 credits attempted. If these reviews reveal unsatisfactory progress toward completion of the degree requirements, the student's dismissal will be recommended to the dean of Graduate Study.

The Master of Science in Applied Statistics

By offering this program the department seeks to increase the number of people with broad training in statistical methodology which is suitable for application in industrial, business, and governmental settings. The program's primary goal is to provide the basis for the skilled and competent application of modern statistical methods. Areas of methodology included in the program in addition to a basic theoretical foundation are design of experiments, regression analysis, non-parametric, multivariate, reliability, sample survey and time series methodology. All courses make use of and stress the importance of modern statistical computing software. Because of the wide diversity of backgrounds of entering students, course selection for completion of the

program is developed in consultation with a faculty adviser. Selection of courses will reflect the goal of broad training and any special needs of the student. All courses for the program are offered in the late afternoon or evening to accommodate the part-time student who is engaged in professional development. Teaching and research assistantships are available to well qualified full-time students.

Admission

All applicants who have received a baccalaureate from an accredited institution with a cumulative grade point average of 3.00 or more will be considered. Previous mathematical training should include the satisfactory completion of courses in single and multivariate calculus and linear algebra, as well as at least one course in elementary statistics. Applicants must also be able to demonstrate competence in at least one scientific computer language.

Requirements for the degree

To fulfill the degree requirements the student must:

1. have completed, with at least a 2.0 in each course and an overall average of 3.00 in all courses, a program of at least 36 credits.
2. have completed at least 24 credits in courses labeled STA as approved by an adviser. The set of elective courses not labeled STA must also be approved by the student's adviser.
3. have performed successfully in two statistical consulting courses which require written and oral presentations;
4. have not included more than six credits of STA 590.

The Graduate Certificate Program in Statistical Methods

The program consists of 20 credits of statistical methods as set forth below. It is designed for completion in either one year or two years by students who are employed full time. The aim of the program is to provide knowledge in modern statistical methods for industrial managers. Graduates of the program will be capable of standard statistical treatment of industrial problems arising in research and production. They also will be able to recognize difficult problems and communicate well with fully trained statistical experts.

Admission

All applicants will be considered, with preference given to those who have received a baccalaureate from an accredited institution. Previous training should include one introductory statistics course and some exposure to calculus.

Requirements for the certificate

To fulfill the certificate requirements, the student must have completed an approved program of at least 20 credits with at least a 2.0 in each course and an overall average of 3.00 in all courses. The courses normally included are STA 501, 502, 503 and 8 additional credits chosen from STA courses numbered 425 or higher. The course selections for a particular student will be chosen to complement previous statistics study and to enhance the competency of the individual in his/her chosen field of application.

Relationship to Master of Science in applied statistics

Six credits from STA 501, 502, 503 will count toward the M.S. degree. All other STA courses numbered 425 or higher count fully toward the degree. It is anticipated that a graduate of the certificate program who has all of the prerequisites for the M.S. program can complete the additional 22 credits needed for that degree in two calendar years.

Course Offerings

Courses are listed and grouped according to the following designations: MTH — mathematics; APM — applied mathematics (applicable analysis and mathematical modeling); STA — statistics; MTS — mathematics for teachers (secondary education).

MATHEMATICS

MTH 405 Special Topics (2 or 4)

Advanced study of some topic in mathematics. May be taken more than once.

MTH 415 Foundations of Mathematics (4)

Examination of the logical foundations of mathematics including analysis of the axiomatic method, basic set theory, cardinal and ordinal numbers, and the axiom of choice.

MTH 453 Multivariable Analysis (4)

The topology of R^n , curves in R^n , derivatives and differentials, Lagrange multipliers, Taylor's formula, inverse and implicit function theorems, manifolds, multiple integrals, multilinear forms, differential forms, closed and exact forms.

MTH 461 General Topology (4)

A study of topological spaces and continuous functions. Separation and countability properties, connectedness, compactness, and local properties will be covered.

MTH 465 Differential Geometry (4)

Theory of curves and surfaces in Euclidean space with an introduction to the theory of matrix Lie groups.

MTH 475-476 Abstract Algebra (4 each)

Algebra of sets and mappings, groups and homomorphisms, rings and ideals, factorization and divisibility, vector spaces, linear transformations, fields and field extensions.

MTH 505 Special Topics (2 or 4)

Study of some topics in mathematics. May be taken more than once.

MTH 551-552 Real Analysis (4 each)

The general theory of measure and integration, including development of the Lebesgue integral, and elements of functional analysis with applications to probability theory.

MTH 555-556 Complex Analysis (4 each)

Analytic functions, Cauchy's theorem, representation theorems, analytic continuation, conformal mapping, and Riemann surfaces.

MTH 561-562 Topology (4 each)

MTH 561 is an introduction to algebraic topology. Topics include elementary homotopy and homology theory. MTH 562 covers various topics in algebraic and general topology at the discretion of the instructor.

MTH 571-572 Algebra (4 each)

Group theory, rings and modules, linear and multilinear algebra, and field extensions. Categorical properties and functorial relationships are emphasized where possible.

MTH 590 Directed Reading and Research (2, 4, 6, or 8)

APPLIED MATHEMATICS

APM 407 Mathematics for Engineering (4)

Topics to be covered include ordinary differential equations, linear algebra, matrix methods and numerical methods.

APM 435 Introduction to Mathematical Science (4)

The algebraic structures of scientific phenomena. Differential equations and dynamical systems. Partial differential equations of the physical and life sciences. Introduction to mathematical modeling.

APM 455 Intermediate Ordinary Differential Equations (4)

Review of elementary techniques, existence and uniqueness theory, series methods, systems of equations, oscillation and comparison theorems, Sturm-Liouville Theory, stability theory, and applications.

APM 463 Graph Theory and Combinatorial Mathematics (4)

Introduction to combinatorics. Topics include techniques of enumeration, fundamental concepts of graph theory, and applications to transport networks, matching theory, and block design.

APM 505 Special Topics (2 or 4)

Study of some topics in applicable analysis and mathematical modeling. May be taken more than once.

APM 535-536 Continuous Methods and Mathematical Models (4 each)

Examines the theoretical background, applications, and numerical computations of applied analysis. Includes differential equations and mathematical models, Fourier analysis, approximation theory, solutions of large linear systems, numerical solutions of ode's and pde's, to include Rayleigh-Ritz, Galerkin, collocation and finite element methods.

APM 541 Mathematical Analysis for Engineers I (4)

Fourier series and integrals, uniform and other types of convergence, Laplace and Z transforms, Gauss and Stokes theorems, Green's identities, and applications to problems in engineering.

APM 542 Mathematical Analysis for Engineers II (4)

Analytic functions, conformal mappings, complex integration, residues, separation of variables, the heat, wave and Laplace equations.

APM 553 Advanced Ordinary Differential Equations (4)

Existence and uniqueness, dependence on initial point, asymptotic behavior of solutions, periodic solutions, self-adjoint problems, stability theory, Liapunov functions, Poincare-Bendixson theory, and topological methods.

APM 554 Advanced Partial Differential Equations (4)

Characteristic surfaces and classification; existence, uniqueness, and stability; fundamental solutions and Green's functions; variational principles; spectral theory, distributions, and generalized solutions.

APM 563-564 Applied Mathematics: Discrete Methods I and II (4 each)

A two course sequence in those areas of discrete mathematics relevant to industrial applications. Topics will be drawn from combinatorics, graph theory, and discrete optimization.

APM 581 The Theory of Computation (4)

A study of what kinds of computation can, in principle, be accomplished by what kinds of computing devices, and how efficiently such computations can be done. Finite automata, pushdown automata, Turing machines, languages, grammars, undecidability, complexity theory, intractability.

APM 590 Directed Reading and Research (2, 4, 6, or 8)

APM 595 Case Studies in Applied Mathematics (4)

An introduction to what the actual application of mathematics consists of in the industrial world.

APPLIED STATISTICS**STA 425 Elements of Stochastic Processes (4)**

Random walk models, Markov chains and processes, birth and death processes, queueing processes, diffusion processes, and non-Markov processes.

STA 427-428 Introduction to Mathematical Statistics (4 each)

The distribution of random variables, conditional probability and stochastic independence, special distributions, functions of random variables, interval estimation, sufficient statistics and completeness, point estimation, tests of hypothesis, and analysis of variance.

STA 501 Statistical Methods in Research and Production (4)

Descriptive statistics — graphical and quantitative, confidence limits and statistical tests, sample size requirements, linear regression and correlation, multiple and curvilinear regression, count data and contingency tables, control charts, sampling and specifications. Designed for students in the Graduate Certificate Program in Statistical Methods.

STA 502 Applied Regression Analysis (4)

Simple linear regression, comparing two straight lines, polynomial and multiple regression analysis, multiple and partial correlations, dummy variables, covariance, residual analysis, transformations and weighted least squares, ridge regression. Designed for students in the Graduate Certificate Program in Statistical Methods.

STA 503 Design and Analysis of Industrial Experiments (4)

Planning of experiments; completely randomized, randomized block, Latin squares and incomplete block designs; factorial experiments, confounding, blocking, fractional factorial experiments, surface fitting designs. Designed for students in the Graduate Certificate Program in Statistical Methods.

STA 505 Special Topics (2 or 4)

Study of some topics in statistics. May be taken more than once.

STA 525 Multivariate Statistical Methods (4)

Samples from multivariate normal distribution, tests of hypotheses on means, multivariate analysis of variance, multiple comparisons, independence of sets of variates, canonical correlations, principal components, factor analysis. (Offered in alternate years.)

STA 526 Nonparametric Methods (4)

Rank tests for location and scale, power of competing tests, confidence intervals, nonparametric analysis of variance methods. (Offered in alternate years.)

STA 527 Linear Statistical Models (4)

General linear model, multivariate normal, regression and design models, variance components. (Offered in alternate years.)

STA 528 Statistical Methods in Reliability and Life Data (4)

Failure models, estimation procedures for exponential, weibull, gamma and lognormal distributions, hypothesis testing, sample size determination, accelerated life testing. (Offered in alternate years.)

STA 529 Statistical Methods in Sample Surveys (4 credits)

Simple random sampling, stratified sampling, systematic sampling, cluster sampling, sub-sampling, probabilities proportional to size sampling; estimation of parameters; applications.

STA 530 Time Series (4)

Introduction to and characteristics of autoregressive moving average models; autocorrelation functions, modeling, estimation and forecasting; deterministic and stochastic trends and seasonality; multiple time series, miscellaneous topics.

STA 590 Directed Reading and Research (2 or 4)**STA 595 Statistical Consulting (2 or 4)****MATHEMATICS FOR TEACHERS (Secondary)****MTS 505 Special Topics (2 or 4)**

Study of some topics in mathematics. May be taken more than once.

MTS 510 The Secondary Mathematics Curriculum (4)

A seminar that examines problems of the secondary mathematics curriculum. Topics will be determined by the instructor and the students. Emphasis is on the role and responsibility of the secondary teacher in developing curriculum.

MTS 514 Concepts in Abstract Algebra (4)

Designed for M.A.T. candidates in secondary education. Includes topics from groups, rings, fields, matrices, linear transformations, and vector spaces. Offered every other year in alternation with MTS 517.

MTS 515-516 Computers and Secondary Mathematics (4 each)

Introduction to the computer with emphasis on use of the computer in secondary mathematics courses, along with selected mathematics laboratory activities.

MTS 517 Concepts in Analysis (4)

Designed for M.A.T. candidates in secondary education. Includes a study of real and complex numbers, functions, limits, differentiation, integration, and infinite series, with emphasis on careful proofs of theorems. Offered every other year in alternation with MTS 514.

MTS 519 Linear Mathematics and Mathematical Models (4)

Includes topics from linear algebra, game theory, and linear programming with applications to the social sciences. Especially appropriate for M.A.T. candidates in secondary education.

MTS 590 Directed Reading and Research (2, 4, 6, or 8)**MTS 614 History of Mathematics (4)**

Mathematics from ancient to modern times: its growth, development, and place in culture.

MTS 619 Foundations of Mathematics (4)

Examination of the logical foundations of mathematics including analysis of the axiomatic method, basic set theory, cardinal and ordinal numbers, and the axiom of choice.

MTS 620 Concepts of Geometry (4)

Development of geometry from an algebraic and metric viewpoint, concentrating on Euclidean geometry.

MTS 627 Elements of Stochastic Processes (4)

Random walk models, Markov Chains and processes, birth and death processes, multi-dimensional processes, queueing processes, diffusion processes, and non-Markovian processes.

MTS 635-636 Introduction to Numerical Analysis (4 each)

Introduction to mathematical methods appropriate to computer work. Topics include interpolation, approximation, quadrature, solution of differential equations, and matrix computation.

MTS 637-638 Statistical Methods and Experimental Design (4 each)

Hypothesis testing and estimation for location and spread for one- and two-sample problems. One- and two-way analysis of variance, multiple comparison techniques, analysis, nonparametric and sequential techniques, randomized blocks, Latin squares, balanced incomplete blocks, factorial and fractional factorial designs, screening experiments, surface fitting methodology, nonlinear estimation, and introduction to time series analysis.

MTS 663 Graph Theory and Combinatorial Mathematics (4)

Introduction to combinatorics. Topics include techniques of enumeration, fundamental concepts of graph theory, and applications to transport networks, matching theory, and block design.

MTS 672 Number Theory (4)

Number-theoretic functions, diophantine equations, congruences, and quadratic residues, including some experimental work aided by the computer.

Related Courses

(Descriptions of the following courses can be found in the education, engineering, and Special Courses sections of this catalog.)

RDG 538	Guiding Reading-Learning in Content Subjects (4)
FE 601	History in Education (4)
FE 602	Philosophy in Education (4)
FE 603	Cross-Cultural Studies in Education (4)
FE 604	Sociology in Education (4)
FE 605	Politics in Education (4)
FE 606	Psychology in Education
CSE 511	Design and Analysis of Algorithms (4)
CSE 542	Data Structures (4)
PSY 510	Developmental Psychology (4)

DEPARTMENT OF MUSIC, THEATRE AND DANCE

Chairperson: *David Daniels*

Professors:

David Daniels, Ph.D., University of Iowa
Stanley Hollingsworth, B.Mus., Curtis Institute of Music and M.M. (Honorary), San Jose State College
Lyle Nordstrom, D.M.A., Stanford University

Associate professors:

Raynold Allvin, D.M.A., Stanford University
James Dawson, A.Mus. D., University of Michigan
John Doyaras, M.M., Northwestern University and D.Litt. (Honorary), Alma College
Robert Facko, Ed.D., Columbia University
Carol Halsted, Ed.D., Wayne State University
Marvin Holladay, M.A., Wesleyan University
Flavio Varani, M.M., Manhattan School of Music

Assistant professors:

Laurie Eisenhower, M.F.A., Arizona State University
Michael Naylor, M.M., University of Miami (Fla.)
John Paul White, Dipl., Curtis Institute of Music

Visiting assistant professors:

Blair Vaughn Anderson, M.A., Western Illinois University
Kathy Devecka, M.A., University of Michigan
William Ward, M.F.A., Wayne State University

Adjunct professors:

David Di Chiera, Ph.D., University of California (Los Angeles)
Terence E. Kilburn

Adjunct assistant professors:

Joyce Adelson, B.M., Eastman School of Music
Janice Albright, B.Mus. Ed., Indiana University
Thomas A. Aston, Wayne State University

Lecturers: *Jacqueline Ammond, Steven Carryer, Robert Conway, Frederic DeHaven, Walter Hill, Susan Wheatley*

Applied music instructors: *Joyce Adelson (piano), Janice Albright (voice), Mary Bartlett (harp), Clarence Beasley (jazz piano), Steven Carryer (jazz guitar), Douglas Cornelsen (clarinet), Penny Crawford (harpsichord), James Dawson (saxophone), Frederic DeHaven (organ), Edith Diggory (voice), John Dion (horn), Pamela Dion (bassoon), Ann Elliott (violin), Robert Gladstone (double bass), John Hall (classical guitar), Pamela Highbaugh (cello), Joanna Hood (viola), Elizabeth Ilku (harp), Wesley Jacobs (tuba), Kenneth Kellett (jazz string bass), Ervin Monroe (flute), Lyle Nordstrom (recorder/lute), Patricia Adams Nordstrom (recorder/viola de gamba), Lawrence Nozero (jazz saxophone), Robert Pangborn (percussion), Joseph Skrzyński (trombone), Daniel Spencer (jazz percussion), Sharon Stanis (violin), Walter Szymanski (jazz trumpet), James Underwood (trumpet), Flavio Varani (piano), John Paul White (voice), Ara Zerounian (viola)*

String quartet-in-residence: *Lafayette String Quartet*

The Master of Music

The Master of Music (M.M.) program is designed to prepare candidates for careers as practicing musicians in performance, conducting, composition and arranging, and as teachers and administrators in private studios, public schools, and junior colleges. The program also prepares candidates for further graduate work.

Degree work consists of courses, independent study, and apprenticeships and includes a core program of 16 credits, a concentration of 16 credits and a 4-credit elective. There are several specified concentrations and the department will, in many cases, help a student construct an individualized program. Please consult the music department graduate handbook for details.

Continuing certification

A planned program for teacher continuing certification may be made a part of the master's program in music education. Students should consult their graduate adviser about these requirements.

Admission

After application materials have been filed with the admissions office each student will be sent a questionnaire. The Department of Music Graduate Committee may require an audition and/or other evidence of ability to work at the graduate level. Persons holding a bachelor's degree in music are the most likely candidates for admission to the program, but persons holding a bachelor's degree in another major may be admitted if they can demonstrate by examinations or experience that they have the expertise necessary to begin work. Remedial work may be required. The department will consider the following factors in determining eligibility for admission:

1. Overall undergraduate grade point average and grade point average in music (normally expected to be 3.00 or better).
2. Personal knowledge of the candidate and/or letters of recommendation and vitae of professional experience.
3. An entrance audition, if electives will be in areas of performance or conducting, or a portfolio of compositions, if concentration will be in composition.

Requirements for the degree

The degree is awarded upon satisfactory completion of 36 hours in an approved program of studies and comprehensive examinations, as well as, in some concentrations, a successful recital.

If the faculty deems areas of the candidate's undergraduate preparation deficient, undergraduate courses may be prescribed. Such work will not count as part of the 36 credits of the master's program.

Each student's progress will be reviewed after every 12 credits are completed. Progress reports will be solicited from the student's adviser. This report, as well as the total grade point average, will be considered. The following may be grounds for dismissal from the program.

1. A grade below 2.5.
2. Two grades below 3.0.

Program of study

The degree program consists of two major components: a core requirement of 16 credits that is identical for all degree programs, and a major concentration of 16 credits. There is also a 4-credit elective.

Core (16 credits)

MUS 510
MUS 521-522
MUT 530
MUS 600

Introduction to Music Bibliography (2)
Seminar in Music Literature (8)
Graduate Seminar in Theory and Analysis (4)
Graduate Seminar (2)

Major concentration (16 credits)

Concentrations are offered in the following areas:

Piano Performance	Orff Pedagogy
Piano Pedagogy	Music Education
Instrumental or Choral Conducting	Jazz Performance
Composition	Vocal Performance
Early Music	Instrumental Performance
Sacred Music	

Other concentrations may be devised with the aid of a departmental adviser.

The requirements for each concentration are stated in the graduate music handbook. Please consult that document for further information.

Elective (4 credits)

The purpose of this elective is to allow the student, *upon approval of the adviser*, to strengthen a particular area within the major concentration (such as Orff pedagogy or applied music); or to improve in some other area (such as orchestration or conducting); or to explore areas outside of music (such as literature or art history). Any 300- or 400-level course may be used in this manner. However, the adviser's approval is required, no matter what the level or area. The student should not take an elective before the first 12-credit review.

Degree study plan

Before the 12-credit review every student must submit a program of study that has been approved by the graduate adviser. This study plan will specify a cohesive plan following one of the department's approved study plans or one of the individualized programs worked out with the adviser.

Students who transfer from continuing certification or change their degree program should submit a study plan with the application for degree program transfer.

The degree will be awarded only when all parts of the study plan have been completed. Changes in the program require recommendation of the adviser and the approval of the departmental graduate committee.

Project or recital

Students offering a project or recital to culminate their programs should secure approval before the beginning of the semester in which the work will take place. The graduate committee will act on requests for such approval upon recommendation of the graduate adviser.

No student may embark upon any culminating activity until after the 24-credit review.

Comprehensive examination

During the student's last semester (generally after any recital has been completed) the department will give the candidate an oral comprehensive examination. Questions will include topics in history, theory, and the candidate's concentration. Any student who does not pass this examination may be offered the examination again one semester later, upon the approval of the student's adviser.

Course Offerings

APPLIED MUSIC

Individual lessons on a particular instrument or in voice. May be repeated for up to 10 credits.

MUA 500	Voice (2 or 4)
MUA 501	Piano (2 or 4)
MUA 502	Organ (2 or 4)
MUA 503	Harpsichord (2 or 4)
MUA 504	Violin (2 or 4)
MUA 505	Viola (2 or 4)
MUA 506	Violoncello (2 or 4)
MUA 507	Double Bass (2 or 4)
MUA 508	Flute (2 or 4)
MUA 509	Oboe (2 or 4)
MUA 510	Clarinet (2 or 4)
MUA 511	Bassoon (2 or 4)
MUA 512	French Horn (2 or 4)
MUA 513	Trumpet (2 or 4)
MUA 514	Trombone (2 or 4)
MUA 515	Tuba (2 or 4)
MUA 516	Timpani (2 or 4)
MUA 517	Percussion (2 or 4)
MUA 518	Harp (2 or 4)
MUA 519	Guitar (Classical) (2 or 4)
MUA 520	Renaissance Winds (2 or 4)
MUA 521	Viola da Gamba (2 or 4)
MUA 522	Lute (2 or 4)
MUA 523	Recorder (2 or 4)
MUA 524	Saxophone (2 or 4)
MUA 530	Piano (Jazz) (2 or 4)
MUA 531	Guitar (Jazz) (2 or 4)
MUA 532	Trumpet (Jazz) (2 or 4)
MUA 533	Saxophone (Jazz) (2 or 4)
MUA 534	Percussion (Jazz) (2 or 4)
MUA 535	Double Bass (Jazz) (2 or 4)
MUA 573	Piano Tuning and Technology (2)

A study of the design and construction of the modern piano. Practical experience in tuning and regulating.

MUA 601 Master's Recital (2 or 4)

A concert or recital demonstrating the candidate's creative and artistic strengths. Credit will be awarded only upon approval of a specially appointed jury committee.

MUSIC ENSEMBLES

MUE 502 Ensemble Performance (1)

Participation in any university performing ensemble plus at least one of the following activities or duties: a musicological study of the work performed, section leader, section rehearsal assistant, assistant conductor, ensemble manager. May be repeated for up to 10 credits.

MUE 504 Chamber Music Performance (1)

Preparation for public concert under the supervision of a chamber music coach. May be repeated for up to 8 credits.

MUE 505 Accompaniment Practicum (1)

Experience in piano accompaniment of vocal and instrumental solo and/or ensembles. May be repeated once for credit.

MUSIC THEORY

MUT 530 Graduate Seminar in Theory and Analysis (4)

A comprehensive review of advanced harmony and a survey of analytical techniques with their applications to styles and forms.

MUT 540 Composition (2 to 8)

Private and group lessons in composition and composition laboratory: technique and individual style are emphasized. May be repeated for up to 10 credits.

MUSIC HISTORY, LITERATURE, AND APPRECIATION MUSIC EDUCATION

MUS 510 Introduction to Music Bibliography (2)

Introduction to basic research methods and music reference materials. Designed as an introduction to graduate work and should be among the first courses taken by the music graduate student.

MUS 518 Business of Music (4)

A survey of business techniques and procedures, laws, licensing and accounting practices in the music industry, and a study of career opportunities related to music. Includes field study or apprenticeship.

MUS 521 Seminar in Music Literature, Medieval to 1750 (4)

An intensive study of music literature and organology up to 1750. Emphasis will be given to a broad base of varied repertory in vocal and instrumental works. Students will perform extensive research in literature of a particular performing medium.

MUS 522 Seminar in Music Literature from 1750 to Present (4)

An intensive study of music literature and organology from 1750 through contemporary works. Emphasis will be given to a broad base of varied repertory in vocal and instrumental works. The student will perform extensive research in literature of a particular performing medium.

MUS 523 History of the Musical Theatre (4)

Survey and analysis of styles and technical aspects of Broadway and musical theatre.

MUS 547 Seminar in the History of Jazz (2)

A seminar researching the development of jazz, including significant periods and trends, stylistic analysis, and aesthetic foundations. May be repeated once for credit with the approval of graduate adviser.

MUS 550 Repertory and Pedagogy of Jazz and Rock (2)

Rock instrumental, vocal, and ensemble instructional methods including arranging and composing for school rock groups, organization and administration of rock ensembles, and curricular development. The course is designed to develop skills in teaching secondary school students. Usually offered in summer sessions only.

MUS 555 Piano Literature (2)

Historical development of music written for the pianoforte. It includes some study of harpsichord and clavichord music.

MUS 560, 561 Church Music I and II (2 each)

Study of liturgy and hymnology. Development of skill in service-playing at the organ, chant accompaniment, modulation and improvisation. Coordination of organ and choral repertory for the church service.

MUS 565 Advanced Studies in Performance Practice (2)

Study of music literature of specific periods and of established performance characteristics unique to a musical period and/or a specific instrument. Detailed analysis of melodic material, harmonic implications, formal structure, rhythmic drive, and textural balance. Usually offered in summer session only. May be repeated for a total of 6 credits.

MUS 570 Independent Study in Jazz (2 to 6)

Individual study in jazz composition, arranging, performance practice, and rehearsal techniques. May be repeated for a total of 6 credits.

MUS 580 Advanced Choral Interpretation and Conducting Techniques (1 to 4)

Techniques and problems of correctly interpreting and conducting choral literature through style analysis, performance practices, choral tradition, and vocal production. Usually offered in summer session only. May be repeated for credit.

MUS 581 Advanced Instrumental Interpretation and Conducting Techniques (1 to 4)

Techniques and problems of correctly interpreting and conducting major orchestral works through style analysis, performance practices, and various instrumentations, including works for a wide range of ensemble combinations. Usually offered in summer session only.

MUS 582 Orff Schulwerk (1 to 4)

A progressive pedagogical system of elementary music education based on the principles of Carl Orff. May be repeated for a total of 12 credits.

MUS 583 Orff Schulwerk Ensemble Development (1 to 4)

Techniques of teaching performance on instruments used in the Orff Schulwerk pedagogy.

MUS 590 Musicological Research (1 to 8)**MUS 591 Ethnomusicological Research (1 to 8)****MUS 593 Music Pedagogy (4)**

Principles of music teaching and learning for the studio teacher. Includes observation and supervised teaching. May be repeated for a total of 8 credits.

MUS 594 Philosophical and Pedagogical Foundations of Music Education (4)

The study of music in American society and the goals and objectives in the public schools. Includes research in current learning theory used to develop contemporary music pedagogy.

MUS 595 Innovations in Music Education (1 to 4)

Innovative patterns of music instruction. Materials, methods, and curricula appropriate to changing philosophies of music education and current research on learning and teaching. Emphasis on structuring learning encounters. Usually offered in summer session only. May be repeated for credit.

MUS 596 Supervision in Music Education (4)

Seminar in the techniques of music teacher evaluation, administrative practices, curriculum building, and test and measurements.

MUS 599 Independent Study (2 to 12)

A program of independent study under the guidance of a faculty adviser. The study plan is subject to final approval by the departmental graduate committee. May be repeated for credit.

MUS 600 Graduate Seminar (2)

Special seminars in music performance, literature, and education. An in-depth study of current topics and issues.

Prerequisite: Completion of all other core courses.

MUS 620 Conducting Apprenticeship (2 to 6)

An individual program under the supervision and in association with one of the major ensemble conductors of the music department.

Prerequisite: Departmental graduate committee approval.

MUS 640 Piano Master Class (1, 2, or 4)

An intensive study of piano literature for stylistic characteristics and technical problems. May be repeated for a total of 8 credits.

Prerequisite: Audition and permission of instructor.

MUS 680 Directed Research in Music Education (2 to 12)

Independent or group research in music education methods, measurement, and curriculum. Prerequisite: Approval of an adviser and the departmental graduate committee.

MUS 682 Orff Pedagogy Master Class (4)

Master class in instructive systems based on the Orff Schulwerk pedagogy.

Prerequisite: Completion of Level IV of the Orff Schulwerk as prescribed by AOSA.

MUS 686 Apprentice College Teaching (1 to 4)

Supervised teaching in college courses together with participation in developing and exploring objectives and materials.

MUS 690 Master's Project (2 to 6)

A project of creative research or teaching approved by the candidate's adviser and the departmental graduate committee.

DEPARTMENT OF PHYSICS

Chairperson: Norman Tepley

Professors:

Abraham R. Liboff, Ph.D., *New York University*
 John M. McKinley, Ph.D., *University of Illinois*
 Ralph C. Mobley, Ph.D., *University of Wisconsin*
 Norman Tepley, Ph.D., *Massachusetts Institute of Technology*
 Robert M. Williamson, Ph.D., *University of Wisconsin*

Associate professors:

Beverly Berger, Ph.D., *University of Maryland*
 Michael Chopp, Ph.D., *New York University*
 Paul M. Doherty, Ph.D., *Massachusetts Institute of Technology*
 Fredrick W. Hetzel, Ph.D., *University of Waterloo (Ontario)*
 Hai-Woong Lee, Ph.D., *University of Pittsburgh*
 W.D. Wallace, Ph.D., *Wayne State University*

Adjunct professor:

Adrian Kantrowitz, M.D., *Long Island College of Medicine*

Adjunct assistant professor of physics:

Bryan P. Shumaker, M.D., *Michigan State University*

Clinical professors of medical physics:

Howard J. Dworkin, M.D. *Albany Medical College*
 Harold Portnoy, M.D. *Wayne State University*
 Paul D. Stein, M.D., *University of Cincinnati*
 Gerald C. Timmis, M.D., *Wayne State University*

Clinical associate professor of medical physics:

Donovan M. Bakalyar, Ph.D., *University of Minnesota*

Clinical assistant professor of medical physics:

Michael B. Smith, Ph.D., *University of Arkansas*

The Doctor of Philosophy in Biomedical Sciences: Medical Physics

Coordinator: Norman Tepley

The College of Arts and Sciences offers a biomedical sciences doctoral program with a specialization in medical physics which is centered in the Department of Physics.

Medical physicists are providing primary contributions to advances in diagnostic and therapeutic medicine. Laser surgery, ultrasonics, nuclear medicine, radiotherapy, and nuclear magnetic resonance imaging are examples of medical modalities developed and implemented by medical physicists. The medical physics specialization of the biomedical sciences doctoral program is designed for students who plan careers in medical research in industrial, hospital, and academic settings. The curriculum is designed to prepare the student to engage in research in areas of physics applied to medicine. Ph.D. candidates may elect to do their dissertation research either with one of a number of Oakland University faculty currently involved in biomedical research or with one of the scientists in area hospitals which collaborate closely with the univer-

sity. Among these are: Henry Ford Hospital, Detroit; Sinai Hospital, Detroit; and William Beaumont Hospital, Royal Oak. In addition to the graduate assistantships described on page 27, hospitals participating in this program may provide support for qualified students. Interested students should consult the program coordinator for details.

Required areas of graduate level proficiency

Areas of graduate level proficiency required for the medical physics specialization are theoretical physics, mathematical methods in scientific research, biophysical sciences, and laboratories. Proficiency in the theoretical physics area would typically be established by taking several of the following courses: PHY 472, 482, 532, 562, and 565. Courses used to satisfy the mathematical methods area might include STA 425, 427 or 501, and APM 535, 536. The biophysical sciences area proficiencies could be met by taking BIO 401, CHM 203 and 204 (or CHM 234 and 235), and CHM 342. Required laboratory courses include courses in biophysical chemistry, biophysics, analog electronics, and medical physics.

For information on admission criteria, procedures and general degree requirements see page 30.

The Master of Science in Physics

The program leading to the degree of Master of Science in physics consists of courses, research, seminar participation, and a final research report or critical essay. A formal thesis is not required. Students receiving the degree will be prepared to work toward the Doctor of Philosophy in physics, to teach at the junior college level, or to work in industry.

The average candidate entering in the fall semester will usually require two academic years to complete the degree. A very well-prepared candidate should complete the required courses and research credits in three semesters. Each student's program will be adjusted to his/her interests and background.

Admission

An applicant for admission to the M.S. program should have a bachelor's degree from an accredited institution or proof of equivalent achievement. The Graduate Record Examination may be accepted in lieu of a formal degree. The applicant's background should be strong in physics and mathematics.

Requirements for the degree

The basic degree requirement is successful completion of 36 credits of graduate courses distributed as follows: 4 credits of PHY 673 (Quantum Mechanics); 1 credit of PHY 600 (Seminar); 23 credits of additional 400-, 500-, or 600-level courses approved by the department; 8 credits of research, including a final written report or critical essay.

Research Fields and Facilities

The Department of Physics faculty is currently involved in research in a number of areas. The biophysics laboratory has been studying electrically mediated growth mechanisms in living systems and protein aggregation in lenses by means of laser light scattering as well as the biomedical topics of magnetocardiography, the fluid dynamics of cerebrospinal fluids and intercranial hemodynamics, radiation protection and

dosimetry in diagnostic radiology, NMR imaging and in vivo NMR spectroscopy, hyperthermia, photodynamic therapy, and image reconstruction in computerized tomography. The experimental nuclear physics group has been studying environmental radiation, particle scattering, gamma ray spectroscopy, and nuclear instrumentation development. The solid state and molecular physics group has been studying surface physics studies, silicon and germanium crystal growth, electronic and magnetic properties of metals and gyromagnetic properties of solids and gases. The theoretical group has been concerned with nuclear structure studies, atomic collision theory, extragalactic radiation sources, and general relativity and cosmology. A computer group has been developing computer graphics programs for solving physics problems. The planetary physics group is studying the Martian atmosphere.

Research facilities include a 2-megawatt-pulsed CO₂ laser, a megawatt-pulsed tunable dye laser, Raman Spectroscopy Laser system including Argon Ion Laser and Dye Laser for photodynamic therapy research, a 4-watt Argon-ion laser, probably the world's largest standard air ionization chamber, a superconducting (SQUID) magnetometer, a 450-kv Cockcroft-Walton nuclear particle accelerator, a 1,024-channel pulse-height analyzer, a time-of-flight analyzer and associated fast-pulse electronics, a visible and ultraviolet grating monochromator, a transient pulse analyzer, a high-field 9-inch Varian magnet, liquid helium cryostats, ultrasonic gear covering the frequency range from 100 kHz to 10GHz, and the Kettering Magnetics Laboratory (unique in the United States), which provides a nonmagnetic environment. A number of telescopes with apertures of up to 10 inches and some research capability are housed in a separate observatory. In addition, an environmental radiation laboratory is operated. Our planetary physics program is supported by our government film repository for all of the Viking Orbiter images of Mars, as well as a low pressure, low temperature, CO₂ chamber which simulates the Martian atmosphere. Among research facilities in neighboring hospitals available to medical physics students are whole-body NMR systems for imaging and spectroscopy, an excellent nuclear medicine laboratory, radiology and computerized tomographic scanning facilities, advanced modalities cancer therapy laboratory including radiotherapy and hyperthermia, diagnostic ultrasonic equipment, a superb laser surgery laboratory, and several major hospital medical libraries. Supporting facilities include an electronics shop and instrument shop staffed by experienced instrument makers. Computer facilities include a Honeywell DPS-2 time-sharing computer, two Tektronix 4051 graphics computers, and several Apple-2, Macintosh, and IBM microcomputers.

Course Offerings

Selected 400-level courses may carry graduate credit.

PHYSICS

PHY 418 Modern Optics Laboratory (2)

Laboratory studies employing modern, sophisticated laser, spectrometer, and photon-counting techniques and equipment including atomic absorption spectroscopy, intensity fluctuation spectroscopy, atomic and molecular fluorescence, and Brillouin scattering. Offered winter only. Prerequisite: PHY 371, and PHY 158 or 159.

PHY 421 Thermodynamics (4)

The zeroth, first, and second laws of thermodynamics with applications to pure substances. Introduction to the kinetic theory of gases and to statistical mechanics. Offered fall only. Prerequisite: PHY 361 and APM 257.

PHY 470 Relativity (4)

Special relativity in mechanics and electromagnetism. Introduction to general relativity and gravitation. Offered winter only. Prerequisite: PHY 361, or 371, or 381.

PHY 472 Quantum Mechanics I (4)

Principles of nonrelativistic quantum mechanics, Schrodinger wave equation, expectation values of energy, position, momentum and angular-momentum operators, spin, perturbation theory, identical particles. With applications to atomic systems. Offered fall only. Prerequisite: PHY 351, 361, 371, and APM 257.

PHY 482 Electricity and Magnetism II (4)

Multipole fields, solutions of Laplace and Poisson equations, electromagnetic waves in insulators and conductors, radiation, and derivation of the laws of optics from Maxwell's equations. Prerequisite: PHY 381, APM 257, and MTH 256.

Graduate courses

PHY 504 Advanced Astrophysics I (4)

Observational properties of stars, galactic structure, stellar dynamics. Prerequisite: PHY 305, 361, 472, and 482.

PHY 505 Advanced Astrophysics II (4)

Stellar structure and evolution, interstellar medium, galaxies, cosmology. Prerequisite: PHY 504.

PHY 522 Statistical Thermodynamics (4)

Review of classical thermodynamics. Kinetic theory of gases, transport phenomena, classical and quantum statistics, partition functions and thermodynamic properties, ensembles, and fluctuations. Prerequisite: PHY 421 and 552.

PHY 525 Radiation Biophysics (4)

The study of molecular and cellular radiation biology, theories of biological effects of radiation, repair of radiation damage, effects of irradiation on human tissue and organs, and radio-sensitivity of human tumors. Prerequisite: BIO 104 and PHY 372 or permission of instructor.

PHY 542 Advanced Electronics (4)

Selected topics in the analysis and design of electronic circuits. Prerequisite: PHY 341 or equivalent.

PHY 548 Advanced Electronics Laboratory (2)

Prerequisite: PHY 347 or equivalent.

PHY 552 Theoretical Physics (4)

Topics and techniques common to graduate physics courses: partial differential equations, eigenvalue problems, special functions, spherical harmonics, Green's functions, variational methods, linear vector spaces, tensors. Prerequisite: PHY 361, 371, and 381.

PHY 562 Mechanics II (4)

Lagrange's and Hamilton's equations of motion, tensors, rotation of rigid bodies, coupled oscillations, canonical transformations. Prerequisite: PHY 361 and APM 257, or equivalent.

PHY 565 Physics of Continuous Media (4)

Introduction to elasticity and fluid mechanics, including tensors, stress, strain, flow, conservation principles, constitutive equations, elasticity, and fluid mechanics. Prerequisite: PHY 361.

PHY 573 Nuclear Physics (4)

Nuclear properties, forces, models, decays, and reactions; nuclear energy, elementary particles. Prerequisite: PHY 372 and 472, or equivalent.

PHY 574 Introduction to Solid-State Physics (4)

Introduction to the thermal, electrical, and magnetic properties of solids, including periodic structure, lattice dynamics, electron interactions and behavior, transport properties, Fermi surface,

optical behavior, and superconductivity. Emphasizes current experimental techniques.
Prerequisite: PHY 371 or 472.

PHY 583 Classical Electrodynamics (4)

Review of electrostatics, magnetostatics, Maxwell's equations, and electromagnetic waves. Relativistic description of particles, fields, and interactions. Radiation by moving charges, bremsstrahlung, radiation damping, self fields.
Prerequisite: PHY 482 and 552.

PHY 600 Seminar (1)

PHY 610 Current Topics in Medical Physics (4)

Lectures on current areas of research in medical physics.
Prerequisite: Admission to Ph.D. program or permission of instructor.

PHY 631 Biomechanics (4)

This course will include topics in statics, kinematics and dynamics, elastic and viscoelastic theory as applied to the physical properties of biological materials and body motion, as well as fluid properties in the mechanics of the circulatory system.
Prerequisite: PHY 361, APM 257, or equivalent.

PHY 632 Introduction to Lasers and Masers (4)

Theory and principles of quantum electronics as applied to lasers and masers, properties of laser light, selected applications.
Prerequisite: PHY 472 or permission of the instructor.

PHY 665 Physics of Fluids in the Body (4)

Newtonian fluid flow; respiration, micturition and non-Newtonian fluid, mucous and blood, circulation; fluid flow in elastic tubes, blood, CSF, lymph.
Prerequisite: PHY 152 and MTH 254.

PHY 673 Quantum Mechanics (4)

Development of formal approach to quantum mechanics, selected illustrations, and applications.
Prerequisite: PHY 472 and 552; PHY 562 advisable.

PHY 674 Advanced Quantum Mechanics (4)

Continuation of PHY 673. Additional illustrations and applications of formal quantum mechanics.
Prerequisite: PHY 673.

PHY 690 Master of Science Research (2 to 12)

PHY 721 The Interaction of Non-Ionizing Radiation with Tissue (4)

Review of electromagnetic theory, dielectric properties of tissue, piezoelectric effects, streaming potentials, dielectrophoresis, passive and active transport, cell-field interactions; observed effects in development, behavior and tissue repair; geomagnetic coupling. Interactions of ultrasound and lasers with cells.
Prerequisite: Admission to Ph.D. program or instructor's permission.

PHY 726 Advanced Radiation Biophysics (4)

In depth study of selected topics in Radiation Biophysics. Areas such as target theory, cell cycle distribution influences, molecular and cellular repair theories and concepts of microdosimetry will be covered.
Prerequisite: PHY 525 and instructor's permission.

PHY 790 Doctoral Research (2 to 12)

PHYSICS FOR TEACHERS

PHT 515 Physics Teaching: Experiments and Equipment (2)

Secondary physics and physical science teachers will design, perform, and critique laboratory and demonstration experiments selected to match individual teaching situations and available equipment. Related physical principles, potential open-ended questions, and sources of experimental difficulties will be viewed.

DEPARTMENT OF POLITICAL SCIENCE

Chairperson: Edward Heubel

Director of public administration program: William A. Macauley

Professors:

Sheldon Appleton, Ph.D., University of Minnesota
*Thomas W. Casstevens, Ph.D., Michigan State University
*Edward Heubel, Ph.D., University of Minnesota
*Roger H. Marz, Ph.D., Michigan State University
James R. Ozinga, Ph.D., Michigan State University
*Carl R. Vann, Ph.D., Syracuse University

Associate professors:

Robert J. Goldstein, Ph.D., University of Chicago
Vincent B. Khapoya, Ph.D., University of Denver
*William A. Macauley, Ph.D., University of Houston

Assistant professors:

*Richard F. Kanost, Ph.D., University of Oklahoma
*Nancy S. Kursman, Ph.D., Rice University
*Karen J. Maschke, Ph.D., Johns Hopkins University
*Brent S. Steel, Ph.D., Washington State University

Visiting assistant professor:

*John S. Klemanski, Ph.D., Wayne State University
*Participants in the public administration program

The Master of Public Administration (M.P.A.)

Graduate adviser: William A. Macauley

Director of internships: John S. Klemanski

The master's degree program in public administration and public policy has been established to provide a challenging education for persons seeking professional careers in governmental and other public agencies. The need for such programs is recognized, given the growth in the number and the complexity of agencies at the state and local levels and the concern for both responsive and effective public service at all levels. The M.P.A. program seeks a generalist focus through a set of core courses and provides an opportunity for specialization through the electives and the directed project/internship option. Persons with significant experience in public service will be advised to undertake a research project; those seeking a transition to a public service career will be assisted in an assignment to a public administration internship in one of the area agencies.

Admission

Admission to the program is selective. Applicants must hold a baccalaureate or the equivalent from an accredited undergraduate institution, and must have a grade record that indicates superior work. The program is designed to accommodate students with a wide variety of undergraduate preparations, provided that certain

courses have been taken and skills acquired as part of those programs. Applicants must meet the university's general requirements for admission to graduate studies. In addition to these requirements, the Department of Political Science will interview the applicants and assess their writing abilities.

Undergraduate preparation for the M.P.A.

Degrees in a wide variety of majors will prepare the student for admission, providing that the record includes:

1. Basic courses in political science, government, or public administration
2. Basic courses in economics
3. One course in accounting

Students otherwise qualified for admission to the program but lacking in these areas may be admitted conditionally with the requirement that the deficiency be corrected during the first year of the program by an appropriate undergraduate course. A departmental adviser will plan with the student an appropriate way of meeting these prerequisites. Undergraduate credits earned to meet these standards will not be counted toward the total of graduate credits needed for the degree.

Requirements for the degree

The requirement for the M.P.A. is 40 credits. The required courses will be offered during the evenings or, in some instances, on Saturdays. If the student successfully carries a normal load, it will be possible to complete the program in two calendar years, starting in the fall of one year and ending in the spring/summer of the next academic year.

Core program

The following core courses are required:

PA 601	Public Administration: Theory	4
PA 620	Quantitative Methods in Public Administration*	4
PA 621	Government Information Systems**	4
PA 653	Public Budgeting and Finance	4
PA 654	Public Personnel Administration	4
PA 655	Public Policy Evaluation	4

Core total 24

*Students with little or no experience with statistics are advised to enroll in PA 522 prior to taking PA 620.

**Students with little or no experience with computers are advised to enroll in PA 523 prior to taking PA 621.

Electives	12
Internship or Project	4

Total M.P.A. credits 40

The student is expected to complete three electives from the public administration offerings and from designated graduate course listings in other schools or programs at Oakland University. At the end of course work, the student who has not had significant public service experience will be assigned an internship; others will be expected to complete a research project.

Assuming a yearly fall admission to the program, core courses and electives may be taken as follows:

	Fall	Winter	Spring/Summer
Year 1	PA 601	PA 620	Elective
	PA 522, 523	PA 654	
Year 2	PA 621	PA 655	Internship or Project
	PA 653	Elective	

Conditional and special graduate status

Students who are conditionally admitted to the program must have the condition removed before undertaking the second year of the program. Students who have special graduate status may take up to two courses in the program without formal admission to the program; to proceed further in the course sequence requires full admission to the program. Upon attaining full graduate status the work done as a special student will be credited toward the program.

Course Offerings

PA 503 Intergovernmental Relations (4)

Conflict and cooperation between, and among, national, state and local governments. Illustrations are drawn from programs in social services, community development and regulation.

Prerequisite: Graduate standing, or junior/senior status with at least three courses in political science, or permission of instructor.

PA 522 Research Perspectives and Techniques (2)

Introduction to descriptive statistics, research design, and methods of data analysis.

PA 523 Computer Applications in Administration (2)

Using and evaluating microcomputer applications such as spreadsheet analysis, business graphics, data base management, productivity and planning software. Exercises will develop proficiency in solving problems in small agency settings.

PA 541 Law and Public Policy (4)

The impact of "the rule of law" concept on administrative policy, practice, and decision-making. Examines the effects of existing procedural requirements on the exercise of administrative discretion, the role of the courts, and the likely consequences of proposed "reforms."

Prerequisite: Graduate standing, or junior/senior status with at least three courses in political science, or permission of instructor.

PA 568 Health Planning: Policies and Processes (4)

The roles and functions of planning in the health care system. Concepts, techniques, issues, and policies relating to health planning and other human services will be examined. Analytic tools will be applied to a number of health problems.

PA 569 Organization and Administration of Health and Medical Care Programs (4)

Emphasis on the application of administrative and organizational analytical perspectives to health and human service organizations. Concepts and perspectives from the governmental and public interest concerns will be applied.

PA 601 Public Administration: Theory (4)

Fundamental concepts of public administration, their origin and development. Distinguishes between public and private and between government and administration.

PA 602 Public Administration: Issues and Problems (4)

Contemporary controversies and trends in public administration systems.

PA 620 Quantitative Methods in Public Administration (4)

A study of quantitative methods for use in the public sector. Emphasis on data analysis for decision-making and attention to common computer techniques are included.

PA 621 Government Information Systems (2 to 4)

Essential tools for management decision-making and program evaluation; data management, information retrieval, selected computer packages, and report writing are covered.

PA 631 Grants: Politics and Administration (4)

An examination of the grant process from the varying perspectives of the granting agencies, the requesting agencies, the institutional offices responsible for compliance, and the ultimate recipients.

Prerequisite: Permission of instructor.

PA 632 Public Sector Collective Bargaining (2)

Policy, law, and process of public sector bargaining.

Prerequisite: Permission of instructor.

PA 633 Workshop in Fair Employment Practices (2)

Statutes, court cases, and federal guidelines for equal opportunity and affirmative action. Exercises with application to local government agencies.

Prerequisite: Permission of instructor.

PA 638 Public Sector Employee Relations (2 to 4)

Policies and practices relating to employee relations and collective bargaining in the public sector.

PA 653 Public Budgeting and Finance (4)

How governments raise funds and allocate them among competing purposes. Relations between agencies and executive budget offices and between executive and legislative branches of government. The elements of budget preparation, defense, and review under various systems, line-item, performance, program, PPBS and zero-base budgets are presented.

PA 654 Public Personnel Administration (4)

Study of the personnel function in public agencies, the legal and political environment, managerial concerns and employee rights, and the problems of public employee collective bargaining.

PA 655 Public Policy Evaluation (4)

How to judge the success of programs; problems of design, data collection, and analysis to sort out causes and evaluate effects; cost-benefit analysis; the organizational and political aspects of evaluation studies.

PA 657 Workshop in Capital Budgeting (2)

Basic principles of government budgeting for capital projects from the perspective of a practitioner at the state and local level.

Prerequisite: Permission of instructor.

PA 658 Internship (4)

Supervised assignment in a public agency for approximately 16 weeks; periodic reports and evaluations.

Prerequisite: Completion of core program.

PA 660 Public Administration Workshop (1 to 4)

Selected applied problems and exercises led by regular adjunct faculty or with the cooperation of practicing public administrators.

PA 690 Research Project (4)

Individual research project related to work or program of a public agency.

Prerequisite: Completion of core program.

PA 691 Directed Readings (2 to 4)

Special readings designed to supplement or augment the course offerings.

PA 692 Special Topics in Public Administration (2 to 4)

Special topics in public administration offered by the department.

Prerequisite: Permission of instructor.

PA 693 Special Topics in Public Policy (2 to 4)

Special topics in public policy offered by the department.

Prerequisite: Permission of instructor.

DEPARTMENT OF SOCIOLOGY AND ANTHROPOLOGY

Chairperson: Jacqueline R. Scherer

Professors:

Peter J. Bertocci (Anthropology), Ph.D., Michigan State University

Judith K. Brown (Anthropology), Ed.D., Harvard University

Jacqueline R. Scherer (Sociology), Ph.D., Syracuse University

Associate professors:

William E. Bezdek (Sociology), Ph.D., University of Chicago

James W. Dow (Anthropology), Ph.D., Brandeis University

Harry Gold (Sociology), Ph.D., University of Michigan

A. Gary Shepherd (Sociology), Ph.D., Michigan State University

Richard B. Stamps (Anthropology), Ph.D., Michigan State University

Donald I. Warren (Sociology), Ph.D., University of Michigan

The Master of Arts in Sociology

The Department of Sociology and Anthropology at Oakland University offers a Master of Arts degree in sociology for individuals who want to develop practical research skills for application to social and community problems. The program can accommodate part-time as well as full-time students.

Admission to the program

The department will consider applicants who hold a bachelor's degree from an accredited institution and whose credentials, including transcripts and letters of recommendation, give evidence of academic proficiency. An undergraduate degree in sociology or anthropology is not necessary; however, some course work in one or both of these disciplines and a course in statistics is required for full admission to the program. Individuals otherwise qualified may be admitted provisionally with the opportunity to make up course deficiencies during their first year in the program.

Requirements for the degree

Candidates for the degree of Master of Arts in sociology must complete 36 credits in approved graduate courses. All candidates, regardless of their fields of concentration, must complete a core program consisting of the following courses: SOC/AN 500; SOC 501; SOC/AN 502; and SOC 503. At the time of admission each candidate will choose a field of concentration from one of the following four areas:

1. Sociology of law, criminal justice, and corrections
2. Sociology of community institutions
3. Social aspects of health and welfare
4. Social anthropology

In consultation with a faculty adviser 12 credits of course work will be selected in the chosen concentration from the courses listed below:

Concentration in law and criminal justice: SOC 522; 525; 527; and 537.

Concentration in sociology of community institutions: SOC 543; 544; 545; and 560.

Concentration in aspects of health and welfare: SOC 514; 515; 528; and 565.

Concentration in social anthropology: AN 501; 510, 530; and 540.

All candidates are required to complete SOC/AN 600: Thesis. Prior to enrollment in this course, all candidates must find a faculty member in the program who will agree to serve as the candidate's thesis adviser. The final product is to be a professional paper of journal length. Each student is free to choose one elective course from any of the graduate offerings in sociology. Appropriate graduate courses in other departments may be taken as an elective only with prior approval of the departmental chairperson or the director of the graduate program.

Typical program of full-time study

Fall

SOC/AN 500 Theories of Society and Culture 4

SOC 501 Survey and Interview Techniques 4

A course in the field of concentration 4

Winter

SOC 502 Specialized Field Techniques 4

SOC 503 Computer Packages 4

A course in the field of concentration 4

Fall

A course in the field of concentration 4

An elective 4

SOC/AN 600 Thesis 4

36

Course Offerings

SOCIOLOGY

SOC 500 Theories of Society and Culture (4)

Acquaints students with the major theoretical foundations of modern sociology. Same as AN 500.

SOC 501 Survey and Interview Techniques (4)

Acquaints students with field interview techniques, questionnaire design, scaling and index construction, experimental and quasi-experimental designs, plus program evaluation research techniques.

SOC 502 Specialized Field Techniques of Social Research (4)

Prepares students in the following areas: research information storage and retrieval, field research instrumentation (photography, cinematography, video and audio recording, field computers), use of archives and data banks, plus participant observation, ethnomethodology and semantic analysis. Same as AN 502.

SOC 503 Computer Packages in Social Science (4)

Prepares students in report writing with computers (text analysis and formatting), various statistical computer packages (SPSS, BMD, Interactive Packages), and computer simulation.

SOC 514 Social Context of Social Work (4)

A study of the social work profession and the social context of welfare policies; the relationships between social structure and the development of social work practice, and public and private welfare organizations.

SOC 515 Sociology of Poverty and Social Welfare (4)

Survey of the development of social welfare programs in the U.S. Procedures developed to deal with problems of poverty, such as case work, community organization, and agency programming; analysis and evaluation of current policy debates on welfare programs.

SOC 522 Sociology of Law (4)

An investigation of law and legal institutions from a comparative perspective, including the uses of law, the development of legal institutions, the role and organization of legal professionals, social influences on law, and the capacity of law to affect social behavior.

SOC 525 Corrective and Rehabilitative Institutions (4)

Correctional institutions according to levels of security, and levels and types of resocialization pressures; problems of interaction within the institution are analyzed; development of inmate subcultures; dynamics of crisis; and equilibrium.

SOC 527 Police and Society (4)

A study of police techniques and problems, of deviant citizen-police relations, and of social control in a field where power is high and visibility is relatively low.

SOC 528 Sociology of Health and Medicine (4)

The structure of the medical profession from the general practitioner who made home calls, to group and hospital-centered practice; the study of medical training, medical practice, and related professions.

SOC 530 Sociology of Youth (4)

A cross-cultural analysis of the emerging youth culture in industrial societies; the economic, social, and political consequences.

SOC 537 Sociology of the Courts (4)

The roles of judges, court officers, jury, and attorneys are described and analyzed in the context of their professional matrix.

SOC 541 Social Change (4)

The prediction and explanation of social change; change mechanisms such as crowds, publics, mass or social movements, and revolutions; and implications for social action.

SOC 543 Communities (4)

Community is examined in both empirical and theoretical contexts, with emphasis on contemporary experiments, recent political and social interpretations of community development, and changing patterns of communal interaction.

SOC 544 Neighborhood (4)

Social patterns of neighborhood life and the individual; the basis of ecological and cultural differentiation in central city, suburbia, and rural fringe areas. Investigation methods include observation and theoretical and applied aspects of research.

SOC 545 Urban Sociology (4)

The social structure, culture, and ecology of early and contemporary urban communities; institutional responses to the problem of modern urban life.

SOC 560 Political Sociology (4)

Sociological factors which influence distribution of power within a society: political communication; maintenance of consensus; the revolution process; the structure of political parties; and the emergence of new states.

SOC 565 Sociological Perspectives on Aging (4)

The most significant recent sociological perspectives on aging: theories of aging and modernization; societal disengagement; age stratification; and comparative status of the aged in developing and industrial societies.

SOC 580 Independent Study and Research (2 or 4)

Directed independent reading and research.

SOC 590 Seminar in Applied Sociology (4)

Content changes yearly. Focuses on the application of research and intervention technique to a contemporary problem. Same as AN 590.

SOC 600 Thesis (4)

Preparation of a professional paper of journal length based on original research and involving the gathering and analysis of data. Same as AN 600.

Prerequisite: Admission to M.A. in sociology program and permission of instructor.

ANTHROPOLOGY**AN 500 Theories of Society and Culture (4)**

Same as SOC 500.

AN 501 Social Anthropology (4)

Examines social structure and social organization in anthropological perspective. Entails the study of economic, political, religious, and kinship systems in the social life of man.

AN 502 Specialized Field Techniques (4)

Same as SOC 502.

AN 510 Cultural Ecology (4)

Examines current theory and data on cultural responses to environment and the processes that lead to human survival or extinction as groups and societies interact with their natural environments.

AN 530 Systems of Wealth and Power (4)

Concepts and methods of political and economic anthropology, emphasizing the interrelated state of political and economic phenomena, with particular reference to preindustrial, non-Western societies.

AN 540 Anthropology of Law (4)

The mechanisms of social control and legal institutions in non-Western, preliterate societies. Topics include the varying types of moral order and the problem of legal enforcement in stateless societies.

AN 580 Independent Study and Research (2 or 4)

Directed independent reading and research.

AN 590 Seminar in Applied Anthropology (4)

Same as SOC 590.

AN 600 Thesis (4)

Same as SOC 600.

Prerequisite: Admission to M.A. in sociology program and permission of instructor.

SPECIAL COURSES

Occasionally, with the approval of the graduate dean, departments which do not have graduate programs may offer certain courses which carry graduate credit. The following courses have been approved by the Graduate Council for these special offerings.

ART AND ART HISTORY**AH 505 African Art (4)**

The arts of the indigenous peoples of West, Central, and East Africa.

AH 555 Michigan Architecture (4)

The development of the commercial domestic, industrial, public, and religious architecture of Michigan from the period of early settlement to the present.

MODERN LANGUAGES**ML 520 Grammar Review Through Translation: French, German or Spanish (4)**

Review of grammar through translation of a wide variety of materials from the foreign language into English. Emphasis on theory of more complex grammatical structures. Introduction to translation theory. Term paper required.

ML 521 Advanced Composition: French, German or Spanish (4)

Practice in written composition. Techniques of textual analysis and exposition are introduced. Term paper in the foreign language required.

ML 522 Advanced Oral Practice: French, German or Spanish (4)

Practice in speaking at an advanced level, which may include style and delivery appropriate to formal and informal speaking situations. May include oral presentations, self-recording, and critique. Students will research underlying principles and current issues in the concept of communicative competence in second language learning.

PSYCHOLOGY**PSY 510 Developmental Psychology (4)**

Description and evaluation of principles and theories of development from birth to maturity. Maturation processes, learning, and emotional disturbances are considered.

Prerequisite: Permission of instructor or acceptance into a graduate program.

PSY 552 Sensation and Perception (4)

Approaches to the basic sensory systems and perceptual processes.

Prerequisite: Permission of instructor.

PSY 553 Cognitive Psychology (4)

The information processing approach to problems in pattern recognition, selective attention, mental operations, short- and long-term memory, the psychology of reading, problem solving, and probabilistic reasoning.

Prerequisite: Permission of instructor.

PSY 590 Seminar: The Psychology of Reading (4)

Cognitive models of reading and reading-related information processing tasks. Empirical studies of the adult reading process.

Prerequisite: Admission to Ph.D. program in reading.

PSY 591 Seminar: The Development of Reading Ability, Individual Differences, and Learning Disabilities (4)

Empirical and theoretical studies of the causes and correlates of differences in reading skill. Developmental models of reading acquisition and individual differences. Analysis of the concept of learning disability.

Prerequisite: Admission to the Ph.D. program in reading; PSY 590 or permission of instructor.

RHETORIC, COMMUNICATIONS AND JOURNALISM**RCJ 515 Summer Institute (2 or 4)**

Concentrated two or four week institutes on topics of interest to high school teachers and post-baccalaureate students. May be cross-listed with ENG 515.

SCHOOL OF BUSINESS ADMINISTRATION

Dean: Ronald M. Horwitz

Office of the Dean:

John E. Tower, associate dean

Julie Dziekan-Schueren, administrator, master of business administration program

Thomas R. Berry, computer facilities administrator

Department chairpersons:

Daniel N. Braunstein, management and marketing

David P. Doane, management information systems and quantitative methods

David D. Sidaway, accounting and finance (acting chair)

Ronald L. Tracy, economics

Professors:

Eleftherios N. Botsas, Ph.D., Wayne State University

Daniel N. Braunstein, Ph.D., Purdue University

Joseph E. Champagne, Ph.D., Purdue University

Alice C. Gorlin, Ph.D., University of Michigan

Karl D. Gregory, Ph.D., University of Michigan

Ronald M. Horwitz, Ph.D., Michigan State University, CPA

Robbin R. Hough, Ph.D., Massachusetts Institute of Technology

Sid Mittra, Ph.D., University of Florida

Miron Stano, Ph.D., Cornell University

Associate professors:

Lizabeth A. Barclay, Ph.D., Wayne State University

David P. Doane, Ph.D., Purdue University

Augustin K. Fosu, Ph.D., Northwestern University

Oded Izraeli, Ph.D., University of Chicago

Paul O. Kingstrom, Ph.D., Wayne State University

Kevin J. Murphy, Ph.D., Michigan State University

Ravi Parameswaran, Ph.D., Georgia State University

Alan Reinstein, D.B.A., University of Kentucky, CPA

Howard S. Schwartz, Ph.D., Cornell University

John E. Tower, Ph.D., State University of New York at Buffalo

Ronald L. Tracy, Ph.D., Michigan State University

Mary P. Van Sell, Ph.D., University of Iowa

Assistant professors:

Sadik Cokelez, D.B.A., Texas Tech University

J. David Diltz, Ph.D., University of Illinois-Urbana

Sherman T. Folland, Ph.D., University of Iowa

Harold Hotelling, Ph.D., Duke University

Barbara T. Kiwicz, M.S.T., Walsh College of Accountancy and Business Administration, CPA

Robert T. Kleiman, Ph.D., Michigan State University

Thomas W. Lauer, Ph.D., Indiana University

Scott A. Monroe, Ph.D., State University of New York at Binghamton

Soo-Young Moon, Ph.D., University of Oklahoma

J. Austin Murphy, Ph.D., University of Georgia

Kevin S. Nathan, Ph.D., University of Oregon
 Eileen E. Peacock, Ph.D., University of Birmingham, England, CPA
 Gerald V. Post, Ph.D., Iowa State University
 Floyd G. Willoughby, Ph.D., Michigan State University

Special instructor:

David D. Sidaway, M.Acc., Ohio State University, CPA

Visiting assistant professors:

Paul Chao, Ph.D., University of Washington
 Margit A. Jackson, M.B.A., Washington State University, CPA
 Sandra S. Pelfrey, M.B.A., Wright State University, CPA
 Anandi P. Sahu, Ph.D., Washington University
 Kenneth M. York, Ph.D., Bowling Green State University

Visiting instructors:

Bruce W. Himrod, M.B.A., Texas Christian University, CPA
 Amir M. Hormozi, M.B.A., University of Houston

Adjunct professors:

Rikuma Ito, Ph.D., University of Illinois
 Paul F. Lorenz, M.B.A., University of Chicago

The Master of Business Administration

A program leading to the Master of Business Administration (M.B.A.) with a special emphasis on the management of information resources is offered by the School of Business Administration. It is designed to educate students for managerial roles in either the private, public, or not-for-profit sectors of the economy. Given the increasing importance of managing information resources at all levels of management, the Oakland M.B.A. program integrates an emphasis on information systems with accounting, behavioral science, quantitative methods, and the functional areas of managerial and business problems — marketing, finance, human resources management, and operations management.

Program philosophy

The M.B.A. program is designed for undergraduate majors from any discipline, including business or management. It is preferred that students with an undergraduate degree in business or one of the functional areas of management have two years of work experience before entering the M.B.A. program. A typical entering class may consist of undergraduate majors from engineering, the natural sciences, the social sciences, computer science, mathematics, business, health care, education, and the humanities. The program is based on the belief that an education in management should:

1. Prepare students for careers involving problem identification, problem solving, decision making, and leadership in any type of organization.
2. Emphasize the determination of goals and the effective utilization of scarce resources.
3. Help students to understand their social environment.
4. Stress understanding of human behavior and the organizational setting, for much of management relates to people — understanding them, communicating with them, working with them, and leading them.
5. Stress the importance of the management of information and information resources in the successful operation of an organization in the 1980s and 1990s.

Board of Visitors

The Board of Visitors provides a direct link between the industrial community and the School of Business Administration. The board is comprised of outstanding corporate and professional leaders from the Detroit metropolitan area. Board members assist the faculty on several projects and provide consultation on goals and objectives, curricula designs and research programs.

The board members are:

Thatcher W. Root, Vice President, Thomson McKinnon Securities, Incorporated; chairman, Board of Visitors
 James A. Aliber, Chairman of the Board and Chief Executive Officer, First Federal of Michigan
 Joseph A. Campana, Vice President, Marketing, Chrysler Corporation
 Keith E. Crain, Vice Chairman, Crain Communications
 James K. Croll, Area Vice President, AT&T Information Systems
 Bernard M. Fauber, Chairman of the Board and Chief Executive Officer, Kmart Corporation
 Glen W. Fortinberry, President and Chairman of the Board, Ross Roy, Incorporated
 William R. James, President, James Associates
 J. Michael Losh, General Manager, Pontiac Motor Division, General Motors Corporation
 Eugene A. Miller, President, Comerica, Incorporated
 Kenneth E. Myers, President, William Beaumont Hospital Corporation
 Harold A. Poling, President and Chief Operating Officer, Ford Motor Company
 Arthur P. Ronan, President, Automotive Operations, Rockwell International Corporation
 Alan E. Schwartz, Senior Partner, Honigman, Miller, Schwartz and Cohn
 Paul G. Stern, President, Unisys Corporation
 James R. Wilbert, Partner, Coopers & Lybrand

Admission

Admissions to the M.B.A. program are selective and depend on several elements, including scholarship and an ability to communicate effectively. Before an applicant can be admitted to the M.B.A. program he or she must have completed:

1. A bachelor's degree or equivalent from an institution of recognized standing except for Oakland University students admitted to the "Accelerated Program."
2. A college course in economics.
3. A recent college algebra course or mathematics courses at a higher level.
4. A college computer programming course in any language, but a structured programming course in Pascal, PL/1, COBOL, BASIC, or FORTRAN is preferred.
5. The Graduate Management Admission Test (GMAT) in the previous five years.

Applicants must also meet the general admission requirements for graduate study at Oakland University. Applications are considered by the Graduate Admission Committee of the School of Business Administration. In making admission decisions, the admission committee assesses the potential of applicants for success in the M.B.A. program by examining their undergraduate records, their GMAT scores, their responses to questions on the supplemental application, and their work experience. Letters of recommendation also may be required by the Graduate Admission Committee.

Graduate Management Admission Test (GMAT)

All applicants for admission must submit scores for the GMAT. This test is administered throughout the world by the Educational Testing Service four times a year, usually in October, January, March, and June. For more information write GMAT, Educational Testing Service, CN 6103 Princeton, New Jersey 08541-6103, or call (609) 771-7330. The GMAT is an important part of the admission process and either careful

study of a GMAT review manual or the completion of a review class is strongly recommended. Applicants with GMAT test scores older than five years will be required to retake the GMAT.

Part-time status

All students should be aware of the high demands placed upon them by graduate work in the Oakland University M.B.A. program. Prospective students should carefully consider the effect of coordinating graduate study with commitments to work, family, and other activities. The "part-time" label should not mislead students about the workload or the commitment required for successful completion of the M.B.A. program. It is required that part-time students complete at least five M.B.A. courses per year. However, the scheduling of M.B.A. classes and student's plans-of-work will be done on the assumption that students will be enrolled in two courses in each of the 15-week fall and winter semesters, and one course in each of the eight-week spring and summer sessions.

Length of program

The length of the M.B.A. program varies from 40 to 60 credits, depending on the student's prior preparation. The minimum program consists of 40 credits of required courses and electives that must be completed by all candidates.

Students may begin the M.B.A. program in the fall, winter, spring or summer sessions depending upon their background. Full-time students normally take 12 credits (four courses) in the fall and winter semesters and three credits (one course) in the spring and summer sessions. The full-time student can finish the complete 60-credit program in less than two years (20 months). Students with sufficient background in business courses may be able to complete the minimum 40 credit M.B.A. program in one year (12 months) of full-time study.

The part-time student taking six courses per year should finish the complete 60 credit program in three and one-third calendar years (40 months) in a year-around program.

In keeping with university regulations, all credits used to meet requirements of the M.B.A. program must be earned within six years of the date that the M.B.A. is awarded.

Accelerated program for undergraduates

The School of Business Administration, in conjunction with other schools and departments of the university, offers an accelerated program which can result in a student earning an M.B.A. and a baccalaureate in a non-business field, in the equivalent of five years of full-time study. Students interested in the accelerated program should apply after they have earned a total of 80 credits and at least one term before they plan to take M.B.A. courses. Students who participate in this track must satisfy all undergraduate degree requirements for their major. They may meet part of these requirements by counting the M.B.A. courses taken before receiving the baccalaureate as "free" undergraduate electives. This program is available to both full-time and part-time students.

The departments which administer the majors of the accelerated program must certify that the students have a GPA in the top 15% of their class and approve their application for the accelerated program. Upon acceptance into the program, the students are considered undergraduates (paying undergraduate tuition) until the baccalaureate is earned and a graduate student (paying graduate tuition) thereafter. Formal admission into the M.B.A. is presumed subject to satisfactory performance in the final courses taken to meet the undergraduate degree requirements. Accelerated program

students must take at least 33 credits in the M.B.A. program after receiving the baccalaureate. Additional information and applications may be obtained from the M.B.A. office.

Graduate assistantships

Graduate assistantships are awarded each year on a competitive basis to full-time students. Graduate assistants assist School of Business Administration faculty with their current research projects and in return receive a stipend and tuition remuneration. Additional information and applications may be obtained from the M.B.A. office.

M.B.A. program of study

The M.B.A. program consists of three parts: the precore program, the core program, and a set of at least four electives. Each part of the program will be detailed below.

M.B.A. precore program

The precore program is designed to develop basic skills in management for the M.B.A. student. These courses do not assume any previous education in business or management. Students entering the M.B.A. program are required to have college courses in economics, algebra, and computer programming, or the equivalent experience. In some cases, M.B.A. applicants may be directed to enroll in appropriate undergraduate courses prior to admission to obtain the required background in economics, college algebra, and computer programming. In such cases, eventual admission to the M.B.A. program will depend upon the successful completion of these courses, along with the usual criteria for admission.

The precore program of 21 credits consists of the following seven courses:

Precore courses	Credits	Who will probably need it?
QMM 501 Quantitative Methods for Management	3	Applicants without a calculus background or who need a review in math through calculus.
MIS 502 Computer Methods for Management	3	Applicants without a course that covers word processing, spreadsheets, data base management, graphics, data communication, programming in a fourth generation language, and related workstation capabilities.
or MIS 503 Computer Orientation	1	Applicants with a course in the workstation capabilities noted above. This is an orientation to the current mainframe and personal computer resources available to M.B.A. students.
QMM 510 Statistical Analysis for Managers	3	Applicants without a calculus-based business statistics course.
ECN 520 Microeconomic Decision Analysis	3	Applicants without an intermediate level microeconomic theory course.

ACC 511	Financial Accounting	3	Applicants without a financial accounting course or two-course principles of accounting sequence.
ORG 530	Organizational Behavior	3	Applicants without the required course work in organizational behavior.
MGT 550	Legal Environment of Business	3	Applicants without a course in the legal environment of business, including ethics, an outline of the legal system, and the law and politics of regulation.

Only students formally admitted into the M.B.A. program or another graduate program at Oakland University may register for the M.B.A. precore courses.

To be exempted from the precore courses the applicant must have passed an equivalent graduate or undergraduate course with a grade of 3.0 (B) or better within the previous ten years. Exemption from a precore course reduces the total credit requirement for the M.B.A. Students exempted from all the precore courses will be required to take the minimum M.B.A. program of 40 credits. Exemptions from precore courses are determined by the M.B.A. office after an evaluation of the student's transcript.

M.B.A. core program

The core program introduces the M.B.A. student to the functional areas of management and applies the tools of accounting, economics, quantitative methods, organizational behavior, management information systems, marketing, and finance to problems and cases in management policy and strategy.

Core courses		Credits
ACC 512	Managerial Accounting Systems	3
ECN 522	Macroeconomic Analysis	3
FIN 533	Managerial Finance	3
MKT 560	Marketing	3
MIS 524	Management Information Systems	3
MIS 525	Management of Information Resources	3
ORG 531	Human Resources Management	3
QMM 521	Operations Management	3
MGT 535	Policy, Strategy, and Goals	3
		27

M.B.A. students may be exempted from any of the core courses except MGT 535, the policy course. To be exempted the student must have earned a grade of 3.0 (B) or better in an equivalent or higher level course at the undergraduate or graduate level within the past ten years. Students exempted from ACC 512, FIN 533, MIS 524, MKT 560, or ORG 531 will be required to take an elective in the same area to replace the core course. Students exempted from ECN 522, MIS 525, or QMM 521 will be required to take an additional M.B.A. elective in any area to replace the core course. MGT 535 will be required of all M.B.A. candidates. Exemptions from core courses and acceptable elective courses are determined by the M.B.A. office after an evaluation of the student's transcript.

M.B.A. electives

M.B.A. candidates complete their program by selecting a minimum of twelve credits of M.B.A. electives. These elective credits may be drawn from M.B.A. courses offered by the School of Business Administration or from a very limited set of approved courses offered by other units of Oakland University. Six of the elective credits may be a master's project. M.B.A. students may not take more than three of their electives in one area of business (ACC, ECN, FIN, MGT, MIS, MKT or QMM).

A typical part-time program for non-business majors

The following program is the standard structured schedule for the M.B.A. student that takes the complete 60 credit part-time program on two evenings per week, from 6:30 to 9:20 p.m. This schedule can also be used as a guide for any student, to determine the sequence in which M.B.A. courses are offered.

		Schedule with start in:	
		Fall term	Spring session
First year			
QMM 501	Quantitative Methods for Management	Fall	Spring
MIS 502	Computer Methods for Management	Fall	Summer
ACC 511	Financial Accounting	Winter	Fall
QMM 510	Statistical Analysis for Managers	Winter	Fall
ECN 520	Microeconomic Decision Analysis	Spring	Winter
ORG 530	Organizational Behavior	Summer	Winter
Second year			
MGT 550	Legal Environment of Business	Fall	Spring
ECN 522	Macroeconomic Analysis	Fall	Summer
ACC 512	Managerial Accounting Systems	Winter	Fall
MIS 524	Management Information Systems	Winter	Fall
MKT 560	Marketing	Spring	Winter
QMM 521	Operations Management	Summer	Winter
Third year			
FIN 533	Managerial Finance	Fall	Spring
ORG 531	Human Resources Management	Fall	Summer
MIS 525	Management of Information Resources	Winter	Fall
MGT 535	Policy, Strategy, and Goals	Winter	Fall
MBA Elective #1		Spring	Winter
MBA Elective #2		Summer	Winter
Fourth year			
MBA Elective #3		Fall	Spring
MBA Elective #4		Fall	Summer

A typical part-time program for business majors

The following program is a typical program for the M.B.A. student with an undergraduate business major and the appropriate background to take the 40 credit M.B.A. program:

Precore courses:

The following program assumes that the student is exempted from these Precore M.B.A. courses because he or she earned a 3.0 (B) or better in an equivalent graduate or undergraduate course:

QMM 501	Quantitative Methods for Management
MIS 502	Computer Methods for Management (must take MIS 503)
ACC 511	Financial Accounting
QMM 510	Statistical Analysis for Managers
ECN 520	Microeconomic Decision Analysis
ORG 530	Organizational Behavior
MGT 550	Legal Environment of Business

Schedule with start in: Fall term Spring session

First year

MIS 503	Computer Orientation (1 credit)	Fall	Spring
ECN 522	Macroeconomic Analysis**	Fall	Summer
ACC 512	Managerial Accounting Systems*	Winter	Fall
MIS 524	Management Information Systems*	Winter	Fall
MKT 560	Marketing*	Spring	Winter
QMM 521	Operations Management**	Summer	Winter

Second year

FIN 533	Managerial Finance*	Fall	Spring
ORG 531	Human Resources Management*	Fall	Summer
MIS 525	Management of Information Resources**	Winter	Fall
MGT 535	Policy, Strategy, and Goals	Winter	Fall
MBA Elective #1		Spring	Winter
MBA Elective #2		Summer	Winter

Third year

MBA Elective #3		Fall	Spring
MBA Elective #4		Fall	Summer

*If exempted from this course, replace with an elective in the same field, i.e., ACC, FIN, MIS, MKT, or ORG.

**If exempted from this course, replace with an M.B.A. elective in any field.

A typical full-time program for non-business majors

The following is a typical schedule for the M.B.A. student who takes the complete 60 credit program on a full-time basis in the evening, from 6:30 to 9:20 p.m.:

First year

Spring:	QMM 501	Quantitative Methods for Management
Summer:	MIS 502	Computer Methods for Management
Fall:	ACC 511	Financial Accounting
	QMM 510	Statistical Analysis for Managers
	MIS 524	Management Information Systems
	MGT 550	Legal Environment of Business
Winter:	ACC 512	Managerial Accounting Systems
	ECN 520	Microeconomic Decision Analysis
	MKT 560	Marketing
	ORG 530	Organizational Behavior

Second year

Spring:	FIN 533	Managerial Finance*
Summer:	QMM 521	Operations Management*
Fall:	ECN 522	Macroeconomic Analysis
	MIS 525	Management of Information Resources
	ORG 531	Human Resources Management
	MBA Elective #1	
Winter:	MGT 535	Policy, Strategy, and Goals
	MBA Elective #2	
	MBA Elective #3	
	MBA Elective #4	

*If a full-time student wishes to advance the program completion it is possible to take more electives in the spring and summer terms of the second year.

A typical full-time program for business majors

The following program is a typical program for the full-time M.B.A. student with an undergraduate business major and the appropriate background to take the minimum 40 credit M.B.A. program:

Precore courses:

The following program assumes that the student is exempted from these Precore M.B.A. courses because he or she earned a 3.0 (B) or better in an equivalent graduate or undergraduate course:

QMM 501	Quantitative Methods for Management
MIS 502	Computer Methods for Management (must take MIS 503)
ACC 511	Financial Accounting
QMM 510	Statistical Analysis for Managers
ECN 520	Microeconomic Decision Analysis
ORG 530	Organizational Behavior
MGT 550	Legal Environment of Business

First year

Fall:	MIS 503	Computer Orientation (1 credit)
	ACC 512	Managerial Accounting Systems*
	ORG 531	Human Resources Management*
	MIS 524	Management Information Systems*
Winter:	MIS 525	Management of Information Resources**
	MKT 560	Marketing*
	QMM 521	Operations Management**
	MBA Elective #1	
Spring:	FIN 533	Managerial Finance*
Summer:	ECN 522	Macroeconomic Analysis**

Second year

Fall:	MGT 535	Policy, Strategy, and Goals
	MBA Elective #2	
	MBA Elective #3	
	MBA Elective #4	

*If exempted from this course, replace with an elective in the same field, i.e., ACC, FIN, MIS, MKT, or ORG.

**If exempted from this course, replace with an M.B.A. elective in any field.

Time of admission

The part-time M.B.A. program for non-business majors starts in the fall semester and spring session. Applicants who wish to enter the part-time program should have their applications completed by June 30 for the fall semester and by February 28 for the spring session. Students with a mathematics background through calculus also may enter the M.B.A. program in the winter and summer terms and should have their applications completed by November 15 for the winter term and April 30 for the summer session. Applicants with a business degree can enter the M.B.A. program in the fall, winter, spring or summer terms and should have their applications completed by the previous June 30, November 15, February 28, and April 30, respectively.

Non-business majors normally start the full-time program in the spring session. If applicants have math through calculus or a business degree, they may enter the M.B.A. in the fall, winter, spring, or summer terms and should have their applications completed by the previous June 30, November 15, February 28, and April 30, respectively. A completed application means that the potential M.B.A. student has on file in the Graduate Admissions Office, 205 Wilson Hall, a complete Application for Graduate Study, an M.B.A. supplemental application, transcripts sent directly to the

Graduate Admissions Office from all previous colleges and universities, and a GMAT score.

Candidates should take the GMAT at least five weeks before the deadline for their applications to allow time for the scores to be sent to Oakland University.

Transfer credit

In accordance with the regulations of the Graduate Council, up to 9 credits of relevant M.B.A. course work may be transferred from an M.B.A. program at an accredited institution. For credit to transfer the student must have earned a grade of 3.0 (B) or better in the course. The transfer credit will reduce the number of credits required in the M.B.A. program. The acceptance of transfer credit and the related course exemptions are determined after an evaluation of a student's transcript. They must be approved by the M.B.A. office and the dean of Graduate Study.

Student evaluation and grading

M.B.A. students must maintain at least a 3.00 grade point average in accordance with the university requirements for graduate students. Dismissal may result from severe deficiencies, such as two or more course grades below 3.0, one grade below 2.5, a grade point average in M.B.A. courses of less than 3.00, or insufficient progress toward a degree. Any course resulting in a grade less than 2.0 must be repeated.

In making dismissal recommendations, three criteria are considered: the student's overall grade point average, the number of course grades below 3.0, and the faculty assessment of the student's academic potential and ability to master the skills emphasized in the program. Hence, a 3.00 grade point average does not necessarily guarantee continuation in the program. Generally, two course grades below 3.0 or one course grade below 2.5 within the first 24 credits of graduate work is viewed as excessive, especially when accompanied by a marginal GPA. Similarly, failure to complete individual courses on schedule jeopardizes progress toward the degree, regardless of GPA, making the student liable for probation or dismissal. Students who do not complete an M.B.A. course for 12 months must formally apply for readmission to the M.B.A. program. Even if students leave the program voluntarily and in good standing, readmission is not automatic.

Master's project (optional)

The optional master's project (equal to six elective credits) requires the application of classroom training and extra-classroom study to a practical management problem. It must involve collection and analysis of data in an actual organizational setting as well as cogent recommendations to management for resolving the problem. The master's project is not designed to be a theoretical master's "thesis." It should be organized around a management problem which requires input from several functional areas of management.

The student obtains a faculty project adviser and, with the adviser's approval, obtains a second faculty person to act as a reader. The reader may be from another discipline. A copy of the project proposal as approved and signed by the adviser, reader, and student must be submitted to the M.B.A. office during the first week of the semester in which the project course is taken.

The master's project is graded as "S" (satisfactory) or "U" (unsatisfactory). A grade of "P" (progress) may be assigned if the project is not complete at the semester's end, and if sufficient progress has been made to warrant the "P" grade. If the project is not completed within two years, the "P" grade becomes an "I" (no credit) grade and the student must register for the course a second time to receive credit for the completed project.

Course Offerings

ACCOUNTING

ACC 511 Financial Accounting (3)

Focus is on financial accounting for external reporting; communications addressed to shareholders, government agencies, potential investors, and the public.

Prerequisite: Admission to the M.B.A. program.

ACC 512 Managerial Accounting Systems (3)

Emphasizes recording, reporting, and the use of data within the enterprise. Cost accounting, budgeting, and internal control systems are covered.

Prerequisite: M.B.A. precore.

ACC 615 Tax Accounting (3)

Examination of the concepts of taxation and the essential logic underlying the federal tax laws. The class will analyze individual and corporate income tax laws rather than train students to prepare current-year tax returns.

Prerequisite: M.B.A. precore and ACC 512.

ACC 618 Computer-Based Accounting and Systems (3)

Examination of computer applications in accounting integrated with inventory control and related operating and sales data processing. Internal control, security, and auditing features will be stressed. Includes analysis of computer hardware and software needs, systems analysis, system development, and implementation.

Prerequisite: M.B.A. precore, MIS 524 and ACC 512.

ACC 690 Independent Study in Accounting (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a faculty member in accounting prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, ACC 512, and prior approval of instructor.

ECONOMICS

ECN 520 Microeconomic Decision Analysis (3)

Analysis of microeconomic decision makers in a market environment. Includes models of: consumer theory, the firm, production processes, costs, pricing, resource allocation, market and industry structure, decision making under certainty, and an introduction to decision making under uncertainty.

Prerequisite: QMM 501 and QMM 510.

ECN 522 Macroeconomic Analysis (3)

Construction, analysis, and interpretation of models of national and international aggregate economic behavior, including policy implications of alternative models, with emphasis on current economic events. International economic interrelationships are explored.

Prerequisite: M.B.A. precore.

ECN 648 Labor Economics (3)

Economic analysis of the functioning of labor markets, with emphasis on: investment in human capital; the role of education; labor market differentiation by race, sex, and age; unemployment; and the geographic and occupational mobility of labor.

Prerequisite: M.B.A. precore and ECN 522.

ECN 673 International Trade and Finance (3)

Examination of the theory of international trade, international monetary mechanisms, exchange-rate regimes, the balance of payments, and economic interdependence.

Prerequisite: M.B.A. precore and ECN 522.

ECN 678 Economic Analysis of Law (3)

Economic analysis of the basic institutions of legal systems. Emphasis is on laws that are not directly intended to regulate the economy, including property, contract, tort, criminal, and procedural law. Labor and anti-trust law will be discussed only tangentially.

Prerequisite: M.B.A. precore.

ECN 690 Independent Study in Economics (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a faculty member in economics prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, ECN 522, and prior approval of instructor.

FINANCE

FIN 533 Managerial Finance (3)

Introduction to and survey of finance. Development of the tools of financial analysis and forecasting, the basics of investment decision making, the fundamentals of valuation theory, and the types of long-term financing.

Prerequisite: M.B.A. precore and ACC 512.

FIN 617 Financial Theory (3)

Examines in detail securities market operations, including yields and returns expected by investors in various segments of the capital market. Includes an analysis of the relative merits of obtaining funds for company growth through stocks, bonds, or retained earnings.

Prerequisite: M.B.A. precore and FIN 533.

FIN 618 Portfolio Analysis (3)

Comprehensive treatment of security analysis and portfolio theory. Includes the scope of investment management, organized securities markets, the influence of macropolicy instruments on the money and capital markets, and analytical procedures for appraising securities.

Prerequisite: M.B.A. precore and FIN 533.

FIN 620 Money and the Financial System (3)

Examination of the nature of money and credit, the supply of money and credit through commercial banks and other financial intermediaries, and the role of the Federal Reserve System in the money supply process and interest rate determination.

Prerequisite: M.B.A. precore, FIN 533, and ECN 522.

FIN 627 Multinational Finance and Accounting (3)

Examination of capital markets, ownership strategies, project evaluation, account consolidation, and auditing across national and currency boundaries.

Prerequisite: M.B.A. precore, FIN 533, and ECN 522.

FIN 642 Cases in Managerial Finance (3)

Analysis of cases in managerial finance applying and expanding principles introduced in FIN 533.

Prerequisite: M.B.A. precore and FIN 533.

FIN 656 Public Finance (3)

Analysis of the basis for public spending and taxation including: equity, efficiency, and flexibility of alternative tax revenue bases; expenditure determination; effects on income distribution, growth, and various sectors of the economy; financing the public debt.

Prerequisite: M.B.A. precore, FIN 533, and ECN 522.

FIN 690 Independent Study in Finance (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a finance faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, FIN 533, and prior approval of instructor.

MANAGEMENT (Including Business Policy and Legal Environment of Business)

MGT 535 Policy, Strategy, and Goals (3)

Application of management tools of economics, statistics, organizational behavior, accounting, marketing, finance, operations management, and management information systems to the analysis of organizational case studies.

Prerequisite: M.B.A. precore and core.

MGT 550 Legal Environment of Business (3)

Examination of the legal and political framework in which business decisions are made and conflicts resolved. Emphasizes the sources and effects of regulation, including the law of antitrust, employee protection, environmental management, lobbying, and corporations.
Prerequisite: ECN 520.

MGT 611 Master's Project (3)

Independent elective project.
Prerequisite: M.B.A. precore and core.

MGT 626 Managing the Multinational Enterprise (3)

Analysis of the scope, structure, and strategies of the multinational enterprise. Includes strategic planning, production and distribution logistics, selection of technology, shifting targets, transfer prices, political risk forecasting, and control of strategy.
Prerequisite: M.B.A. precore and ECN 522.

MGT 638 Labor-Management Relations (3)

Analysis of management-employee relations in modern organizations and public policy in labor-management areas.
Prerequisite: M.B.A. precore and ORG 531.

MGT 660 Launching and Managing Small Businesses (3)

Analysis of the role of small businesses in the U.S. economy, the small business administration, franchise opportunities, consulting as a business, and the launching, financing, and managing of a small business. A significant term project is required.
Prerequisite: M.B.A. precore and core.

MGT 667 Health Care Organization (3)

Application of the tools of economic analysis to the health care industry and government health policy. Examination of proposed changes in the current system and benefit/cost analysis applied to public policy and resource allocation.
Prerequisite: M.B.A. precore and QMM 521.

MGT 670 Nonprofit Sector Management (3)

Managerial principles for, and cases on, the management of nonprofit institutions. Examination of goal setting, progress evaluation, cost-benefit analysis, program design, and financing.
Prerequisite: M.B.A. precore and core.

MGT 680 Seminar: Current Business Topics (3)

The analysis of topics of current interest in management. Outside faculty and managers will participate in the seminar as an integral part of the course.
Prerequisite: Completion of the core of the M.B.A., excluding MGT 535.

MGT 690 Independent Study in Management (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a management faculty member prior to registering for this course. Offered every term.
Prerequisite: M.B.A. precore and prior approval of instructor.

MANAGEMENT INFORMATION SYSTEMS**MIS 502 Computer Methods for Management (3)**

Introduction to the use of computers in management. Topics include computer hardware and software technology; workstation capabilities including word processing, spreadsheet analysis, data base management/query systems, business graphics, data communication, and programming in a fourth generation language. Includes exercises on personal computers and the university's mainframe computer.
Prerequisite: Admission to the M.B.A. program.

MIS 503 Computer Orientation (1)

Familiarization with the Oakland University mainframe and microcomputer environment, including word processing, spreadsheet analysis, data base management, business graphics, data communication, third and fourth generation languages, and the Explore, Minitab, SPSS,

and BMDP statistical programs. (Graded S/U.)

Prerequisite: Admission to the M.B.A. program and exemption from MIS 502.

MIS 524 Management Information Systems (3)

The development of information systems from the perspective of the manager as user. Topics include the behavioral, organizational, and systems theory foundations of MIS; strategies for determining information, database, and user interface requirements; alternative system development strategies; and the integration of transaction processing, decision support, office automation, and telecommunications.
Prerequisite: M.B.A. precore.

MIS 525 Management of Information Resources (3)

Topics include organization of the MIS function; evaluation of information systems; acquisition of resources; support of end users; and the management of the system development process, telecommunications, and the information systems staff.
Prerequisite: M.B.A. precore and MIS 524.

MIS 600 Analysis of Complex Systems (3)

Modeling, instrumentation, and control of complex systems. Emphasizes design, implementation, and testing of information and control systems in unstructured and realistic contexts. Includes specification, evaluation, and selection of hardware and software systems, ranging from applications in microcomputers to large-scale computers.
Prerequisite: M.B.A. precore, MIS 524, and QMM 521.

MIS 604 Data Base Management/Data Communication (3)

Examination of the technology, organization, use, economics and administration of data base management systems (DBMS) and data communication systems. Topics include the capabilities, logical organization, and implementation of a DBMS; the technology, design, control, and use of wide area and local area networks. Includes exercises using R:Base 5000 or equivalent.
Prerequisite: M.B.A. precore and MIS 525.

MIS 607 Computer Systems for Problem-Solving (3)

An advanced communications and problem-solving course in which students learn to specify and design systems for computers. Consists of field studies by teams of students, leading to computerized solutions of real world problems.
Prerequisite: M.B.A. precore and MIS 525.

MIS 636 Information Processing and Decision Making (3)

This course examines the design and implementation of decision support systems from the viewpoint of behavioral and organizational theory. Includes a critical review of the theory and case studies taken from recent MIS literature.
Prerequisite: M.B.A. precore and core.

MIS 644 Simulation in Management (3)

Computer simulation models of management processes using GPSS, or an equivalent simulation language, and using standard programming languages. Implications of models and sensitivity analyses for forecasting, planning, and decision making in the management environment are explored.
Prerequisite: M.B.A. precore, MIS 525, and QMM 521.

MIS 690 Independent Study in Management Information Systems (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a management information systems faculty member prior to registering for this course. Offered every term.
Prerequisite: M.B.A. precore, MIS 525, and prior approval of instructor.

MARKETING**MKT 560 Marketing (3)**

Focuses on problems of product planning, market segmentation, demand analysis, consumer behavior, product distribution, pricing, and promotion. The approach to these problems considers both the normative or theoretical, and the empirical or marketing research orientations.
Prerequisite: M.B.A. precore.

MKT 604 Consumer Behavior (3)

Study of basic factors influencing consumer behavior, with emphasis on structuring and managerial use of consumer decision-making models. Social-psychological and economic variables, including learning, motivation, attitude, personality, small groups, demographic, and cultural factors are examined.

Prerequisite: M.B.A. precore and MKT 560.

MKT 605 Marketing Research (3)

Focus on the generation and management of information in marketing decisions. Covers the evaluation of additional marketing information; how it is acquired and used; the manager's role in market research; the researcher's role in supplying marketing information.

Prerequisite: M.B.A. precore and MKT 560.

MKT 608 Marketing Management (3)

In-depth study of a selected topic relevant to management of the marketing function. Possible topics include marketing and society, advertising and mass media, institutional marketing, distribution channel management, operations marketing, and promotion policies.

Prerequisite: M.B.A. precore and MKT 560.

MKT 680 Seminar in Marketing (3)

Applications of recent theoretical and empirical findings in marketing. Students work on a project, in cooperation with local firms, where they apply the tools acquired in marketing and related courses to a current managerial problem.

Prerequisite: M.B.A. precore and core.

MKT 690 Independent Study in Marketing (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a marketing faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, MKT 560, and prior approval of instructor.

ORGANIZATIONAL BEHAVIOR**ORG 530 Organizational Behavior (3)**

Organizational behavior is analyzed at individual, group, and organizational levels. Individual and group processes such as perception, learning, motivation, communication, and conflict are studied in depth. Organizational-level topics include size, structure, complexity, and effectiveness.

Prerequisite: Admission to the M.B.A. program. Corequisite: QMM 510.

ORG 531 Human Resources Management (3)

Theoretical and empirical issues of the personnel function in modern organizations. Includes job analysis and design, employee recruiting, compensation policies and practices, research techniques, government policy, law, and social and environmental factors related to decision making.

Prerequisite: M.B.A. precore.

ORG 635 Decision Making in Organizations (3)

A comparison of current cognitive, social, and organizational approaches to the study of decision making. Behavioral information processing concepts will be used as an aid to understanding how managerial decisions are made. Examples are introduced from functional management, as well as policy and strategy.

Prerequisite: M.B.A. precore and ORG 531.

ORG 636 Leadership and Group Performance (3)

Comprehensive examination of different leadership theories, with emphasis on relevant empirical evidence and application of the theories to case studies.

Prerequisite: M.B.A. precore and ORG 531.

ORG 637 Motivation and Work Behavior (3)

Analysis of the individual organizational factors affecting employee motivation, performance, and satisfaction. Includes the role of leadership, job design, environmental variation, compensation policies, goal-setting techniques, and group influences.

Prerequisite: M.B.A. precore and ORG 531.

ORG 654 Research Methods (3)

Topics in methods of organizational research. Representative subjects include development of hypotheses, sampling, research design, research types, measurement, methods of data collection, and analysis and interpretation of data.

Prerequisite: M.B.A. precore and ORG 531.

ORG 680 Topics in Organizational Management (3)

Study of selected topics related to organizational behavior and/or human resources management. Topics may include: job design, career development, compensation, management across cultures, and power in organizations.

Prerequisite: M.B.A. precore and ORG 531.

ORG 690 Independent Study in Organizational Behavior (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from an organizational behavior faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, ORG 531, and prior approval of instructor.

QUANTITATIVE METHODS**QMM 501 Quantitative Methods of Management (3)**

Theory and application of mathematical skills required for courses in the M.B.A. program. Covers linear algebra, linear programming, calculus, probability, and their applications in management.

Prerequisite: Admission to M.B.A. and college algebra.

QMM 510 Statistical Analysis for Managers (3)

Statistical methods useful in management. Includes statistical description, discrete and continuous probability models, estimation, hypothesis testing, control charts, simple time-series modeling, and regression analysis. Real-world applications and use of "canned" computer programs are stressed.

Prerequisite: QMM 501.

QMM 521 Operations Management (3)

Economic problems of production management in manufacturing and service industries, such as inventory management, statistical quality control, plant and equipment investment, facility location, optimization, and operations scheduling. Qualitative problems of the production environment are also considered.

Prerequisite: M.B.A. precore.

QMM 640 Operations Research (3)

Topics in modeling of managerial decision problems under certainty and under uncertainty. Includes linear programming, game theory, PERT and CPM, Bayesian analysis, simulation, chance-constrained programming, queuing theory, and Markovian analysis. Designed to refine the student's scientific problem-solving skills with emphasis on applications of these skills.

Prerequisite: M.B.A. precore and QMM 521.

QMM 641 Manufacturing Planning and Control (3)

Definitions, techniques, and practices in manufacturing applications, including traditional manufacturing techniques as well as current issues such as cellular and flexible manufacturing systems. Emphasizes differences between American and foreign manufacturing techniques.

Prerequisite: M.B.A. precore and QMM 521.

QMM 645 Cases in Operations Management (3)

Analysis of diverse cases from the perspective of the operations function in service and manufacturing organizations. Cases are descriptive of actual operating situations. Covers situations which lend themselves to analytical and computer techniques as well as problems involving subjective judgment and creativity in translating theory into practice.

Prerequisite: M.B.A. precore and QMM 521.

QMM 652 Forecasting (3)

Survey of analytical forecasting methods, techniques include exponential smoothing, time series decomposition, Box-Jenkins, simple econometric and distributed lag models, seasonality and autocorrelation, Delphi and other qualitative methods, assessment of commercially available fore-

casting services, and case studies of managerial forecasting. Extensive use of computer packages to prepare actual forecasts for written and oral presentation.
Prerequisite: M.B.A. precore and ECN 522.

QMM 655 Econometric Data Analysis (3)

Formulation and testing of statistical models using regression techniques. Topics include: violations of regression assumptions, binary variables, autoregressive and distributed lag models, "large" simultaneous equation models and alternatives to ordinary least squares. Includes extensive experience using computer packages to prepare analyses of read data for written and oral presentation.
Prerequisite: M.B.A. precore.

QMM 690 Independent Study in Quantitative Methods (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a quantitative methods faculty member prior to registering for this course. Offered every term.
Prerequisite: M.B.A. precore, QMM 521, and prior approval of instructor.

SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

Dean: Robert M. Desmond

Office of the Dean:

Nan K. Loh, associate dean for graduate studies and research and John F. Dodge professor of engineering
Bhushan L. Bhatt, acting associate dean for administration

Department chairs:

David E. Boddy (acting), computer science and engineering
Tung H. Weng (acting), electrical and systems engineering
Joseph D. Hovanesian, mechanical engineering

Professors:

David E. Boddy, Ph.D., Purdue University
Robert M. Desmond, Ph.D., University of Minnesota
Robert H. Edgerton, Ph.D., Cornell University
David H. Evans, Ph.D., Brown University
Richard E. Haskell, Ph.D., Rensselaer Polytechnic Institute
Joseph D. Hovanesian, Ph.D., Michigan State University
Yau Yan Hung, Ph.D., University of Illinois
Glenn A. Jackson, Ph.D., University of Michigan
Keith R. Kleckner, Ph.D., Cornell University
Janusz W. Laski, Ph.D., Technical University of Gdansk
Nan K. Loh, Ph.D., University of Waterloo
Gilbert L. Wedekind, Ph.D., University of Illinois
Tung H. Weng, Ph.D., University of Missouri
Thomas G. Windeknecht, Ph.D., Case Institute of Technology
Howard R. Witt, Ph.D., Cornell University

Associate professors:

Bhushan L. Bhatt, Ph.D., Oakland University
Subramanian Ganesan, Ph.D., Indian Institute of Science
Robert P. Judd, Ph.D. Oakland University
Andrzej Rusek, Ph.D., Warsaw Technical University
Ronald J. Srodawa, Ph.D., University of Michigan
Sarma R. Vishnubhotla, Sc.D., Washington University

Assistant professors:

Hoda S. Abdel-Aty-Zohdy, Ph.D., University of Waterloo
Ka C. Cheok, Ph.D., Oakland University
Frank A. Cioch, Ph.D., University of Michigan
Ren-jyh Gu, Ph.D., State University of New York at Buffalo
Chin L. Ko, Ph.D., University of Oklahoma
Michael Latcha, M.S., Wayne State University
Syed M. Mahmud, Ph.D., University of Washington
Fatma Mili, Dr. de 3eme cycle, Universite Paris VI
Brian P. Sangeorzan, Ph.D., University of Wisconsin
Robert P. Van Til, Ph.D., Northwestern University
Christian C. Wagner, Ph.D., Michigan State University
Mohamed A. Zohdy, Ph.D., University of Waterloo

Visiting assistant professors:

Manohar Das, Ph.D., Colorado State University
 You L. Gu, Ph.D., Purdue University
 Keh C. Liu, Ph.D., Pennsylvania State University
 Qiuming Zhu, Ph.D., Rensselaer Polytechnic Institute

Special instructor:

Jerry E. Marsh, M.S., Oakland University

Adjunct professors:

Martin A. Erickson, M.M.E., Chrysler Institute of Engineering
 Donald R. Falkenburg, Ph.D., Case Western Reserve University
 Reuben Hackam, Ph.D., University of Liverpool
 Michael Marcotty, B.S., University of Reading
 Joseph S. Rice, Ph.D., Rensselaer Polytechnic Institute

Adjunct associate professors:

Osman D. Altan, Ph.D., University of California (Berkeley)
 Ronald R. Beck, Ph.D., University of Iowa
 Steven L. Plee, Purdue University

Adjunct assistant professor:

Ranjit K. Roy, Ph.D., University of Missouri

The School of Engineering and Computer Science offers work leading to the Master of Science degree in electrical and computer engineering, mechanical engineering, systems engineering, and computer science and engineering, and the Doctor of Philosophy degree in systems engineering.

The School of Engineering and Computer Science is housed in Dodge Hall of Engineering, a modern facility with extensive laboratories for research and design studies. Laboratories cover robotics, machine vision, experimental stress analysis, heat transfer, fluid flow, system simulation, circuits and communications, control, mechanical and electrical properties of materials, solid state devices and microelectronics, microprocessors, mini-computers, computer graphics, and computer-aided design. The school has a fully equipped CAD/CAM system consisting of a VAX 780 and a Prime 9750 digital computer. Students have access to the various computing facilities of the school and the university's Honeywell 68/DPS-2 MULTICS system. Fully equipped and staffed electronics and machine shops complement these facilities.

The Center for Robotics and Advanced Automation within the School of Engineering and Computer Science is an active and well-funded research center. It is well equipped with modern facilities and supports the teaching and instructional programs in the School of Engineering and Computer Science.

Graduate Student Handbook

This section of the catalog describes the requirements and conditions for the various graduate programs of the School of Engineering and Computer Science. To assist students in program planning and to clarify regulations pertaining to progress and academic standing, the school also publishes a Graduate Student Handbook. Copies are available in the Office of the Dean, 248 Dodge Hall.

The Doctor of Philosophy in Systems Engineering

The field of systems engineering has evolved into a blending of disciplines that is well-suited for dealing with such concerns as robotics and machine vision, electronic

and communication systems, mechanics, material and manufacturing systems, fluid and thermal systems, dynamic systems and control, computer and microprocessor systems, and artificial intelligence and expert systems. Oakland's School of Engineering and Computer Science is concentrating its efforts in these areas at the Ph.D. level.

Oakland's Ph.D. program in systems engineering is specifically for students who plan careers in industrial or governmental research and development laboratories or problem-oriented agencies as well as in the academic field. Students can begin doctoral study on a part-time basis, availing themselves of late afternoon or evening courses while working full-time in local industry. However, later phases of study and research will require full-time devotion to the program. Students must also fulfill a residency requirement.

Admission

The Ph.D. program at Oakland is designed for students with academic backgrounds in engineering. Students with backgrounds in computer science, mathematics or the physical sciences may also be admitted to the program, but will be required to build up basic engineering knowledge through preliminary course work. Superior performance in a master's program is excellent preparation. Students with outstanding undergraduate records may apply directly for admission to the doctoral program, but normally a master's degree from an accredited institution is an admission requirement. Admission is highly selective; applicants should present transcripts of all previous academic work and recommendations from three faculty members of their most recent study program who can evaluate their scholarly achievement and promise. Foreign applicants must submit scores from the Graduate Record Examination general and engineering subject tests.

Entrance classification

All students who have been accepted for admission to doctoral study are classified as regular Ph.D. students and are subject to all of the general degree requirements listed below. Although students who have compiled extraordinary undergraduate academic records may be admitted directly as doctoral students, possession of an appropriate master's degree is normally the minimal admission requirement. Applicants with a master's degree who do not intend to pursue a degree program but wish merely to attend one or two courses are classified as post-master's students. Credits earned as a post-master's student are not applicable toward an Oakland degree unless the student subsequently transfers to regular status and the courses are accepted as part of the Ph.D. program.

Transfer from post-master's to regular status

Post-master's students who have demonstrated outstanding achievement and who later wish to become degree-seeking students may request transfer of status. Students desiring to transfer status must complete a new application form, available from the Office of Graduate Admissions, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the engineering faculty will weigh most heavily the applicant's performance level at Oakland.

Advisory committee

As soon as possible after admission and before applying to take the Ph.D. comprehensive examination, students must form an advisory committee which will direct and guide the progress of their program. Such a committee is composed of four Oakland faculty members, specified as follows:

1. Three faculty members nominated by the student, one designated as chairperson and one a member of a department outside the School of Engineering and Computer Science.
2. One member appointed by the Associate Dean of Graduate Studies and Research.
3. Upon recommendation of the advisory committee, following successful completion of the Ph.D. comprehensive examination, one member from outside the university community may either be added to the committee or replace a member for the thesis proposal and review.

The entire committee must have the approval of the Dean of the School of Engineering and Computer Science and the Dean of Graduate Study.

Initial advising

During the first semester after admission to the Ph.D. program, a student will be given a preliminary evaluation by a committee of two faculty members appointed by the Associate Dean for Graduate Studies and Research. The purpose of the preliminary evaluation is to examine the student's background and preparation to do independent research. The committee will formulate an initial Plan of Study for use until the student forms his/her advisory committee, thereby ensuring the benefit of faculty counsel throughout the Ph.D. program. The student's advisory committee can at any time update the Plan of Study.

Doctoral degree requirements

The basic requirement for the Ph.D. is completion of a unified program of formal course work and independent research, directed and approved by the advisory committee. While the courses and examinations for a particular student are specified by the advisory committee, all programs are subject to the following general regulations.

Residence: Writing a doctoral dissertation requires a full commitment to research. Such research cannot be effectively pursued in an environment which places that research in a secondary role. Doctoral students are required to be full-time students for at least one year of their active dissertation research. The doctoral student should arrange such a period of residency by (1) registering for at least 8 credits of doctoral dissertation research for two consecutive semesters, and (2) making a commitment, in a statement addressed to his/her advisory committee, to a program of full-time (at least 20 hours per week) research.

The above represents the normal residency requirement. However, if the present occupation of the candidate (e.g., industrial research or teaching) is conducive to the intended research, there is an alternative method to fulfilling the residency requirement. To arrange for that kind of residency, the candidate must apply in writing to his/her advisory committee at the time of the dissertation proposal. The committee must be furnished with a written statement by the candidate's employer confirming that the dissertation research constitutes a major portion of the job assignment. If the advisory committee grants permission to pursue this option, the student must enroll in doctoral dissertation research (at most 8 credits) for at least two consecutive semesters.

The work of the latter Ph.D. students will be documented by term reports, reviewed and accepted by the chairman of the advisory committee. A copy of every report will be kept in the student's file. The advisory committee will review these reports. If the progress is unsatisfactory or the student and the employer are unable to fulfill the terms of the residency agreement, the advisory committee can declare the residency requirements unfulfilled.

Course work credits: At least 56 credits must be earned for course work beyond the bachelor's degree (exclusive of dissertation). The normal full-time load is 8 to 12

credits per semester. Students who have earned credits in a master's degree program at Oakland or another university may petition to have these credits applied toward the 56. The advisory committee will evaluate the student's prior work and allow Ph.D. credits for courses relevant to the proposed Ph.D. course of study. All candidates must complete at least 16 credits of course work exclusive of these at Oakland University. In the Ph.D. program, credit will not be awarded for courses in which a grade less than 3.0 is earned. All grades earned are used in computing a student's GPA.

Comprehensive examination: After completion of all the courses in the Plan of Study, a student will be required to take the comprehensive examination. The examination is designed to assess the student's analytical reasoning, theoretical knowledge in his/her area of concentration, and preparedness to do independent research. The examination will contain both written and oral components; the written part will include a mathematics section as well as sections relevant to the student's concentration. The advisory committee may allow the student to repeat the entire examination or individual sections if his/her performance is deemed inadequate. A student may repeat the examination once.

Dissertation: Each candidate will submit a dissertation to the advisory committee. The dissertation must be the candidate's own work and must constitute a contribution to knowledge in his/her field of endeavor.

Dissertation proposal review

As soon as a candidate and the advisory committee chairperson agree on a specific research topic, the candidate must write a dissertation proposal. This document contains a formulation of the problem, the background work leading to the formulation, and a plan for the subsequent research. Candidates must orally present the proposal to their advisory committees and any other interested faculty, at which time the committee may question the preparedness of the student to carry out the research.

Research credits

Students who have advisory committee approval of their dissertation proposals and are conducting research should register for EGR 790. At least 24 credits in EGR 790 are required of all doctoral candidates. However, merely amassing credits does not indicate satisfactory progress toward or completion of the dissertation. These judgments are made by the advisory committee. The dissertation is judged completed upon successful completion of the final examination.

Final examination

Each Ph.D. candidate must satisfactorily defend the dissertation in a final oral examination administered by the advisory committee. The examination is taken after the advisory committee certifies that the dissertation is ready for final review. At the committee's option, one reexamination may be permitted if a candidate fails to pass the final examination.

Time limit

Students have a seven-year time limit to complete all requirements for the Ph.D. beginning with the first term of enrollment in the program. Credits accepted in transfer toward the degree may not be more than seven years old at the time of completion of the program.

Graduation

Students expecting to graduate in a given semester must file an application for degree card at the Office of the Registrar and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

General Regulations for Master's Degree Programs

Admission

The engineering programs leading to a Master of Science degree build upon the preparation acquired in a baccalaureate engineering curriculum. A bachelor's degree in physics, mathematics, or other field of science may be acceptable, but a student presenting such a degree should plan to spend additional time in residence to gain proficiency in the fundamentals of engineering.

A suitable background for the program leading to the Master of Science in computer science and engineering is a baccalaureate in computer science, mathematics or engineering. A degree in another field may be acceptable but a student with such credentials should expect to spend additional time acquiring the fundamentals necessary to the computer science and engineering major.

Admission to master's study is selective; applicants should have an undergraduate GPA of 3.00 or better in their major area of study and in their mathematics and science courses. Applicants should present academic transcripts and recommendations from two members of the undergraduate major department who are familiar with their accomplishments and promise. These recommendations form an important part of the admission credentials. Graduate Record Examination general and subject test scores are required of graduates of foreign institutions, of engineering applicants who are graduates of programs not accredited by the Accreditation Board of Engineering and Technology (ABET), and are encouraged for other applicants whose credentials do not meet regular admission criteria. The TOEFL score must be submitted by applicants who are graduates of programs taught in a language other than English. Additional entrance requirements for the computer science and engineering program are listed on page 120.

Entrance classification

A graduate student is classified in one of three categories:

Regular status: For students who meet normal entrance requirements and who are seeking the Master of Science degree.

Conditional status: For students whose credentials do not meet criteria for regular admission and who are seeking the Master of Science degree; this category is not used to admit students who present substantially weak credentials for graduate study. Conditional status may be granted for one semester; the minimum requirement for continuation in the program is a GPA of 3.00 for the semester.

Special status: For applicants who merely wish to attend classes and do not intend to pursue a degree. To be admitted to special status, students must provide evidence of technical competence and must obtain approval from the chairperson of the department which offers the classes the student plans to attend. Credits earned as a special student do not apply toward the Master of Science from Oakland University unless the student subsequently transfers to regular status and the courses are accepted as part of the Master of Science program. In addition, no more than 12 credits earned in this status can be applied toward the degree.

Post-baccalaureate status: For students who have a bachelor's degree from an accredited college or university and wish to enroll in undergraduate courses to prepare

for an advanced degree program. Application for this type of admission should be made through the undergraduate admissions office.

Transfer to regular status

Students desiring to transfer to regular status must complete an application form available from the Office of Graduate Admissions, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the faculty will weigh heavily the applicant's performance at Oakland. A 3.00 cumulative average in Oakland graduate courses is a minimal requirement.

Master's adviser

The progress of each regular student toward the Master of Science degree is directed by the master's adviser, who is a faculty member of the School of Engineering and Computer Science assigned at time of admission. Incoming students seeking the degree are urged to discuss their proposed concentration area with their adviser or faculty members in that area. Students who wish to change their adviser can do so with the approval of the chairperson of their department.

Course credit

Normally, graduate credit is awarded only for courses numbered 500 or higher. However, up to 4 credits of senior-level courses in the major can be approved for graduate credit by their master's adviser. With the added approval of the graduate committee of the school, an additional 4 credits of senior-level courses can also be counted toward the required 32 credits. Course credit will not be awarded for work applied toward another degree.

Work load and scheduling

Full-time students normally register for 8 to 12 credits per semester. Graduate assistants must be full-time students and commit 20 hours per week toward their research or teaching assistantship assignment. Graduate assistants normally register for only 8 credits per semester; however, a 12 credit load can be taken with the approval of the chairperson of their department.

For the convenience of part-time students employed in industry, courses are arranged in late afternoon and early evening. However, these students should be aware of the very real demands of graduate studies and should keep outside work commitments and their academic load in balance.

Academic progress

The minimum satisfactory grade for graduate work is 3.0. Credit for completion of a course in a Master of Science program will be given for grades of 2.5 or above but not more than two grades may be in the range of 2.5 to 2.9. Graduate credit will not be awarded for grades below 2.5. To repeat a course a student must have the permission of the graduate committee of the school.

All grades received as a graduate student are used in computing the grade point average. If a course has been repeated, the most recent grade received is used in the calculation of the GPA. Any graduate student receiving more than one grade less than 3.0 in any course or having a grade point average less than 3.00 will be placed on academic probation and a student receiving more than two grades less than 3.0 may be subject to dismissal.

In all programs the minimum grade point requirement is an average of at least 3.00. If a student's grade point average is less than 3.00 after having attempted 16 credits, the student will be recommended for dismissal from the program.

The Master of Science Degrees in Electrical and Computer Engineering, Mechanical Engineering, and Systems Engineering

Students may earn the Master of Science in electrical and computer engineering, mechanical engineering, or systems engineering. Programs do not require a thesis, although a design project is optional and is encouraged. A design project is a unique and valuable learning experience in which an individual student works with a faculty member in an area of mutual interest. The object of the Master of Science program is to provide students with broad education in an area of engineering rather than a narrow apprenticeship in a specific research area.

General degree requirements

To fulfill the requirements for a Master of Science degree in electrical and computer engineering, mechanical engineering, or systems engineering programs, a student must:

1. Complete at least 32 credits of graduate-level work, of which at least 24 credits must be in approved courses offered by the School of Engineering and Computer Science.
2. Earn a cumulative grade point average of at least 3.00 in courses applied toward the degree.
3. Complete the requirements specified for the program in electrical and computer engineering, mechanical engineering, or systems engineering.

Adviser's approval is required for independent study, project and special topics courses used to fulfill program requirements. Not more than 8 credits of project work may be applied toward the degree.

Electrical and computer engineering requirements

In addition to the general degree requirements a student must fulfill the following program requirements to be awarded the Master of Science in electrical and computer engineering:

Mathematics: 4-8 credits from

APM 541-542	Mathematical Analysis for Engineers (4 each)
APM 563	Applied Mathematics: Discrete Methods (4)
MTH 555-556	Complex Analysis (4 each)

(Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)

 4-8

Required courses: (20 credits)

SYS 520	Signal and Systems Analysis	4
EE 545	Electromagnetic Engineering	4
EE 581	Integrated Circuits and Devices	4
EE 625	Integrated Active Network Design	4
CSE 578	Switching Theory and Digital Logic	4

 20

Electives: Remaining 4-8 credits from:

Any graduate level courses with EE designation
 SYS 510, 517, 523, 532, 557, 558, 563, 569, 574, 630, 631, 664, 721, 722, 731, 734
 CSE 513, 517, 518, 547, 564, 568, 570, 571
 PHY 562, 574, 583, 632, 673
 With the adviser's consent courses may also be chosen from:
 EGR 594, 595, 690, 795

 4-8

 32

Students with specialized interests should consider choosing electives within depth areas as indicated:

Communications

EE 533	Random Signals and Processes (4)
EE 534	Principles of Data Communications (4)
EE 535	Information Theory and Coding in Digital and Computer Applications (4)
EE 633	Signal Detection and Estimation Theory (4)
EE 637	Digital Signal Processing (4)

Computers

EE 570	Microprocessors and Microcomputers (4)
CSE 564	Computer Organization and Architecture (4)
CSE 571	Microprocessor Systems Applications (4)

Controls

EE 572	Microcomputer-Based Control Systems (4)
SYS 574	Digital Control Systems (4)
SYS 630	Optimal Control Theory (4)

Electronics

EE 487	Integrated Electronics (4)
EE 682	Field-Effect Devices (4)
EE 683	Introduction to MOS Very Large Scale Integration (4)
EE 726	High-Frequency Electronics (4)
PHY 574	Introduction to Solid-State Physics (4)

Energy

SYS 557	Energy Conservation Systems (4)
SYS 558	Electrical Energy Systems (4)
SYS 721	Large-Scale Dynamic Systems (4)

Mechanical engineering requirements

In addition to the general degree requirements a student must fulfill the following program requirements to be awarded the Master of Science in mechanical engineering:

Mathematics: 4-8 credits from

APM 541-542 Mathematical Analysis for Engineers (4 each)
 (Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)

 4-8

Required course: One of

ME 521	Dynamics (4), or
ME 582*	Fluid and Thermal Energy Systems (4)

4

Depth areas: Two courses from each of two of the following depth areas**Energy systems**

ME 582*	Fluid and Thermal Energy Systems and one of the following:
ME 554*	Solar and Alternate Energy Systems (4)
ME 555	Combustion Processes (4)

Thermal Energy Transport

ME 548*	Thermal Energy Transport (4)
ME 648	Thermal Transport Phenomena (4)

Fluid Transport

ME 538*	Fluid Transport (4)
ME 638	Convective Transport Phenomena (4)

Solid Mechanics

ME 663	Applied Elasticity (4) and one of the following:
ME 524	Vibration Analysis (4)
ME 569	Finite Elements (4)

Experimental Stress Analysis

ME 565	Experimental Stress Analysis I (Continuation Methods) (4)
ME 665	Experimental Stress Analysis II (Contemporary Methods) (4)

16

Electives:

Remaining 4-8 credits from those listed under depth areas above or from the following:

ME 549, 561, 572, 610

SYS 520, 557, 630

CSE 517, 518

With adviser's consent, courses may be taken from:

EGR 594, 595, 690, 795

4-8

32

Other electives in engineering, mathematics, physics, and chemistry that are appropriate to the student's plan of study require prior approval of the faculty adviser.

*These courses are cross-listed as advanced undergraduate and graduate courses. Students who have completed these as 400-level courses or their equivalent may consider them in meeting depth requirements, but may not count them toward the 32-credit requirement of graduate-level work.

Systems engineering requirements

Three options are available for the Master of Science in systems engineering:

1. Dynamic systems and control
2. Robotics
3. Manufacturing systems

In addition to the general degree requirements a student must fulfill the program requirements for one of the options to be awarded the Master of Science in systems engineering.

Dynamic systems and control engineering option**Mathematics:** 4-8 credits from

APM 541-542	Mathematical Analysis for Engineers (4 each)
APM 553	Advanced Ordinary Differential Equations (4)
MTH 555	Complex Analysis I (4)

(Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)

4-8

Required courses: (16 credits)

SYS 520	Signal and Systems Analysis	4
SYS 630	Optimal Control Theory	4
SYS 631	Estimation and Control Theory	4
EE 533	Random Signals and Processes	4

16

Electives: Remaining 8-12 credits from:

SYS 510, 523, 532, 574, 721, 722, 731, 734

CSE 517, 518, 570, 571, 578

EE 570, 572, 625, 637

ME 521

PHY 562

With the adviser's consent, courses may also be chosen from:

EGR 594, 595, 690, 795

8-12

32

Robotics engineering option**Mathematics:** 4-8 credits from

APM 541-542	Mathematical Analysis for Engineers (4 each)
APM 553	Advanced Ordinary Differential Equations (4)
MTH 555	Complex Analysis I (4)

(Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)

4-8

Required courses: (12 credits)

SYS 520	Signal and System Analysis	4
SYS 523	Dynamics and Control of Robot Manipulators	4
EE 570	Microprocessors and Microcomputers	4

12

Electives: 12-16 credits.

At least 8 credits chosen from group A and the remainder from group B

Group A

SYS 532	Analysis of Nonlinear Control Systems (4)
SYS 574	Digital Control Systems (4)
CSE 513	Pattern Recognition (4)
CSE 515	Expert Systems and Decision Support Systems (4)
CSE 516	Artificial Intelligence (4)
ME 521	Dynamics (4)

Group B

Any graduate level courses with SYS designation
CSE 517, 518, 542, 545, 550, 565, 571, 578

EE 533
PHY 562

With the adviser's consent, courses may also be chosen from:
EGR 594, 595, 690, 795

12-16

32

Manufacturing systems engineering option**Mathematics:** 4-8 credits from

APM 541-542	Mathematical Analysis for Engineers (4 each)
APM 563	Applied Mathematics: Discrete Methods I
APM 505	Mathematical Programming
(Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)	

4-8

Required courses: (20 credits)

CSE 501	Programming and Data Structures (4), or	4
CSE 545	Database Systems (4)	4
SYS 563	Foundations of Computer-Aided Design	4
SYS 569	Simulation in Engineering	4
SYS 583	Production Systems	4
SYS 684	Computer-Integrated Manufacturing Systems	4
		20

Electives: Remaining 4-8 credits from:

SYS 510, 517, 520, 523, 574, 585, 630, 664, 788
CSE 513, 516, 517, 518, 545, 547, 568, 571
EE 567, 570

ME 569, 572

With the adviser's consent, courses may also be chosen from:
EGR 594, 595, 690, 795

4-8

32

It is recommended, but not required, that students elect two courses within one of the following depth areas. The student's adviser should be consulted for assistance in course selection.

Computer science

CSE 513	Pattern Recognition (4)
CSE 516	Artificial Intelligence (4)
CSE 545	Database Systems (4)

Computer hardware

EE 567	Computer Networks (4)
EE 570	Microprocessors and Microcomputers (4)
CSE 547	Computer Communications (4)
CSE 568	Fault Tolerant Computing (4)
CSE 571	Microprocessor Systems Applications (4)

Mechanical engineering

ME 569	Finite Elements (4)
ME 572	Materials Properties and Processes (4)

Robotics

SYS 422	Intelligent Robotics (4)
SYS 520	Signals and Systems Analysis (4)
SYS 523	Dynamics and Control of Robot Manipulators (4)

Manufacturing systems

SYS 510	Systems Optimization and Design (4)
SYS 517	Probability and Its Manufacturing Applications (4)
SYS 585	Statistical Quality Control (4)
SYS 664	Advance Computer-Aided Design (4)
SYS 788	Propagation of Error (4)

Dynamic systems

SYS 520	Signals and Systems Analysis (4)
SYS 574	Digital Control Systems (4)
SYS 630	Optimal Control Theory (4)

Numerical methods

CSE 517	Applied Numerical Methods: Approximations (4)
CSE 518	Applied Numerical Methods: Matrix Methods (4)

Energy engineering

Master of Science students in any of the engineering programs can elect courses which focus on power and energy engineering. The specific courses that apply include the following:

Energy systems courses

ME 456	Energy Systems Analysis
ME 554	Solar and Alternate Energy Systems
ME 555	Combustion Processes
ME 582	Fluid and Thermal Energy Systems
SYS 557	Energy Conservation Systems
SYS 558	Electrical Energy Systems
SYS 721	Large Scale Dynamic Systems
EGR 595	Special Topics in Energy Systems
EGR 690	Graduate Engineering Project
EGR 795	Special Topics

Related courses include: CSE 570, 571; ME 538, 548, 549, 572, 638, 648; SYS 520, 569, 630, 685, 731, 734, and PHY 573.

The Master of Science in Computer Science and Engineering

The Master of Science program in computer science and engineering is designed to prepare students for significant computer-related careers in business and industry and simultaneously for further graduate study. The Master of Science program in computer science and engineering offers a natural continuation of studies for students who have received a baccalaureate in computer engineering or computer science. The advanced level, prerequisite courses CSE 501-504 afford an opportunity for students with strong academic or professional records in related fields to prepare for graduate studies in computer science and engineering in minimal time.

To be accepted into the Master of Science degree program in computer science and engineering, an entering student must have a bachelor's degree from an accredited institution. Preference will be given to students with majors in computer engineering, computer science, mathematics, and engineering. Applicants should have an undergraduate GPA of 3.00 or better in their major area of study and in their science, engineering, and mathematics courses. In addition, prospective students must:

1. demonstrate proficiency in at least one high-level programming language and familiarity with assembly language programming.
2. have received credit for at least two years of college computer science or engineering, including data structures, digital logic and microprocessors, computer organization and assembly programming, and one of the following: foundations of computer science, computer hardware design, or operating systems.
3. have received credit for at least two years of college mathematics, including differential calculus, integral calculus, linear algebra, and discrete mathematics. Course work in statistics is beneficial.

Students who do not meet these requirements but have strong academic or professional records will be required to complete appropriate advanced level, prerequisite courses from CSE 501-504 before being admitted to the program.

Degree requirements

To fulfill the requirements for a Master of Science degree in computer science and engineering a student must:

1. successfully complete at least 32 credit hours of approved graduate-level work. (Of these 32 credits, at least 24 credits must be in courses of the School of Engineering and Computer Science.)
2. earn a cumulative grade point average of at least 3.00 in courses applied toward the degree.
3. complete required and elective courses as described below. These requirements are based on the table of course groups in the CSE curriculum, which follows. The specific choice of courses must be approved by the student's adviser.
 - a. Required courses include:
 - i. Two courses from the theory group, at least one of which must be an APM course; and
 - ii. Two courses from the system software group; and
 - iii. One course from the hardware group.
 - b. Elective courses include any other three courses chosen from: the table of course groups in the CSE curriculum; EGR 595 Special Topics; EGR 690 Graduate Engineering Project. Not more than 8 credits of EGR 690 may be applied toward the degree. Both EGR 595 and EGR 690 require approval of the CSE department chairperson.

Course groups in the CSE curriculum

Theory Group

APM 563	Applied Mathematics: Discrete Methods I
APM 564	Applied Mathematics: Discrete Methods II
APM 581	Theory of Computation
CSE 511	Design and Analysis of Algorithms
CSE 542	Data Structures
EE 533	Random Signals and Processes
STA 425	Elements of Stochastic Processes
STA 427	Introduction to Mathematical Statistics I
STA 428	Introduction to Mathematical Statistics II
SYS 520	Signal and System Analysis

System Software Group

CSE 535	Run-Time Structures in Programming Languages
CSE 545	Database Systems
CSE 550	Operating Systems
CSE 559	System Programming
CSE 565	Compiler Design

Hardware Design Group

CSE 508	Digital Logic and Computer Hardware Design
CSE 564	Computer Organization and Architecture
CSE 568	Fault Tolerant Computing
CSE 578	Switching Theory and Digital Logic
CSE 665	Parallel and Distributed Processing

Artificial Intelligence Group

CSE 513	Pattern Recognition
CSE 515	Expert Systems and Decision Support Systems
CSE 516	Artificial Intelligence

Applications Group

CSE 517	Applied Numerical Methods: Approximations
CSE 518	Applied Numerical Methods: Matrix Methods
CSE 570	Microprocessors and Microcomputers
CSE 571	Microprocessor Systems Applications
EE 572	Microprocessor-Based Control Systems
SYS 569	Simulation in Engineering
SYS 574	Digital Control Systems

Software Engineering Group

CSE 538	Programming Methodology
CSE 539	Software Engineering
CSE 540	Software Quality

Communications Group

CSE 547	Computer Communications
EE 534	Principles of Data Communications
EE 535	Information Theory and Coding in Digital and Computer Communication
EE 567	Computer Networks
EE 637	Digital Signal Processing

CAD/CAM Group

CSE 555	Introduction to Computer Graphics
CSE 556	Advanced Computer Graphics
ME 487	Mechanical Engineering CAD/CAM Systems
ME 569	Finite Elements

SYS 422	Intelligent Robots
SYS 563	Foundations of Computer Aided Design
SYS 664	Advanced Computer-Aided Design
SYS 684	Computer-Integrated Manufacturing Systems

Course Offerings

ENGINEERING

EGR 500 Engineering Seminar (1)

Lectures and discussions conducted by faculty, graduate students, and speakers from industry and other universities. Emphasis is on current research interests of the school.

EGR 594 Independent Study (2 to 4)

Advanced independent study in a special area. Topic must be approved prior to registration.

EGR 595 Special Topics (2 to 4)

Advanced study of special topics in engineering. May be taken more than once.

EGR 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project. Topic must be approved prior to registration.

EGR 790 Doctoral Dissertation Research (2 to 12)

Directed research toward the dissertation.

EGR 794 Independent Study (2 to 4)

Advanced independent study in a special area. Topic must be approved prior to registration.

EGR 795 Special Topics (2 to 4)

Advanced study of special topics in engineering. May be taken more than once.

ELECTRICAL ENGINEERING

For additional related courses students should refer to the course offerings in systems engineering (SYS) and computer science and engineering (CSE).

EE 533 Random Signals and Processes (4)

This course provides the foundation needed to work with the random signals which are encountered in engineering. Concept of a random variable. Properties of one and multi-dimensional random variables. Concept of a stochastic process. Characterization of random waveforms using power spectral density and the correlation function. Random signals in linear systems. Applications to engineering systems.

Prerequisite: SYS 520.

EE 534 Principles of Data Communications (4)

Concepts of data communications, baseband data transmission; bandpass digital signaling; multiplexing techniques; random process analysis; performance and design of digital communication systems corrupted by noise; elements of error correcting codes and description of data networks.

Prerequisite: SYS 520 and a course in probability.

EE 535 Information Theory and Coding in Digital and Computer Communication (4)

Information theory concepts; source coding and data compression; channel capacity; introduction to error correcting codes; linear block codes; cyclic codes; convolutional codes; application of coding to reliable data communication and fault tolerant computing.

Prerequisite: EE 533 or permission of instructor.

EE 545 Electromagnetic Engineering (4)

Electromagnetic theory with applications. Diffraction, radiation, propagation, guided waves, optical transmission and resonant cavities.

Prerequisite: Background in vector calculus and basic electromagnetic theory.

EE 567 Computer Networks (4)

Resource-sharing principles; communications and networks; packet switching; the ARPANET; network performance using principles of queueing theory; network design principles, capacity assignment; flow assignment; topological design. Other related topics.

EE 570 Microprocessors and Microcomputers (4)

Introduction to microprocessors and microcomputers; the CPU on a chip; interfacing microprocessors with external systems; programming considerations; hands-on laboratory experience. Credit may not be earned for both CSE 570 and EE 570.

EE 572 Microcomputer-Based Control Systems (4)

Microcomputer-aided control design techniques combined with single-chip and single-board microcomputer technology. Digital controller design and implementation; digital filtering/state estimator design and implementation; multiple processor systems and real-time applications.

Prerequisite: EE 570 or CSE 570.

EE 581 Integrated Circuits and Devices (4)

Fundamentals of semiconductor electronics. Theory and operation of PN junctions and junction devices. MOS devices. Semiconductor technology as related to integrated circuits, including epitaxy, photolithography, oxidation, diffusion, ion implantation, and the design of some typical ICs.

EE 588 Integrated Electronics Laboratory (2 to 4)

Experimental projects on solid-state materials and devices. Experiments on material preparation, characterization, fabrication, and parameter measurements of devices.

Prerequisite: Permission of instructor.

EE 625 Integrated Active Network Design (4)

Introduction to network synthesis, basic concepts in synthesis with emphasis on filter theory and design, active RC filter design, multiple loop feedback design, sensitivity considerations.

Prerequisite: SYS 520.

EE 633 Signal Detection and Estimation Theory (4)

Noise analysis concept review, binary decision theory, multiple decision, sequential decision theory, nonparametric decision theory, fundamentals of estimation, sequential estimation theory, detection of coded information and error control.

Prerequisite: EE 533.

EE 637 Digital Signal Processing (4)

Analysis of discrete signals and systems. Introduction to digital filters including finite and infinite impulse response filter. Discrete and Fast Fourier Transformations. Application of digital signal processing.

Prerequisite: SYS 520.

EE 682 Field-Effect Devices (4)

Electronic structure of semiconductor surfaces; concepts of surface states and surface charges; the MOS diode. Conductivity modulation and theory of MOS transistors, thin-film phenomena and devices; Silicon integrated device technology; oxidation, diffusion, epitaxy and ion implantation.

Prerequisite: EE 581.

EE 683 Introduction to MOS Very Large Scale Integration (4)

Metal-Oxide-Semiconductor devices, circuits, and future trends. MOS processing and design rules. MOS transistor theory; analog and digital VLSI MOS circuits, design techniques and performance evaluation. Integrated System Fabrication and the Large Scale Integration (LSI) design route. Data and control flow in systematic structures. Implementing integrated system designs: From circuit topology to patterning geometry to wafer fabrication.

Prerequisite: EE 581.

EE 725 Theory of Networks (4)

Network models of linear dynamic systems; network graphs and topological constraints, generalized equilibrium equations, time-frequency duality, energy and stability constraints, network passivity or activity, input-output representations, and state-transition matrices.

Prerequisite: SYS 520.

EE 726 High-Frequency Electronics (4)

Topics relating to the generation, transmission, amplification, and detection of radio signals at HF, VHF, and UHF. Large- and small-signal resonant-load amplifiers, high-frequency effects in transistors, oscillators, impedance matching, transmission lines, cavity resonators, and filters. With laboratory.

Prerequisite: SYS 520.

EE 741 Coherent Optics (4)

Current developments in coherent optics and holography; two-dimensional Fourier analysis, diffraction theory, Fourier transforming and imaging properties of lenses, holographic interferometry, optical data processing. With laboratory.

Prerequisite: SYS 520.

EE 784 Advanced Solid-state Devices (4)

General properties of negative-resistance amplifiers and oscillators. Microwave bipolar and FET transistors, Gunn amplifiers; generators and logic elements; IMPATT and TRAPATT devices, microwave integrated circuits. Parametric amplifiers, harmonic generators, mixers and detectors, microwave switches, attenuators and limiters.

Prerequisite: EE 581.

MECHANICAL ENGINEERING**ME 521 Dynamics (4)**

Generalized coordinates and matrix methods of analysis of the motion of particles and rigid bodies. Energy and momentum methods applied to mechanical systems. Euler and Lagrange methods applied to forces and motion. An introduction to mechanical vibrating systems. Keplerian motion and kinematics.

ME 524 Vibration Analysis (4)

Analysis of lumped mechanical systems by application of D'Alembert's principle, Lagrange's equations, Hamilton's principle, and integral transforms. Matrix formulation of general n -degree-of-freedom systems with and without damping. Methods of approximation for continuous systems.

ME 538 Fluid Transport (4)

Continued study of the fundamentals of fluid mechanics and their applications; angular momentum, generalized study of various turbomachines, potential flow of inviscid fluids; laminar and turbulent boundary layer theory; dimensional analysis and similitude; compressible flow. With laboratory.

ME 548 Thermal Energy Transport (4)

Continued study of basic concepts, properties, and descriptions of conduction, convection, and thermal radiation heat transfer; thermal boundary layer theory; convective heat transfer correlations, combined conduction convection, radiation intensity, shape factors, and appropriate engineering applications. With laboratory.

ME 549 Numerical Techniques in Heat Transfer and Fluid Flow (4)

Overview of practical numerical solution techniques. Major emphasis is on concepts, methodology and physics associated with the formulation of the discretization equations appropriate for the representation and solution of linear and nonlinear partial differential equations governing heat transfer and fluid flow. Personal and main frame computers will be used for the solution of a variety of problems.

ME 554 Solar and Alternate Energy Systems (4)

The analysis and design of energy conversion systems. Principles of optimum power transfer and efficiency. Availability analysis of systems for heating, chemical conversion and electrical generation. Emphasis on solar applications and alternative energy technology.

Prerequisite: ME 331 and 341 or equivalent.

ME 555 Combustion Processes (4)

Thermodynamics of state, mixtures, Gibbs free energy; chemical equilibrium, stoichiometry; chemical reaction kinetics, reaction rate, mixing, catalyst action; fluid vaporization, condensation,

atomization; applications, spark and compression ignition, continuous combustion.

Prerequisite: ME 456 or equivalent.

ME 561 Analysis and Design of Mechanical Structures (4)

Use and methods of advanced mechanics of materials to design mechanical structures to meet elastic strength criteria. Topics include plates and shells, torsion of noncircular cross-sections, curved and composite beams, energy methods, mechanical stability, and beams on elastic foundations.

ME 565 Experimental Stress Analysis I (Continuation Methods) (4)

Experimental determination of stress and strain in loaded members. Use of brittle coatings, strain gages, two-dimensional photoelasticity, and photoelastic coatings. Emphasis on optimal designs. With laboratory.

ME 569 Finite Elements (4)

Structural analysis through matrix formulation using direct and variational methods; stiffness and flexibility matrices for triangular, quadrilateral and isoparametric elements in two- and three-dimensions. Finite element programs and available graphics hardware for data preparation.

ME 572 Materials Properties and Processes (4)

Mechanical behavior of materials. True stress-strain properties of materials, plastic deformation and fracture of materials, failure theories, fatigue damage under cyclic loading, creep and high temperature application, destructive and nondestructive evaluation of material properties such as composites, ceramics and metals, behavior of materials during manufacturing processes such as stamping, drawing, extrusion, spinning, forging and others.

Prerequisite: ME 361 and EGR 372 or equivalent.

ME 582 Fluid and Thermal Energy Systems (4)

Study of systems involving fluid and thermal phenomena. Includes conventional and unconventional energy conversion, fluid and thermal energy transport. Analysis, design and optimization of systems are emphasized using basic integral, differential, and lumped parameter modeling techniques. The course bridges conventional engineering design disciplines.

ME 610 Continuum Mechanics (4)

Foundations in vector and tensor fields, kinematics of deformation, measures of strain and analysis of stress, equations of motion, compatibility conditions, constitutive equations, thermodynamics of deformation. Study of infinitesimal elasticity, ideal fluids, ideal elastoplasticity, processing, and material capabilities are studied in a systems context.

ME 638 Convective Transport Phenomena (4)

Development of the fundamental equations expressing conservation of mass and momentum principle. Navier-Stokes equations. Approximation techniques. Boundary layer theory. Introduction to turbulent transport processes. Hydrodynamics of two-phase flows.

ME 648 Thermal Transport Phenomena (4)

Development of the fundamental continuum equation expressing conservation of energy. Radiation and conduction heat transfer, extended surfaces, multi-dimensional conduction problems, and one-dimensional unsteady conduction problems. Convective heat transfer, thermal boundary layer theory, forced and natural convection, and two-phase flow phenomena.

ME 663 Applied Elasticity (4)

Fundamentals of solid mechanics, stress-strain and equilibrium and compatibility equations, generalized Hooke's law, boundary conditions. Plane strain and generalized plane stress, plane elasticity. Airy stress function, torsion and bending, St. Venant principle, and introduction to thermoelasticity, and numerical methods.

ME 665 Experimental Stress Analysis II (Contemporary Methods) (4)

Modern contemporary optical methods in experimental stress analysis, including three-dimensional photoelasticity, speckle methods, correlation methods, x-ray and optical diffraction methods, holography and other coherent optical methods. With laboratory.

SYSTEMS ENGINEERING

For related courses students should refer to course offerings in electrical engineering or computer science and engineering.

SYS 510 Systems Optimization and Design (4)

Introductory convexity theory, necessary and sufficient optimality conditions. Computer techniques for systems optimization and design. Direct and indirect search techniques including line search, linear programming, unconstrained and constrained optimization. The course emphasizes a capstone design experience involving systems modeling, simulation and optimal design.

SYS 517 Probability and Its Manufacturing Applications (4)

Review of probability theory and applications of the effects of randomness on manufacturing systems, congestion, Markov chains, scheduling, inventories, etc.

Prerequisite: SYS 317 or equivalent.

SYS 520 Signal and System Analysis (4)

Fundamentals of continuous-time and discrete-time signals and linear systems. Formulation of describing equations in the time and frequency domains. Convolution operations and time response functions. State-space realization of transfer functions. Fundamental and state transition matrices, modal decomposition characteristics. Fourier integrals, discrete Fourier transform, and applications.

SYS 523 Dynamics and Control of Robot Manipulators (4)

Homogenous transformations, Denavit and Hartenberg link modeling; forward and backward solution of kinematic equations; Euler-Lagrange and Newton-Euler formulation of dynamic equations; simplification of dynamic equations; linearization and servo control; joint interpolated motions; application of manipulator dynamics to development of robot language.

Prerequisite: SYS 520.

SYS 532 Analysis of Nonlinear Control Systems (4)

Analysis of nonlinear physical systems with engineering applications. Phase-plane analysis for autonomous systems, singular points, and characterization of equilibrium points. Stability analysis via theorems of Liapunov, existence of limit cycles, harmonic analysis, and describing functions.

SYS 557 Energy Conservation Systems (4)

Techniques for improving energy use in industrial and commercial applications. Topics include: energy accounting; energy auditing; energy conservation management; net energy analysis; second law methods of analysis; combined use energy systems; new technology for energy conservation; assessment of alternative technology.

SYS 558 Electrical Energy Systems (4)

Generation and transmission of electrical energy. Analytical methods for solution of planning and operation problems with effective computer utilization. Analysis of synchronous machines, transformer excitation, prime mover governing, transmission networks and loads. System dynamic performance under disturbance conditions, line switching, and parameter variations with attention to frequency and voltage control strategies.

SYS 563 Foundations of Computer Aided Design (4)

The design of computer aided graphics software for electrical, mechanical and systems engineering. Raster graphics fundamentals, fill algorithms, transformations, curve generation, user input techniques, and 2-D animation.

SYS 569 Simulation in Engineering (4)

Basic modeling and simulation methodology for discrete and continuous systems. The selection of input parameters and probability distributions. On-line user interactive graphical displays for output analysis and validation.

SYS 574 Digital Control Systems (4)

Theoretical foundation needed to implement the microprocessor in control applications. Effects of sampling, data conversion, quantization, finite word length and time delays on system response and stability are examined. Actual construction of a microprocessor based controller culminates the course.

Prerequisite: SYS 520. Corequisite: EE 570 or CSE 570.

SYS 583 Production Systems (4)

Computer manufacturing systems which control the flow of manufactured products from forecast to ordering: parts explosion, billing of material, Pareto distribution and inventory control, lead times, shop floor control, etc.; all illustrated by a computer system for a typical product.

SYS 585 Statistical Quality Control (4)

Fundamentals of statistical quality control with particular emphasis on applications. Control charts for mean and range for variable, control charts for attributes, cusum charts, runs and other process quality monitoring topics. Single, double, and multiple sampling inspection plans, sequential sampling, and related topics.

Prerequisite: SYS 317 or SYS 517 or equivalent.

SYS 630 Optimal Control Theory (4)

Modern control theory applied to linear dynamical systems. Differential and difference equations; controllability, reachability, observability and constructibility of linear systems; stability of optimal control systems; dynamic programming; calculus of variation and Pontryagin's minimum principle; optimally switched control systems, linear regulator problem application of theory to practical control system design methodology; simulation and laboratory demonstration of optimal control systems.

Prerequisite: SYS 520.

SYS 631 Estimation and Control Theory (4)

Stochastic differential and difference equations; Luenberger observer theory; Kalman-Bucy filtering theory; design of stochastic optimal and microprocessor-based control systems; duality between optimal estimation and control problems; the separation principle; simulation and laboratory implementation of observers and filters in stochastic control system.

Prerequisite: SYS 630, EE 533.

SYS 664 Advanced Computer-Aided Design (4)

Three dimensional graphics in computer aided design systems. Hidden surface elimination, shading, algebraic surface drawing, solid modeling, and 3-D animation. Projects emphasize the application of 3-D graphics to engineering design and analysis.

Prerequisite: SYS 463 or 563.

SYS 680 Engineering Decision Analysis (4)

Consideration of risk and uncertainty in decision criteria for resource allocation. Mathematical programming in engineering applications for multi-attribute utility analysis.

Prerequisite: SYS 517.

SYS 684 Computer-Integrated Manufacturing Systems (4)

The integration of the computer in the manufacturing process from concept, through engineering design, production planning, materials handling and process quality control and inventory management. The course will utilize simulation to study parts and information flow in a computer-integrated manufacturing facility with fixed and flexible automation.

SYS 685 Human Factors Engineering (4)

Behavioral characteristics of man which affect performance at the man/machine interface; man's sensory, information processing, and motor capabilities studied in a systems context; techniques for collecting and analyzing human performance data.

SYS 721 Large-Scale Dynamic Systems (4)

Analysis using a systems methodology including state variable modeling, and multilevel structure. Structural stability, dynamic reliability, aggregation and decomposition. Application to estimation and control of large systems.

Prerequisite: SYS 520.

SYS 722 Linear Multivariable Systems (4)

Fundamental and state-of-the-art modeling, analysis, and design of linear multivariable dynamic systems. The role of polynomial matrices and differential operators in the description and structural realization of multivariable systems. Concepts of multivariable poles, zeros, Nyquist arrays, and generalized root loci. Algebraic design methods based on state feedback, observers, and model-matching. Inverse Nyquist and characteristic locus techniques as extensions of classical control design.

Prerequisite: SYS 630.

SYS 731 Stochastic Optimal Control and Estimation Theory (4)

Foundation of stochastic optimal control and estimation theory. Continuous-time and discrete-time stochastic linear and nonlinear systems; analysis and design of stochastic optimal control systems; nonlinear filtering smoothing and prediction theory; and adaptive control estimation.

Prerequisite: SYS 630.

SYS 734 Statistical Communication System Theory (4)

Harmonic analysis, sampling theory, stochastic processes and correlation functions, linear systems response to random inputs, optimum linear systems (matched filters, Wiener filters) coherent and noncoherent filtering, nonlinear systems with random input (zero memory, square law, nth law devices), modulation theory, interference considerations.

Prerequisite: EE 633.

SYS 788 Propagation of Error (4)

Study of systems with imperfect elements, with emphasis on the statistical tolerancing problem. Analytical determination of joint distribution functions of several random variables with applications to tolerancing for mass production, quality control, reliability, and sensitivity analysis.

Prerequisite: SYS 317 or equivalent.

COMPUTER SCIENCE AND ENGINEERING

For additional computer courses students should refer to the course offerings in electrical and computer engineering.

CSE 501 Programming and Data Structures (4)

An advanced-level introduction to the operating system of a large computer, including the command language, the file system and the text editor; a major, high-level language such as PL/1; structured, modular programming; data structures such as stacks, queues, lists, trees, and graphs; applications such as discrete simulation. Credit not applicable toward the M.S. in CSE.

Prerequisite: Differential and integral calculus and a knowledge of at least one high-level programming language.

CSE 502 Microprocessors, Computer Organization, and Assembly Language Programming (4)

Architecture and operation of the 6052, 6809, 8088, and 68000 microprocessors; digital data representations; digital arithmetic; assembly language programming.

Prerequisite: CSE 501.

CSE 504 Discrete Structures and Foundations of Computer Science (4)

Basics of set theory, relations, propositional logic and Boolean algebra. Graphs, trees, their traversal, iteration and recursion. Algorithms, time and space orders, proof of correctness of algorithms. Topics in finite automata, Turing machine, and halting problem.

Prerequisite: CSE 501.

CSE 508 Digital Logic and Computer Hardware Design (4)

Number systems, Boolean functions, simplification, and their design using LSI and VLSI. Electronic logic families. Sequential logic, flip-flops, registers, data transfer, and memory devices. Control unit design, microprogramming and input/output unit design.

CSE 511 Design and Analysis of Algorithms (4)

Top-down structured programming and program correctness; a survey of algorithm design methods including: subgoals; hillclimbing; working backward; heuristics; backtrack program-

ming; branch and bound; and recursion. Applicants to current computer science algorithms such as: sorting, searching, arithmetic and logical expressions.

Prerequisite: Background in data structures and discrete mathematics.

CSE 513 Pattern Recognition (4)

Application of digital computer techniques to a variety of problems in pattern recognition; linear decision functions, Bayes decision theory, maximum likelihood estimation, multivariate normal features, non-parametric techniques, feature selection, clustering, and unsupervised learning.

Prerequisite: Background in linear algebra and statistics.

CSE 515 Expert Systems and Decision Support Systems (4)

The study of expert systems and decision support systems technologies. Both kinds of systems deal with reasoning with incomplete knowledge. Inexact logic; decision models; knowledge representation methods and design issues such as architecture of the systems, iterative design methods and evaluation. A project is required.

Prerequisite: One course in artificial intelligence.

CSE 516 Artificial Intelligence (4)

Introduction to artificial intelligence including: (1) current techniques in AI for knowledge representation and use, search methods, means-end analysis, network systems, production systems, frames, expert systems, genetic and other learning algorithms; (2) existing applications of AI with MYCIN, NETL, DENDRAL, checker player, chess player, natural language understanding; (3) an AI project requiring the creating of a working intelligent system in the student's area of interest.

Prerequisite: CSE 335, CSE 342 or equivalent.

CSE 517 Applied Numerical Methods: Approximations (4)

Propagation of errors; classical methods for the solution of non-linear equations, summation of series, approximation of functions, numerical integration, numerical solution of differential equations and the Fast Fourier Transform. Emphasis on student development of general purpose subroutines for use in engineering and scientific applications.

Prerequisite: A course in statistics and knowledge of a scientific language.

CSE 518 Applied Numerical Methods: Matrix Methods (4)

Systems of linear and nonlinear equations, eigenvalue problems, optimization methods, statistical methods.

Prerequisite: Knowledge of linear algebra and a scientific language.

CSE 535 Run-Time Structures in Programming Languages (4)

Language processors; data storage structures; operations in programming languages; sequence control structures; data control structures; storage management; operating environment and block structures; syntax and translation.

CSE 538 Programming Methodology (4)

Systematic approach to the design and analysis of computer programs. Program development cycle; semantical analysis of programs; program control structures and structured programming; abstract data structures; top-down, step-wise refinement programming synthesis; testing; program metrics.

Prerequisite: CSE 342 or equivalent and major standing.

CSE 539 Software Engineering (4)

The course will study, in a realistic environment, the techniques and methodology of developing programs for user applications. Topics include specifications, top-down modular design, structure programming, documentation, testing, and verification.

CSE 540 Software Quality (4)

A first course in software quality, intended for students who have mastered fundamental design and programming skills. The impact of software design techniques on structural quality for both object-oriented and traditional decomposition techniques. Assessment of software quality via scientific experimentation and software metrics with emphasis given to software understandability and maintainability.

Prerequisite: Knowledge of data structures.

CSE 542 Data Structures (4)

Theory and advanced applications of data structures. Trees; general and binary; threaded trees; tree traversal; trees and grammar; trees and sorting. Graphs: paths and cycles in diagraphs; graphs of programs. File organization: relations; indexed files, hashed files.

Prerequisite: CSE 342, and APM 263 or equivalent.

CSE 545 Database Systems (4)

Study of the design and implementation of relational, hierarchical, and network database systems. Query/update data languages; conceptual data models; physical storage methods; database system architecture. Database security and integrity. Includes the study of existing systems. Credits cannot be earned for both CSE 445 and CSE 545.

Prerequisite: Knowledge of data structures.

CSE 547 Computer Communications (4)

Emphasis is placed on functional characteristics of digital components related to computer communication and the design of computer communication software. Telecommunication transmission facilities, signal and conversion devices, terminals, controllers, interfaces, error detection and correction, multiplexing and concentration, line control procedures and protocols, and control software. Case studies include point-to-point connection between computers and terminals, local area networks and private networks, value added networks, and digital support in telephone system.

Prerequisite: CSE 450, or permission of the instructor.

CSE 550 Operating Systems (4)

Introduction to the concepts and design of multi-programmed operating systems. Typical topics include: historical perspectives; sequential processes; concurrent processes; processor management; store management; scheduling; file management; resource protection; a case study.

CSE 555 Introduction to Computer Graphics (4)

An introduction to the software and hardware aspects of computer graphics systems. Vector and raster displays. Typical data structures and programming language requirements. Emphasis on real time interactive graphics systems.

CSE 556 Advanced Computer Graphics (4)

A study of the mathematics, algorithms, and data structures used for the computer storage, manipulation, and rendering of geometric objects. Topics covered will be chosen from curve and surface representation, including Bezier and B-Spline techniques; solid modeling, including Constructive Solid Geometry and Boundary Representation Schemes; surface and solid intersection techniques; hidden line and surface removal; and realistic shading and rendering techniques.

Prerequisite: CSE 555.

CSE 559 System Programming (4)

Introduction to the organization of computer systems with equal emphasis on both hardware and software as complementary entities. Views a system as a multilayer, hierarchically nested family of virtual machines. Topics: machine language level; executive (kernel) level; assembly level; batch, multiprogramming and time-sharing systems; file systems; design of multilevel machines. Class project.

CSE 564 Computer Organization and Architecture (4)

Stored program computers, organization of arithmetic-logic unit, central processing unit, main and auxiliary memory, input/output units and exercises in microprogramming. Central and distributed processing computer networks, architecture of some main frame computers and some microprocessors, parallel and pipeline processing.

Prerequisite: CSE 578 or permission of instructor.

CSE 565 Compiler Design (4)

The student is directed through development of a compiler. Major items include: scanning; parsing via bottom-up and top-down methods; precedence grammars; internal forms for source programs; semantic routines; and symbol table organization. The compiler is constructed in a high-level language.

Prerequisite: Knowledge of data structures and programming languages.

CSE 568 Fault-Tolerant Computing (4)

General introduction; fault-models; test generation techniques; logic simulation; redundancy techniques; error correcting codes; software reliability; testing tools and measurement; proving program correctness; case study of fault-tolerant computer architectures.

CSE 570 Microprocessors and Microcomputers (4)

Introduction to microprocessors and microcomputers; the CPU on a chip; interfacing microprocessors with external systems; programming considerations; logic design with microcomputers; hands-on laboratory experience. Credit may not be earned for both CSE 570 and EE 570.

Prerequisite: Ability to program in at least one language.

CSE 571 Microprocessor Systems Applications (4)

The design of microprocessor-based equipment and systems. Interfacing techniques. Serial asynchronous and synchronous communications methods. Direct memory access, A/D and D/A converters, peripheral interface devices, computer graphics. Project-oriented course.

Prerequisite: CSE 570 or EE 570.

CSE 578 Switching Theory and Digital Logic (4)

Combinational switching functions, minimization and analysis, implementation using relay circuits, TTL, CMOS and other popular logic families. Symmetric functions, threshold logic, and iterative circuits. Analysis and synthesis of clock mode, level mode, and pulse mode sequential circuits. Design and implementation of digital systems. Turing machines and finite automata.

CSE 650 Theory of Operating Systems (4)

Formal models of operating systems. Typical topics include: scheduling anomalies, control of concurrent processes, scheduling algorithms, deadlocks, memory management, resource protection, distributed processing.

Prerequisite: CSE 550 or equivalent.

CSE 664 Advanced Compiler Design (4)

Advanced topics in compiler design. Topics include: language extensions, parsing algorithms, error correction, data flow analysis, code optimization strategies, code generation strategies.

Prerequisite: CSE 565 or equivalent.

CSE 665 Parallel and Distributed Processing (4)

Classes of computer systems, SIMD parallel and MIMD computers, interconnection networks and parallel memories, parallel algorithms; performance evaluation of parallel system; parallel computers — Illiac IV, PEPE, STARAN, pipe-lined computers, multiprocessing by tight coupling and loose coupling, distributed systems, data flow machines, architecture and software considerations.

Prerequisite: CSE 564.

SCHOOL OF HEALTH SCIENCES

Interim Dean: Joel W. Russell

Office of the Dean:

Alfred W. Stransky, associate dean for community health

Professors:

Abraham R. Liboff, Ph.D., New York University
Philip Singer, Ph.D., Syracuse University
Norman Tepley, Ph.D., Massachusetts Institute of Technology
Carl R. Vann, Ph.D., Syracuse University

Associate professors:

Michael Chopp, Ph.D., New York University
Osa Jackson, Ph.D., University of Michigan
Uwe Reischl, Ph.D., University of California (Berkeley)
Alfred W. Stransky, Ph.D., Florida State University
Lynne Williams, Ph.D., Wayne State University

Assistant professors:

Larry S. Carr, Ph.D., Brigham Young University
Kornelia Kulig, Ph.D., Academy of Physical Education (Wroclaw, Poland)
Richard J. Rozek, Ph.D., Wayne State University
John R. Stevenson, Ph.D., Indiana University

Special instructors:

Henry R. DeLorme, M.A.T., Oakland University
Pamela A. Hilbers, M.S., University of Michigan
Harry R. Hoerr, Jr., B.S., Ohio State University
Michael F. Kraemer, B.A., Northeastern Illinois University
Christine Pillow, M.A., Wayne State University
Marilyn J. Raymond, M.A., Wayne State University
Mary L. Sherman, M.S., Wayne State University

Visiting associate professor:

Robert W. Jarski, Ph.D., University of Iowa

Consulting professors:

Duane L. Block, M.D., University of Wisconsin
Joseph A. Rinaldo, M.D., Harvard University
Julius Rutzky, M.D., New York University
Robert L. Segula, M.D., University of Michigan
John R. Ylvisaker, M.D., University of Minnesota
Richard Zunker, B.S., Marquette University

Clinical professors:

Seymour Gordon, M.D., University of Michigan
Myron M. LaBan, M.D., University of Michigan; M.M.Sc., Ohio State University
John R. Pfeifer, M.D., University of Saskatchewan

Clinical associate professors:

Ali A. Abbasi, M.D., University of Damascus
George R. Gerber, M.D., Wayne State University

Nasir Ul Haque, M.D., Dacca Medical College
David R. Pieper, Ph.D., Wayne State University
Alexander Ullmann, M.D., University of Munich

Clinical assistant professors:

Jaime V. Aragones, M.D., University of Santo Tomas
Arnold L. Brown, M.D., University of Texas
Nitin C. Doshi, M.D., S.C.B. College (Cuttack, India)
Moufid Mitri, M.D., St. Joseph University

Adjunct assistant professor:

Sonya Friedman, Ph.D., Wayne State University

Exercise Science Program

Graduate program coordinator: Larry S. Carr

Associate professor:

Alfred W. Stransky, Ph.D., Florida State University

Assistant professors:

Larry S. Carr, Ph.D., Brigham Young University
John R. Stevenson, Ph.D., Indiana University

Clinical professor:

Murray B. Levin, M.D., Wayne State University

Clinical associate professors:

William R. Back, D.O., Kirksville College
Barry A. Franklin, Ph.D., Pennsylvania State University
John J. Karazim, M.D., Wayne State University
Creagh E. Milford, D.O., Chicago College of Osteopathic Medicine
Rajendra Prasad, M.D., Prince of Wales Medical College (India)

Clinical assistant professors:

Joseph A. Arends, M.D. Wayne State University
John F. Kazmierski, D.O., College of Osteopathic Medicine and Surgery, Des Moines, Iowa
Robert C. Nestor, D.O., Kansas City College of Osteopathic Medicine
Thomas E. Schomaker, D.O., Chicago College of Osteopathic Medicine

Clinical instructor:

Michael D. Cribbs, M.S., University of Michigan

The Master of Science in Exercise Science

This program is designed to prepare specialists in the field of exercise science with concentration in the areas of health improvement and human performance. The curriculum emphasizes the interrelationships among life-style, health and physical activity, and the optimization of human performance. Graduates of the program are prepared for professional positions such as: cardiac stress testing specialists; exercise specialists in medical settings, sport scientists; and directors of adult fitness programs, cardiac rehabilitation programs, and health maintenance/health improvement programs in corporate, industrial, and educational settings.

Admission

An applicant for admission to the Master of Science in exercise science program should have: (a) a bachelor's degree from an accredited school with an undergraduate cumulative GPA of 3.00 or above, (b) a strong background in basic and applied health sciences, and (c) completed the following prerequisite courses: human anatomy, physiology, exercise physiology, kinesiology (human motion analysis), statistics, first aid, and 4 semester hours of health enhancement (or physical education activity/theory).

While not required, additional course work in biochemistry, organic chemistry, and mathematics through precalculus, is highly recommended.

Applicants who are deficient in no more than two prerequisite courses can be considered for conditional admission status. Such applicants will be required to complete all prerequisite courses before conditional status can be removed. Applicants with an undergraduate GPA less than 3.00 with the appropriate academic background and strong letters of recommendation may be considered for conditional admission status. Students who qualify for this status must complete a minimum of 16 hours of graduate level work with a GPA of 3.00 or above before conditional status can be removed.

Admission to this program is competitive. All required application materials should be sent to the admissions office at least three months before the beginning of the desired starting semester (fall or winter).

Thesis research or comprehensive examination option

Candidates for the master of science degree must choose either to carry out an independent research project culminating with the completion of a master's thesis, or to conduct in-depth study in a number of approved areas, followed by a comprehensive examination covering these areas.

Students who choose the thesis option select an adviser, who serves as the thesis committee chairperson, and two committee members from selected faculty in other departments and programs. A thesis proposal is presented orally and in writing to the committee for approval. Research topics usually consist of experimental studies in the areas of biomechanics, cardiac rehabilitation, exercise physiology, measurement and evaluation, performance assessment, physical rehabilitation, and studies of life-style behavior. The thesis is presented and defended by the candidate at a meeting open to all interested faculty members.

The comprehensive examination option is designed to provide those students who do not wish to conduct thesis research an opportunity for in-depth study in several areas. Under this option, students, with their adviser's approval, select a minimum of three topics. Extensive reading lists for each topic are compiled from recommendations submitted by three or more faculty members who have expertise in the area. A comprehensive examination, consisting of selected questions for each topic area, is given in order to determine if the candidate has the in-depth knowledge expected of a master's degree candidate. The comprehensive examination can be arranged to be given in three parts, covering each of the topics studied.

Clinical internship

The clinical internship component of this program provides an opportunity for students to gain first-hand experience in the practice of exercise science. Internship placements will be the responsibility of the program and will include public and private health care settings and corporate wellness settings. Students entering the program with significant previous clinical experience, comparable to the internship experiences offered through this program, may be exempted from one or both internship courses

(EXS 601 and 602) by following the course competency procedure and/or the graduate petition of exception procedure.

Requirements for the degree

The average candidate entering the fall or winter semester will spend two full-time academic years to successfully complete this graduate program, which requires:

1. Completion of a minimum of 36 approved credits with a grade point average of 3.00 or better. Credit toward the degree will not be given for courses with grades under 2.5.
2. Completion of the core courses: EXS 500, 520, 525, 530, 540, 601 and 602. Students will select six hours of elective course work, approved by their advisers, either from department offerings or from advanced course work (300 level or above) in such areas as biology, chemistry, computer science, engineering, health science, or psychology.
3. Completion of a master's thesis or comprehensive examination. The master's thesis option requires the completion of a minimum of 6 credits in EXS 690. The comprehensive examination option requires the completion of a minimum of 6 credits in EXS 650.

Course Offerings

EXS 500 Introduction to Research (4)

An introductory graduate level course in research methods for students pursuing graduate degrees in the health sciences. Topics include: scientific method, ethics, research design, interpretation of existing research, statistical concepts, computer resources, conceptualization of research problems, instrumentation, and proposal preparation and presentation.

Prerequisite: STA 225, graduate status.

EXS 505 Health and Disease (2)

This course familiarizes the student with the pathogenesis of representative diseases, including major emphasis on health disorders associated with life-style factors.

Prerequisite: EXS 304.

EXS 510 Stress Management (2)

This course examines the causes of stress and the physiological changes that occur as a result. The physiological results of stress are measured and practical solutions to improving stress management and job performances are discussed.

Prerequisite: EXS 304.

EXS 520 Advanced Exercise Physiology (4)

This course emphasizes the incorporation of recent advances in biological research with the study of exercise. Topics include: morphological, biochemical, and physiological responses to both acute and chronic exercise; mechanisms in metabolic control; hormonal, renal, and digestive factors in exercise; and, the relationships between exercise and cardiovascular disease.

Prerequisite: BIO 325 or CHM 201, EXS 304, or instructor's permission.

EXS 525 Biomechanics (4)

This course emphasizes basic principles of mechanics as applied to human movement. Students learn to analyze selected movements and activities, including gait, in both a qualitative and quantitative manner. The measurement of kinematic and kinetic variables, such as displacement, velocity, force, and torque, are performed through the use of photoinstrumentation and various force-recording devices.

Prerequisite: EXS 350.

EXS 530 Diagnostic Testing and Exercise Prescription (2)

Course content emphasizes stress testing procedures and techniques for exercise prescription, including basic concepts in electrocardiography. Students completing this course should be able

to make clinical assessments regarding ECG information and, under faculty supervision, will be responsible for implementing a program of exercise rehabilitation for cardiac patients.
Prerequisite: EXS 304, 520, or instructor's permission.

EXS 540 Nutrition, Weight Control, and Exercise (2)

This course emphasizes basic concepts in nutrition as applied to exercise, physical training, health improvement, and cardiac rehabilitation. Topics are related to the importance of food nutrients in sustaining physical function during moderate to severe physical activity, the energy value of foods, and the relationships between nutrition, fitness, and health.
Prerequisite: BIO 325 or CHM 201, EXS 304, or instructor's permission.

EXS 545 Physical Activity and Aging (2)

This course examines the effects of aging on physical work capacity, body composition, cardiovascular and pulmonary function, and neuromuscular and musculoskeletal function. Retardation of the aging process through the use of physical conditioning programs is presented and principles for prescribing and conducting exercise programs are included.
Prerequisite: EXS 304, 350, and 505.

EXS 601/602 Clinical Internship I/II (4 each)

Supervised clinical experience in a wide variety of educational settings, including hospitals, clinics, physicians' offices, or the Oakland University Health Maintenance/Health Improvement or Cardiac Rehabilitation programs.
Prerequisite: 20 credits of graduate study, including EXS 520, 525, and 530.

EXS 605 Administration of a Cardiac Rehabilitation or Community Exercise Program (2)

This course emphasizes the administrative steps necessary to establish and operate a cardiac rehabilitation or community exercise program. Staffing, facilities, equipment, budgeting, scheduling, legal liabilities, and contacts with physicians, support personnel, and health care centers are discussed.
Prerequisite: EXS 510, 520, and 530, or instructor's permission.

EXS 610 Clinical Biomechanics (2)

This course focuses on the biomechanics of the human musculoskeletal system. Topics include the static and dynamic responses of human skeletal tissue and the biomechanical considerations involved in joint motion of the extremities, the trunk, and the head and neck.
Prerequisite: EXS 350 and Human Gross Anatomy, or instructor's permission.

EXS 615 Laboratory Instrumentation (2)

This course involves both concepts and procedures regarding the measurement of human performance using appropriate laboratory instruments and data collection systems in the disciplines of exercise physiology and biomechanics. Students will learn proper techniques for data acquisition, equipment calibration, and data interpretation for instrumentation used in exercise science.
Prerequisite: 16 graduate hours, including EXS 500, 520, and 525.

EXS 620 Muscle Physiology (2)

This course focuses on the basic principles and current knowledge pertaining to muscle structure and function. Topics include muscle tissue anatomy, contraction, muscle fiber types and their recruitment patterns, energy metabolism, substrate utilization, fatigue and mitochondrial adaptations.
Prerequisite: EXS 304, 520, or instructor's permission.

EXS 625 Advanced Concepts in Human Performance (4)

This course involves advanced concepts and their applications to the improvement of human performance, particularly athletic performance. Recent research in topics from biomechanics, exercise physiology, motor learning, psychological aspects, and sports medicine will be presented and discussed using a seminar approach.
Prerequisite: Completion of required core courses in EXS.

EXS 650 Independent Study (2-6)

Prerequisite: 24 credits of graduate study, including completion of the clinical internships, EXS 601 and 602.

EXS 690 Thesis Research (2-6)

Prerequisite: 20 credits of graduate study at the 500 level or above.

SCHOOL OF HUMAN AND EDUCATIONAL SERVICES

Dean: Gerald J. Pine

Professors:

Edward A. Bantel, Ed.D., Columbia University
 Jane M. Bingham, Ph.D., Michigan State University
 Harold C. Cafone, Ed.D., University of Arizona
 George E. Coon, Ed.D., Wayne State University
 Ronald L. Cramer, Ph.D., University of Delaware
 Gerald G. Freeman, Ph.D., University of Michigan
 Harry T. Hahn, Ed.D., Temple University
 W. Dorsey Hammond, Ph.D., University of Delaware
 James W. Hughes, Ed.D., University of New Mexico
 Jacqueline I. Loughheed, Ed.D., Wayne State University
 Donald M. Miller, Ph.D., University of Wisconsin
 William F. Moorhouse, Ed.D., University of Wyoming
 Gerald J. Pine, Ed.D., Boston University
 Roderic E. Righter, Ed.D., Wayne State University
 Howard Splete, Ph.D., Michigan State University

Associate professors:

John Atlas, Ed.D., Wayne State University
 Richard F. Barron, Ph.D., Syracuse University
 Gloria T. Blatt, Ph.D., Michigan State University
 Marc E. Briod, Ph.D., Northwestern University
 Robert W. Brown, Ph.D., Wayne State University
 Robert J. Christina, Ph.D., Syracuse University
 F. James Clatworthy, Ph.D., University of Michigan
 David N. Cooper, Ed.D., Rutgers University
 Anne Cairns Federlein, Ph.D., University of Michigan
 William C. Fish, Ed.D., Columbia University
 David C. Housel, Ph.D., Arizona State University
 Anne P. Jaworski, Ph.D., Wayne State University
 Patrick J. Johnson, Ed.D., Wayne State University
 William H. Jones, Ph.D., University of Michigan
 David P. Meyer, Ph.D., Arizona State University
 Billy Joe Minor, Ph.D., Indiana University
 Sharon P. Muir, Ph.D., University of Nebraska-Lincoln
 Mary L. Otto, Ph.D., Indiana University
 Robert G. Payne, Ph.D., University of Michigan
 James C. Schmidt, Ph.D., Wayne State University
 Robert M. Schwartz, Ph.D., University of Illinois
 Keith E. Stanovich, Ph.D., University of Michigan
 Ronald M. Swartz, Ph.D., New York University
 Carol A. Swift, Ph.D., University of Arizona

Assistant professors:

L. Di Anne Borders, Ph.D., University of Florida
 John P. Orehovec, Ed.D., Boston University
 Luellen Ramey, Ph.D., University of Florida

Adjunct associate professor:

Elinor B. Waters, Ed.D., Wayne State University

The School of Human and Educational Services offers programs leading to:

- Doctor of Philosophy in Reading
- Education Specialist in School Administration
- Master of Arts in Teaching in four areas:
 - early childhood
 - curriculum, instruction and leadership
 - reading and language arts
 - special education
- Master of Arts in Counseling
- Continuing Certification

In addition, the College of Arts and Sciences and the School of Human and Educational Services jointly sponsor candidates for the Master of Arts in Teaching in English and mathematics. Descriptions of these programs are in the English and mathematics sections of this catalog.

In order to remain in good standing, students must earn a grade point average of 3.00. No grade below 2.0 can be applied toward a graduate degree, and two course grades below 3.0 or one below 2.0 automatically lead to an evaluation of progress and possible dismissal.

Students will be allowed to take no more than 12 credits before admission to a program.

Michigan Continuing Certificate Requirements

New teacher certification rules

Beginning September 1, 1989, persons receiving a continuing certificate will be required to renew that certificate every five years on the basis of six semester hours of academic credit from an approved teacher preparation institution or the equivalent in State Board approved teacher preparation programs or activities that will award credits obtained as Continuing Education Units (CEUs). Continuing certificates issued before the above date remain valid as long as the holder serves in an educational capacity 100 days within a five-year period.

To meet the continuing certificate requirements of the State of Michigan, candidates must complete the following: 1) three years of experience within their certificate level; 2) 18 semester hours of course work in an approved planned program; and 3) both elementary and secondary candidates must show evidence of completing coursework in methods of teaching reading (both undergraduate and graduate coursework will apply). Six semester hours are required for elementary candidates and three semester hours are required for secondary candidates. If additional courses in reading need to be taken, the approved coursework for Oakland University is as follows:

For elementary teachers:

RDG 500	Foundations of Reading Instruction (4)
RDG 534	Reading and Language Arts Instruction (4)

For secondary teachers:

RDG 538	Guiding Reading-Learning in Content Subjects (4)
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For those students enrolled in the M.A.T. in Reading and Language Arts only, RDG 632 and RDG 633 may be used. This reading requirement applies to students seeking a continuing certificate after July 1, 1983.

Admission

Admission will be through the Graduate Admissions Office. To be admitted, all students must complete a graduate application, pay a \$20 application fee and arrange to have official transcripts from all schools previously attended sent to the above office.

Advising

Students must schedule an appointment with an adviser to plan their programs *after they have been notified* that their application and transcripts have been received and forwarded to the School of Human and Educational Services. Applicants for special education endorsement should call the Department of Human Development and Child Studies (370-3077). All other applicants for certification or endorsement should contact the School of Human and Educational Services Advising Office (370-4182) for an appointment.

General Information

Candidates for the continuing certificate are urged to complete their 18 semester hours as part of a master's degree. This choice offers maximum flexibility. As an alternative, students may choose non-degree planned programs and be admitted to the university in continuing certification status. Oakland University will accept 6-9 credits in transfer from another institution toward certification requirements upon adviser approval.

Those teachers who wish to renew a lapsed provisional certificate may be recommended to the state upon successful completion of ten semester hours of course work within their planned program.

Upon successful completion of course work (3.00 for graduate courses, 2.00 for undergraduate), students must apply for the state certification and/or endorsement through the Office of the Registrar/Records, 102 O'Dowd Hall.

Planned Program Options

Planned programs are available through the following departments (course work for these programs is listed under the department):

- Counseling
- Curriculum, instruction and leadership
- Human development and child studies, both early childhood (EC) and special education (SE)
- Reading and language arts, both reading and microcomputer applications

Vocational education

Individuals who hold a secondary provisional teaching certificate with a vocational endorsement may be recommended for a continuing certificate in vocational education upon completion of three years of successful teaching experience and the following planned course of study:

Vocational education courses: (minimum of 10 credits)

VTE 510	Design of Vocational Courses (2 or 4)
VTE 511	Vocational Laboratory Planning (2)
VTE 520	Instructional Methods and Media Use (2)
VTE 530	Vocational Guidance and Placement (2)
VTE 540	Issues and Trends in Vocational Education (2 or 4)

Electives: Up to 8 credits in related courses approved by adviser in areas such as: area studies, communication arts, computer sciences, economics, education (i.e., administration, law, career guidance, reading, special education, early childhood), English, engineering, management, mathematics, nursing, political science, psychology, sociology.

Initial Certification

Students who hold a bachelor's degree and wish to obtain an initial teaching certificate need to contact undergraduate admissions for information.

Endorsements

Endorsements refer to any subject areas, specializations or change of grade levels which are added to a certificate. No undergraduate grade below 2.0 or graduate grade below 3.0 can be applied to this program.

1. Endorsements which require the completion of a master's degree at Oakland University are:

Guidance and counseling

Reading

Special education (first endorsement)

Students who wish to pursue these programs should apply to the master's program in the appropriate department.

2. The following endorsements do not require completion of a master's degree:
 - Elementary (K-6) endorsement.** Applicants should consult the Department of Curriculum, Instruction and Leadership. Change of level endorsements require evaluation of previous course work by an adviser.

Major/minor subject area endorsements may be added in any of the areas approved by the State of Michigan for Oakland University. They are as follows: mathematics, science, biology, chemistry, physics, language arts, history, political science, psychology, sociology, speech, social studies, Spanish, French, German and fine arts.

Early childhood endorsement: Course work follows the planned program mentioned previously.

Special education endorsement: Autistically impaired, emotionally impaired, and learning disabilities endorsements may be added if students already have a special education endorsement. Emotionally impaired and learning disabilities endorsements may also be earned as part of a master's degree program if students do not already have a special education endorsement. Students should contact the Department of Human Development and Child Studies for advising. To be recommended for endorsement in any of the above programs, students must be admitted through the Graduate Admissions Office in certification status and have their program approved by a SHES academic adviser, located in 472 O'Dowd Hall. These endorsement programs may also be used as planned programs for continuing certification.

DEPARTMENT OF COUNSELING

Chairperson: Robert W. Brown

Professors: Gerald J. Pine, Howard Splete

Associate professors: Robert W. Brown, William H. Jones, Mary L. Otto, James C. Schmidt

Assistant professor: L. Di Anne Borders

The Master of Arts in Counseling

The Department of Counseling offers a Master of Arts degree in counseling for individuals who wish to work in professional counseling roles with children, youth, adults, and families in school and community settings. The program can accommodate both full- and part-time students.

Admission to program

The department will consider applicants who hold a bachelor's degree from an accredited institution and whose credentials, including transcripts and letters of recommendation, provide clear evidence of academic distinction. Admission is selective.

A grade point average of 3.00 in all undergraduate course work is ordinarily considered the minimum standard for admission. Applicants must have completed a minimum of 24 semester hours of undergraduate or graduate credits in the behavioral sciences such as psychology and sociology before admission to the program (this requirement is evaluated by the admissions committee). Persons should not apply until they have completed these credits. Transcripts of previous work can be evaluated by the counseling department faculty before formal application.

All applicants must submit a written statement that explains reasons for entering the counseling program, program emphasis, employment goals, and a description of experiences and accomplishments in working with children, youth and adults.

Recommendations are important to the application procedure. The two required references must be from professionals who can attest to the applicant's academic ability and effective interaction with youth and adults.

Part-time students are admitted three times each academic year: fall, winter and spring. Full-time students are admitted only for the fall semester. Please see page 8 for application dates.

Graduation requirements

At least 48 graduate level credits are required for the degree. A maximum of 12 credits earned in special graduate status at Oakland University may be accepted toward the degree.

A valid teaching certificate is required of applicants who seek recommendation for a school counselor endorsement upon graduation. Students who complete the degree and who have followed the counseling emphasis in the school setting may be recommended for counselor endorsement at the K-9, 7-12, or K-12 level depending on completion of the specific course requirements for each endorsement level. Students must consult with their advisers regarding endorsement.

Required core courses

All candidates for the M.A. in counseling must take four core courses:

CNS 562	Testing and Assessment in Counseling (4)
CNS 565	Theories of Counseling (4)
CNS 575	Introduction to the Counseling Profession (4)
CNS 576	Developmental Counseling (4)

Upon completion of the core courses, students must select an emphasis either in school or community counseling as the setting for their course work, research, and internship. The courses required for each emphasis and setting are listed below.

Counseling emphasis in school settings

The following courses are for persons preparing for a position as a school counselor and who are seeking school counselor endorsement. In addition to the four core courses, students must take CNS 561, 563, 571, 660, 661, 664, 665, 666, and 4 credits of electives.

Counseling emphasis in community settings

The following courses are designed for persons preparing for counseling positions in community, agency, and industry settings. In addition to the four core courses, students must take CNS 563, 564, 574, 660, 661, 664, 665, 666, and 4 credits of electives.

Program Options

Full-time program

The full-time program is designed for students who wish an intensive and concentrated program in counseling. This program option is most appropriate for students with strong undergraduate preparation in areas such as psychology, sociology, social work, human resource development, or other related helping fields. Full-time employment is not recommended for students who enroll in the full-time program option.

The full-time program allows completion of the degree in two academic years. Students receive intensive practicum and internship experiences and attend both day and evening classes.

Admission to the full-time program, which begins only in the fall semester, is highly selective. A completed application for fall admission should be received by the date specified on page 8.

A typical full-time program

	Year 1	Year 2
Fall	CNS 575	CNS 664
	CNS 565	CNS 660
	CNS 576	CNS 563
	CNS 661	CNS 666
Winter	CNS 562	Elective
	CNS 665	
	CNS 564/571	
Spring	or	
Summer	CNS 561/571	

Part-time program

The part-time program is designed for students who are employed and/or have other responsibilities prohibiting full-time study and wish a more flexible schedule. Although the part-time program offers students a high degree of flexibility, they are expected to meet all regular admission requirements.

Students in the part-time program may take one or more courses each semester and must complete degree requirements within six calendar years. Students are admitted to the part-time program for the fall, winter, and spring semesters. Deadline dates for receipt of completed applications are listed on page 8.

A typical part-time program

	Year 1	Year 2	Year 3	Year 4
Fall	CNS 575	CNS 562	CNS 660	CNS 661
Winter	CNS 565	Elective	CNS 660	CNS 661
Spring	CNS 576	CNS 564/574 or CNS 561/571	CNS 665	CNS 666
Summer				

Planned program in counseling

Core courses (all required): CNS 562, 565, 575, 576

Elective: CNS 665, 563 or 561

Course Offerings

CNS 560 Special Problems in Counseling and Personnel Work (1, 2, 4, 6, or 8)

Study of specialized problems in various phases and areas of guidance and counseling. Specific topics are based on student needs. May be taken more than once, but for no more than a total of 8 credits. May be elected for independent study.

Prerequisite: Permission of instructor.

CNS 561 Introduction to School Counseling (2)

Provides an overview of the role of the school counselor at all grade levels, K-12. Includes a study of techniques appropriate for school counseling, provides an overview of issues facing school counselors, and examines procedures for organizing and administering a school counseling program.

CNS 562 Testing and Assessment in Counseling (4)

Introduction to assessment procedures and instruments, including vocational, educational, intelligence, and personality tests, for working with children, adolescents, and adults. Covers basic statistics, technical aspects of an instrument, and ethical considerations. Provides for supervised experiences in assessment and report writing. Required for core program.

CNS 563 Group Counseling (4)

Theory, practice, and ethics of group counseling. Provides opportunities to develop group counseling skills under supervision.

CNS 564 Introduction to Community/Agency Counseling (2)

Surveys key issues in providing human services to the public. Legal, historical, and social factors are examined. Includes examples of systems approaches to the delivery of employment, mental health, vocational rehabilitation, and welfare services. Includes delivery of human services in business and industry settings.

Prerequisite: CNS 562, 563, and 565 or permission of instructor.

CNS 565 Theories of Counseling (4)

Study of the major counseling theories including historical development, philosophical tenets, and current applications. Required for core program.

CNS 566 Counseling and Guidance in Adult Education Settings (4)

Provides an overview of major theoretical models of counseling for adults which are carried on in educational settings, both traditional (community college and university) and nontraditional (alternative educational schools, and business and industry sites).

CNS 567 Workshop in Counseling and Guidance (2, 4, 6, or 8)

Evaluation and development of guidance and personnel programs and practices through the study of a particular area of professional service for implementation in school, college, community agency, or business setting. Offered on request by school or agency personnel.

CNS 571 Consultation Theory and Practice (2)

Consultation roles, methods of establishing collaborative working relationships with various populations, and introduction to individual and group consulting approaches.

CNS 573 Family and Couple Counseling (4)

An introduction to the major theoretical approaches to counseling families and couples. Case studies, analysis of one's own family, and simulations may be used to facilitate the transition from theory into practice.

CNS 574 Diagnosis and Treatment Planning in Counseling (2)

Introduction to the criteria and procedures used in DSMIII and other systems for client diagnosis. The case study method is used to develop treatment plans based upon diagnostic information.

CNS 575 Introduction to the Counseling Profession (4)

Basic tenets of the counseling profession: professional identity, legal and ethical issues, history and social/cultural foundations, and counseling of special populations. Required for core program.

CNS 576 Developmental Counseling (4)

An overview of life-span developmental theory for counseling, children, adolescents, and adults. Includes the use of case studies to assess developmental needs of clients in a variety of settings. Required for core program.

CNS 557 Counseling for the Gifted and Talented (4)

Investigates the role of the school counselor and the teacher in developing and implementing counseling and guidance programs for the gifted and talented.

CNS 660 Research in Counseling (2, 4, 6, or 8)

Study of research techniques and procedures in counseling, including research design, data collection, and statistical analysis. The major course requirement is to identify a problem in counseling, design a research study to investigate this problem, conduct the study, analyze the data and describe the results in research report. May be elected for independent study.

Prerequisite: CNS 562 or permission of instructor.

CNS 661 Techniques of Counseling (4)

Laboratory training in counseling and consultation skills and application of theory and research to practice. Development of a personal theory of counseling is expected. Includes audio and video taping of counseling interviews with clinical supervision.

Prerequisite: Core courses and admission to the counseling program.

CNS 663 Advanced Group Counseling (4)

Problems of group leadership composition, selection, intervention, termination, evaluation and follow-up. Students develop a written description of their own group counseling approaches and validate the description with concurrent application in a supervised group counseling experience.

Prerequisite: CNS 563, 661 and permission of instructor.

CNS 664 Counseling Practicum (4)

Application of counseling and consulting theories and techniques. Emphasizes skill practice with clients in a supportive lab environment. Students develop and critique audio and video counseling and consulting tapes. Includes individual and group clinical supervision. May be elected a second time with instructor's permission for a total of not more than 8 credits.

Prerequisite: Admission to program in counseling and completion of CNS 661 with a grade of 3.0 or better.

CNS 665 Career Development Theory and Practice (4)

Covers theories of career development and strategies for life/work planning with individuals from early childhood to adulthood. Emphasizes the processes for providing career guidance for self-understanding, decision-making, and employability.

Prerequisite: Core courses and admission to program in counseling or permission of instructor.

CNS 666 Internship in Counseling (2, 4, 6, or 8)

A field counseling experience supervised by an approved counseling practitioner. Placement is at a site suitable to the counseling emphasis requirements and interests of the student. Related course seminars are conducted by the university instructor.

Prerequisite: Completion of final course work as specified in the student's authorized degree program plan, including completion of CNS 664 with a grade of 3.0 or better.

CNS 668 Affective Approaches in Guidance (4)

Emphasizes a synthesis in education of the affective and cognitive domains. Presents models for the enhancement of affective learning and development including theoretical bases, rationale, and strategies for application. Examines legal and ethical issues in affective education.

Prerequisite: Teaching experience or permission of instructor.

CNS 671 Supervision in Human Services (4)

Introduces advanced students to fundamentals of supervision theory and practice. Compares several approaches to supervising counselors and others in human services. Covers aspects of program development, employee training and performance evaluation.

Prerequisite: Core courses or permission of instructor.

CNS 672 Seminar in Counselor Supervision (4 or 6)

Topics include theories of supervision, major supervision models, methods of assessing counseling effectiveness, and the role of ethics and values in the supervision process. The lab portion of the course will consist of assisting graduate faculty members in supervising counselor education students enrolled in ED 661 and 664.

Prerequisite: Permission of instructor.

CNS 674 Advanced Consultation Techniques (4)

Various theories of consultation will be reviewed and related consultant roles will be presented. The majority of the course will include demonstrations of consulting techniques, as well as practice of these techniques in the classroom and in the field.

CNS 677 Reaction to Significant Loss (4)

Covers the concept of significant loss, behavioral and psychosocial reactions to such loss and effective counseling strategies. Among losses covered are those resulting from death, divorce, and loss of self esteem and mobility.

CNS 678 Program Planning and Evaluation (4)

Covers programs, materials, and systems for the comprehensive planning and evaluation of counseling, human services, and vocational guidance in a broad range of community, business, and industry settings. Includes methods and models for program planning and emphasizes techniques and practices of program evaluation. Includes skills for managing, evaluating and obtaining funding for government supported human service programs.

Prerequisite: Core courses and CNS 665 or permission of instructor.

DEPARTMENT OF CURRICULUM, INSTRUCTION AND LEADERSHIP

Chairperson: Sharon P. Muir

Professors: James W. Hughes, Jacqueline I. Lougheed, Roderic E. Righter

Associate professors: David C. Housel, Patrick J. Johnson, Sharon P. Muir

Assistant professor: John P. Orehowec

The Department of Curriculum, Instruction and Leadership offers a Master of Arts in Teaching (M.A.T.) degree with concentrations in either leadership or in curriculum and instruction for both elementary and secondary educators. The department also offers Michigan certification planned programs in elementary education for continuing certification, elementary endorsements for holders of teaching certificates, and professional development opportunities for practicing teachers.

The M.A.T. in Curriculum, Instruction and Leadership is designed to enrich the expertise and competence of teachers and other professional staff in the research and theory of teaching, learning, and administration. The leadership concentration prepares educators for entry into a career in educational administration in both elementary and secondary schools. The curriculum and instruction concentration assists teachers in understanding the process of learning and in improving the art of teaching.

Admission

Applicants for the M.A.T. apply to Oakland University and the Department of Curriculum, Instruction and Leadership through the Office of Graduate Admissions. Application forms for the university and for the department are available from that office. Admission is a selective process; meeting the minimum criteria does not guarantee acceptance into the program. Completed applications are processed beginning February 1 for spring admittance, April 1 for summer, June 1 for fall, and October 1 for winter. Students normally are notified of their admission status one month before the beginning of each term.

Minimum criteria are: 1) an undergraduate grade point average of 2.80, 2) Miller Analogies Test score, 3) an initial teaching certificate, and 4) two letters of recommendation from individuals in a supervisory relationship to the applicant. The Miller Analogies Test is administered monthly by the Office of Special Advising at Oakland University.

Students seeking up to 12 hours of non-degree course work for personal or professional development may be assigned special graduate status. Post-master's students may take additional course work upon completing an Instructor's Permission Form with signed approval from the department chair. Applications for special graduate status and Instructor's Permission Forms are available from and processed through the Office of Graduate Admissions.

Requirements

Upon admission, a plan of study is prepared jointly by the student and the faculty adviser. Students concentrating in either leadership or in curriculum and instruction complete a program of 36-40 credits, depending on the exit plan selected. Sixteen hours must be selected from one concentration.

Core—16 credits

CIL 510	Introductory Seminar in Curriculum, Instruction & Leadership
CIL 512	Principles of Curriculum Development
CIL 554	Interaction Laboratory for Teacher Development

one of the following:

CIL 509	Schools, Students and Educational Equity
CIL 580	Theories and Techniques of Leadership
CIL 585	Law for Teachers and Administrators

Concentration — 16 hours (choose leadership or curriculum and instruction)

Leadership

CIL 509	School, Students and Educational Equity (4)
CIL 513	Organization of the Schools (4)
CIL 580	Theories and Techniques of Leadership (4)
CIL 585	Law for Teachers and Administrators (4)
CIL 593	Evaluation and Accountability in Education (4)
CIL 611	Issues in Education (4)
CIL 612	Applied Curriculum Studies (4)
CIL 658	The Educational Administrator (4)
CIL 659	Advanced Seminar in Law for Teachers and Administrators (4)
CIL 661	Topics in Educational Leadership (2-4)
CIL 677	Women in Leadership (2 or 4)
FE 592	Foundations of Research and Evaluation Methods (4)
FE 605	Politics in Education (4)
FE 660	Change Models in Education (4)
FE 680	Learning Models (4)

Curriculum and instruction

CIL 505	Science and Children (4)
CIL 506	Outdoor Education (4)
CIL 507	Aerospace Education (2 or 4)
CIL 577	Art for the Elementary Teacher (4)
CIL 581	Teaching about Black Africa in the Public Schools (4)
CIL 587	Social Studies in the Elementary School (4)
CIL 588	Supervisory Skills for Cooperating Teachers (2 or 4)
CIL 589	Integrating Sciences Across the Curriculum (2 or 4)
CIL 597	Oakland University — Greenfield Village Practicum in the Social Studies (8)
CIL 612	Applied Curriculum Studies (4)
CIL 613	Open Math (4)
CIL 614	The Elementary Mathematics Curriculum (4)
CIL 615	Diagnosis and Remediation for Mathematical Difficulties of Elementary School Children (4)
CIL 687	Global Education in the Elementary and Middle Schools (4)
CIL 688	Global Education in the Secondary Schools (4)
RDG 594	Computer Literacy and Personal Computing (4)

one of the following:

RDG 500	Foundations of Reading Instruction (4)
RDG 534	Reading-Language Arts Instruction in the Elementary School (4)
RDG 538	Guiding Reading-Learning in Content Subjects (4)
Exit Plan — 4-8 credits (choose one)	
CIL 695	Practicum in Curriculum Instruction and Leadership (4) plus 4 credits selected with prior adviser approval
CIL 699	Terminal Project in Curriculum Instruction and Leadership (4)

The terminal research project is completed under the direction of the faculty adviser or, in the case of a thesis, with a committee.

Michigan Certification

Continuing certification: Continuing certification for holders of a teaching certificate may be earned while pursuing the M.A.T. program in curriculum, instruction and leadership. Teachers seeking only continuing certification must take CIL 512 and 554 plus 8 credits from one M.A.T. concentration and 4 credits from the other M.A.T. concentration. After September, 1987, one of the first three courses must be CIL 512 or 554. Students not admitted to the M.A.T. program are advised by staff in the school's Advising Office.

Elementary endorsement: Individuals holding a teaching certificate may acquire an elementary endorsement by completing RDG 500, RDG 534, CIL 505, CIL 587, CIL 614 and a major/minor in fine arts, history/social studies, language arts, mathematics, modern languages, or science. The internship (CIL 455) may be waived upon application and with verification of two years of successful teaching within the last five years at the K-8 level. Students not admitted to the M.A.T. program are advised by staff in the school's Advising Office.

Course Offerings

CIL 505 Science and Children (4)

Surveys new science curricula for grades K-9. Topics include verbal skills, methods of teaching special children, the gifted and culturally different, outdoor education, integration of science with other subjects, and aerospace education. Field trips are included.

CIL 506 Outdoor Education (4)

Studies methods, materials, and sites for education in, for, and about the outdoors. Topics include backpacking, family camping, ecological systems, bringing the outdoors indoors, adventure education, and planning outdoor education programs. Field trips are included.

CIL 507 Aerospace Workshop (2 or 4)

Explores teaching science, mathematics, social studies and language arts using aerospace concepts. Emphasis is on the integration of modern technology into the curriculum. Surveys methods, materials and resources, including those of NASA. Weekend field trip possible.

CIL 509 Schools, Students, and Educational Equity (4)

Examines curricular, organizational, and resource strategies for achieving educational equity for a wide range of student variability in a variety of school settings. Students use case study, interview, and observational research techniques to study students.

CIL 510 Introductory Seminar in Curriculum, Instruction and Leadership (4)

Investigates current educational research, technology and instructional techniques, and methods of implementing them in effective teaching and leadership practices.

CIL 512 Principles of Curriculum Development (4)

Studies the basic elements of curriculum design and ways of planning, organizing, and implementing new curricula at the elementary, middle, and secondary school levels.

CIL 513 Organization of the Schools (4)

Examines, from a historical, sociological, and ecological perspective, the nature and character of schools as evolving organizations. Studies the norms, values, expectations, and the changing nature of schools and focuses on the diagnosis of schools as dynamic organizational structures.

CIL 539 Substitute Teaching — Practices and Procedures (2, 4, 6, or 8)

Investigates policies, practices, and procedures relative to the role of substitute teachers. Reviews current methods and materials in the content areas of public education as well as a variety of instructional and management strategies.

CIL 553 Curriculum and Environment of the Middle School (4)

Investigates psychological and philosophical bases of the middle school. Provides teachers with an opportunity to develop curricula that consider characteristics of the Preadolescent, organizational patterns, scheduling, teaching techniques, facility architecture, and staffing procedures. Prerequisite: CIL 512

CIL 554 Interaction Laboratory for Teacher Development (4)

Acquaints teachers with the importance of human relations skills in teaching and provides exposure to interpersonal problems among pupils, parents, and fellow teachers within a school setting. Teachers participate in role-playing, simulations, and action-oriented problem-solving.

CIL 577 Art for the Elementary School Teacher (4)

Provides teachers with an opportunity to learn about art materials, media, and procedures suitable to elementary students and teachers in the primary and intermediate years.

CIL 578 Enrichment of the Curriculum Through the Arts (2 to 4)

Allows participants, through a workshop practicum, to implement artistic activities into school subject areas. Provides for integration and enrichment of the curriculum via the arts. May be repeated up to a total of 8 credits.

Prerequisite: RDG 570, RDG 572, or CIL 577 or permission of instructor.

CIL 580 Theories and Techniques of Leadership (4)

Investigates leadership theories and techniques. Techniques relate to specific skills including goal setting, team building, decision making, problem and conflict resolution, change, organizational climate, and supervision.

CIL 581 Teaching about Black Africa in the Public Schools (4)

Studies contemporary and historical topics of Black Africa applicable to elementary and secondary schools, including materials evaluation and selection of Black African topics for classroom instruction.

CIL 583 The Middle School (2 or 4)

Studies all aspects of the emerging middle school, including organizational patterns, curriculum, psychological factors, philosophical bases, and methodologies. Provides in-depth analysis of the relationship to contemporary educational, social, and student needs.

Prerequisite: CIL 512

CIL 585 Law for Teachers and Administrators (4)

Introduces school law, with a unique opportunity to study crucial areas in public/private education that affect all educators. Investigates landmark cases and legislative statutes concerning the rights and responsibilities of teachers, students, and parents.

CIL 587 Social Studies in the Elementary School (4)

Studies methods, current trends, and content of effective social studies programs, with emphasis on the relationships among social science discipline areas in a multicultural society.

CIL 588 Supervisory Skills for Cooperating Teachers (2 or 4)

Strengthens and/or develops the supervisory skills of teachers who will work with interns as well as students in field experiences. Emphasizes role of practitioners as teacher educators as well as observation and feedback techniques.

CIL 589 Integrating Sciences Across the Curriculum (2 or 4)

Explores methods and materials for implementing a realistic problem solving approach in the elementary classroom. Emphasis is on thematic unit planning using problems that integrate natural science, social science and mathematical components.

CIL 590 Special Problems in Curriculum, Instruction and Leadership (2, 4, 6, or 8)

Pursues directed readings or independent study of topics related to leadership or to curriculum and instruction. May be taken more than once, but for no more than a total of 8 credits.

CIL 593 Evaluation and Accountability in Education (4)

Examines educational accountability and evaluation from historical, sociological, and philosophical perspectives. Studies approaches to accountability and evaluation, national evaluation standards, and issues of validity and reliability in accountability.

CIL 597 Oakland University/Greenfield Village Practicum in the Social Studies (4)

Utilizes facilities of Henry Ford Museum and Greenfield Village to assist teachers in developing and using primary resources in their social studies and science programs. Includes hands-on activities and discussions of cause-effect relationships of inventions and technology as they relate to teaching. Two consecutive semester enrollments of 4 credits each are required.

CIL 611 Issues in Education (4)

Studies current issues impacting on the organization, administration, and environment of schools. Issues may include youth advocacy, federal role in education, educational equity, and collaboration in professional development programs.

CIL 612 Applied Curriculum Studies (4)

Examines practices and research in curriculum in modern public school settings. Students have an opportunity to investigate the total experiences of young people in school and to challenge existing practices on the basis of recent curriculum developments.

Prerequisite: CIL 512

CIL 613 Open Math (4)

Assists teachers and parents in helping preschool through junior high children apply basic mathematical skills to everyday situations. Presents over 250 instructional ideas through a televised format, by correspondence, and in workshops.

CIL 614 The Elementary Mathematics Curriculum (4)

Provides a comprehensive overview of the content, teaching methods, instructional materials, and evaluation included in the elementary mathematics curriculum.

CIL 615 Diagnosis and Remediation of Mathematics Difficulties of Elementary School Children (4)

Guides elementary teachers in acquiring skills for determining children's instructional levels, diagnosing learning difficulties, and designing instruction for remediation and follow-up procedures.

Prerequisite: CIL 614

CIL 658 The Educational Administrator (4)

Emphasizes processes and procedures in functional educational administration as well as the theoretical roles and models of the administrator. Explores the roles of federal, state, and local government in supervision of school instruction.

CIL 659 Advanced Seminar in Law for Teachers and Administrators (4)

Analyzes current judicial decisions and legislative statutes that affect education in general and students, teachers and administrators in particular. Focuses on the cause and effect relationships and the general context of appropriate case law.

Prerequisite: CIL 585 or equivalent class.

CIL 661 Topics in Educational Leadership (2 or 4)

Focuses on significant leadership issues in education. Themes include: staff development, educational change, school effectiveness, educational research, instructional supervision, community relationship, finance, curriculum and instructional leadership. May be taken more than once for up to 8 credits.

CIL 677 Women in Leadership (2 or 4)

Examines organization and leadership theories, personal and professional skills, and networking strategies. Students participate in researching leadership styles of men and women as well as attitudes of men and women toward women leaders.

CIL 685 Staff and Curriculum Development (4)

Examines the current areas of curriculum development and research as they relate to local school district planning and implementation. Focuses attention on various indices and paradigms of effective staff training and development from the literature and research as related to practical applications.

CIL 687 Global Education in the Elementary and Middle Schools (4)

Identifies ways that elementary and middle school teachers can meet objectives of global education within the existing curriculum. Develops competence in using content, materials, methods and evaluation techniques unique to the objectives of a global society.

CIL 688 Global Education in the Secondary Schools (4)

Identifies ways that secondary school teachers can meet objectives of global education within the existing curriculum. Develops competence in using content, materials, methods and evaluation techniques unique to the objectives of a global society.

CIL 695 Practicum in Curriculum, Instruction, and Leadership (4)

Synthesizes and applies knowledge gained from courses in the M.A.T. in curriculum, instruction and leadership program to professional experience in the field.
Prerequisite: To be taken within last calendar year of program with adviser's approval.

CIL 699 Terminal Project in Curriculum, Instruction and Leadership (4)

Plans and executes a significant project in accordance with the student's adviser, or in the case of a thesis with an advisory committee. Students must request approval from the adviser early in the semester prior to enrollment for the project. Completed projects must be submitted at least two weeks before the end of classes in the semester of graduation.
Prerequisite: Admission to M.A.T. program.

DEPARTMENT OF HUMAN DEVELOPMENT AND CHILD STUDIES

Chairperson: Donald M. Miller

Professors: Edward A. Bantel, Gerald G. Freeman, Donald M. Miller

Associate professors: Marc E. Briod, Anne Cairns Federlein, Ronald M. Swartz, Carol A. Swift

The Department of Human Development and Child Studies offers programs leading to degrees of Master of Arts in Teaching (M.A.T.) in early childhood and special education. The M.A.T. in early childhood may include the ZA endorsement. The M.A.T. in special education may include an endorsement in autistic impairment, emotional impairment or learning disabilities. These endorsements are available for post-master students or those who have an undergraduate degree in special education. Students with an undergraduate degree in special education who are teaching autistic children may qualify for the autistic impairment endorsement program. The department course offerings include studies in the foundations of education.

Admission

The department will consider applicants who hold a bachelor's degree from an accredited institution and whose credentials, including transcripts and letters of recommendation, provide clear evidence of professional and academic distinction. Admission is selective. Meeting the minimum criteria does not guarantee acceptance.

Application is initiated through the university's Office of Graduate Admissions. Completed applications (this includes receipt of letters of recommendation, which the candidate should verify) are reviewed beginning February 1 for the spring session, April 1 for summer, June 1 for fall, and October 1 for winter. Applicants are normally notified of their admission status one month before the beginning of each term.

Criteria for admission are divided into two categories: one set determines acceptance into the department's programs; the second set, which may be subdivided if special program requirements are involved, determines acceptance into specific endorsement and/or degree programs.

Minimum criteria for acceptance into the department are: 1) an undergraduate degree with a grade point average of 3.00 (applicants who do not meet this standard may be conditionally admitted with the recommendation of a faculty member, but must receive a grade of 3.0 or above for the first 12 credit hours); 2) completion of a minimum of 24 semester credit hours at the undergraduate or graduate level in education, humanities, social sciences, health, or an appropriate related field (this requirement is carefully weighed by the department's faculty admissions committee); 3) two letters of recommendation from individuals in a supervisory relationship to the applicant; and 4) a written statement that explains reasons for application, the intended focus of graduate study, professional and career goals, and a description of experiences and accomplishments in working with children and youth.

Criteria for endorsement and/or degree programs in special education are that the applicant must 1) hold a valid Michigan teacher's certificate, and 2) must be interviewed by a special education faculty member, at which time a program authorization

will be completed. The interview should be arranged at least two months prior to the semester of intended enrollment. The interview is required before an application will be fully considered and may occur prior to or during the application review process.

Courses taken before official admission are accepted for credit at the discretion of the faculty. Potential applicants should seek admission to a program as early as possible. Under no circumstances should a potential applicant take more than 12 credits before seeking admission. Students seeking up to 12 hours of non-degree coursework for professional development or personal reasons are admitted to special graduate status before seeking admission. Students seeking up to 12 hours of non-degree course work beyond the 12 hours upon obtaining the permission of an instructor and approval by the chairperson of the department. Students with special status or post-master's status may be accorded a low priority at course registration. Applications for special graduate, post-master's and instructor permission forms are available from and processed through the Office of Graduate Admissions.

SPECIAL NOTE: Because of current and pending changes in Michigan rules governing credentials, the department's programs are under review for appropriate revision. Admitted students will be advised accordingly about possible recommended revisions in the planned program of study.

The Master of Arts in Teaching: Early Childhood

The graduate program in early childhood leads to the Master of Arts in Teaching (M.A.T.) degree. The program trains professionals to work with children from birth through age nine in public and private schools and agency settings. It also provides training for the direction and evaluation of early childhood programs, and the coordination of community resources for young children and families. The program combines theory with observation and participation in clinical, community, and school practicum settings.

The academic program stresses the linguistic, psychological, sociological, and anthropological foundations of child development. Also addressed are the medical and physiological bases of intellectual and social development. Practica are available in a variety of settings including hospitals, early childhood centers, infant and toddler programs, kindergartens, and primary grade classrooms.

Special options

Persons who hold provisional or continuing elementary certificates may work toward the endorsement in early childhood as an addition to their certificates. A combined program option with special education is also available in which the student receives the M.A.T. with an early childhood endorsement and with either the emotionally impaired endorsement or the learning disabilities endorsement.

Admission

Criteria and procedures for admission are the same as those stated for the department.

Requirements for the M.A.T. in early childhood

Degree requirements are 36 credits, distributed as follows:

Early childhood foundations (16 credits — all required):

- EC 540 Theories of Early Childhood (4)
- EC 542a Applied Developmental Principles — Early Childhood (4)

- EC 543 Teacher as Child Advocate and Adult Educator — Early Childhood (4)
- EC 650 Practicum in Early Childhood (4)

Educational foundations (4 credits):

- SE 501 Introduction to the Education of Exceptional Children (4)
- FE 503 Major Theorists in Education (4)
- FE 601 History in Education (4)
- FE 602 Philosophy in Education (4)
- FE 603 Cross-Cultural Studies in Education (4)
- FE 604 Sociology in Education (4)
- FE 605 Politics in Education (4)
- FE 606 Psychology in Education (4)
- FE 611 Issues in Social Foundations (4)
- FE 680 Learning Models (4)

Psychological foundations (4 credits):

- *PSY 510 Developmental Psychology (4)
- EC 542b Applied Development Principles — Early Childhood: Special Topics (4)
- EC 547 Infants: Normal and Exceptional Development and Programming (4)
- EC 548 Toddlers: Normal and Exceptional Development and Programming (4)
- EC 549 Development of the Young Exceptional Child (4)

*Required if student has not had an equivalent course.

Specialization sequences (12 credits):

Specializations are currently offered in administration/consulting, early childhood programming, reading and language arts, infants/toddlers, pediatric play, and special education. For those who do not choose to specialize, the 12 credits required to complete the program may be selected from a broad range of courses, with adviser approval. Required courses for the specializations follow:

Early Childhood Programming: EC 544 and EC 546, and one additional course from special options.

Administration/Consulting: EC 544, EC 545 and one additional course from special options.

Infancy/Toddlers: EC 544, 547 and 548.

Pediatric Play: EC 544, 550, and 644.

Reading and Language Arts: EC 544 and EC 546, and one additional course from specific options.

Special Education (nonendorsement options): SE 501, EC 544 and one additional special education course.

Planned program in early childhood

Early childhood foundation (all required): EC 540, EC 542a or PSY 510, EC 543, 544.

Elective: Choose one from RDG 532, 574, EC 542b, 545, 546, 550. (Other electives may be selected with adviser's approval.)

The Master of Arts in Teaching: Special Education

The master's program in special education allows students to design a balanced program consistent with their educational backgrounds and career goals. These

individualized programs assist in developing the skills required to meet professional demands within the special classroom, resource room, or institutional setting. They also help regular classroom teachers meet the needs of children who have moderate learning and/or behavior problems.

Admission

Criteria and procedures for admission consist of two parts as stated above: one set determines acceptance to the department, and the second set determines acceptance to a particular endorsement and/or degree program in special education, that is, the applicant must hold a valid Michigan teacher's certificate and must be interviewed by a faculty member prior to or during the application review process.

Degree and endorsement requirements

A total of 36 to 44 credits, depending on program option, is required for the M.A.T. in autistic impairment, emotional impairment or learning disabilities, provided the student already holds a special education endorsement. When necessary, students may be required to take additional courses to adjust for deficiencies in background, training, and experience.

In addition to the regular M.A.T. special education program, students may elect a post-master's endorsement in autistically impaired, emotionally impaired, learning disabilities, or an M.A.T. in special education with no endorsement. Post-master's endorsements typically consist of 20 or more credits, depending on the student's background. Endorsement candidates must apply to the department for the endorsement during the first semester of their authorized program. Students who fail to comply with this provision will not be recommended for endorsement. The endorsement program in autistic impairment is available only to current teachers of autistic students who hold at least one other special education endorsement.

The following course sequences are required to fulfill master's degree requirements and the endorsement in emotional impairment, learning disabilities or autistic impairment. These courses are listed for information purposes only and do not constitute program authorization. A final program is designed for each applicant and may deviate from the course listing. A final program authorization can only be made during the admission interview by a special education adviser.

Requirements for the M.A.T. in special education

General special education core (24 credits)

RDG 500	Foundations of Reading Instruction (4)
SE 501	Introduction to the Education of Exceptional Children (4)
SE 502	Legal Issues in Educating Exceptional Children (4)
SE 524	Assessment in the School Setting (4)
SE 618	Behavior Management (4)
SE 619	Theoretical Foundations of Exceptionality (4)

Emotionally impaired core (20 credits)

SE 616	Consultation Skills for Special Education Teachers (4)
SE 620	Social Deviancy in Special and Regular Education (4)
SE 621	Educational Procedures for Emotionally Impaired Children (4)
SE 627	Behavioral and Emotional Disorders in Children (4)
SE 622	Practicum in Special Education — Emotionally Impaired Children (4)

(See course descriptions for prerequisites.)

Learning disabilities core (20 credits)

SE 523	Educational Procedures for Children with Learning Disabilities (4)
SE 617	Language Disabilities (4)
RDG 632	Diagnosis of Reading Disabilities (4)
RDG 633	Correction of Reading Disabilities (4)
SE 626	Practicum in Special Education — Learning Disabled Children (4)

(See course descriptions for prerequisites.)

Autistic impairment core (24 credits)

SE 527	Educational Procedures for Autistic Students (4)
SE 559	Autistic Children and Youth (4)
SE 578	Language Problems and Autism (4)
SE 579	Behavior Management in the Autistic Classroom (4)
SE 596	Consultation Skills for Teachers of Autistic Students (4)
SE 607	Practicum in Special Education — Autistic Students (4)

(See course descriptions for prerequisites.)

Any grade below 3.0 in SE 523, SE 524, or SE 621 will result in an evaluation of the student's progress and could lead to dismissal from the program. In addition, a grade of less than 3.0 in the practicum may require additional practicum experience and could result in no endorsement.

Special education practica will be completed at Oakland's approved sites in the summer following completion of all course work. Practicum placements in student's own rooms are not permitted. Practicum applications can be obtained from the Office of Field Services, 527 O'Dowd Hall, and must be returned to that office by January 15 of the year the student wishes to complete the practicum.

Endorsements

Endorsements generally refer to any content areas, specializations, or change of grade levels which are added to a certificate. Endorsement programs can be used as planned programs for continuing certification. No undergraduate grade below 2.0 or graduate grade below 3.0 can be applied to this program. Students who hold a bachelor's degree in education with endorsement in special education may pursue a program leading to a second endorsement in learning disabilities, emotionally impaired, or autistically impaired. Students without special education credentials will be required to complete the master's degree.

Specializations can be added in nondegree programs. An early childhood endorsement requires 20 credits approved by an adviser. An emotionally impaired or learning disabilities endorsement requires 20 credits if students already have a special education endorsement. Holders of other master's degrees should be evaluated by a special education faculty adviser.

Planned program in special education

Required courses are SE 501, 502, 618, 619, 523, or 621. This program does not meet the requirements for any special education endorsement.

Combined Programs

As additional options for students, a number of combined programs are offered. Students must be specifically accepted into these programs with adviser approval of both the master's area and concentration or endorsement area. Intent to enter a combined program should be stated on initial application to a master's program.

M.A.T. in early childhood or in special education with both early childhood and special education endorsements

Two core options are available in this program. The student selects either the M.A.T. in early childhood or the M.A.T. in special education. Within either M.A.T., students work toward endorsement in both early childhood and emotionally impaired or in both early childhood and learning disabled. Students take both core sequences and select either the emotionally impaired or learning disabled option.

Special education core (16 credits)

- SE 501 Introduction to the Education of Exceptional Children (4)
- SE 502 Legal Issues in Educating Exceptional Children (4)
- SE 618 Behavior Management (4)
- EC 645 Assessment of the Young Exceptional Child

Early childhood core (16 credits)

- EC 540 Theories of Early Childhood (4)
- EC 542a Applied Developmental Principles — Early Childhood (4)
- EC 543 Teacher as Child Advocate and Adult Educator — Early Childhood (4)
- EC 544 Play as a Learning Medium (4)

Learning disabled option (8 credits)

- SE 523 Educational Procedures for Children with Learning Disabilities (4)
- SE 665 Practicum in Special Education/Early Childhood (combined) (4)

Emotionally impaired option (8 credits)

- SE 621 Educational Procedures for Emotionally Impaired Children (4)
- SE 655 Practicum in Special Education/Early Childhood (combined) (4)

(See course descriptions for prerequisites.)

Blocks A and B (12 credits)

Select at least one from each block

Block A: RDG 500, SE 616, SE 617, SE 619, SE 620, SE 627

Block B: EC 542b, EC 547, EC 548, EC 549, EC 550

M.A.T. in reading and language arts and certificate endorsement in learning disabilities

The reading and language arts department and the special education department offer a combined program leading to the M.A.T. in reading and language arts and a Michigan teaching certificate endorsement in learning disabilities and reading. The dual program consists of 48 credits.

Courses are selected from two blocks:

Block I — Reading foundations: RDG 500, 571, 575, 632, 633 and 699 (candidates may substitute RDG 570 and 534 for RDG 699).

Block II — Learning disabilities approval: SE 501, 502, 523, 524, 618 and 626.

This program involves a dual admissions/advising process. Following admission to graduate studies, an advising interview should be scheduled with both the reading and language arts department and the special education department. Failure to arrange both interviews may result in loss of completed credits and/or suspension from the program. See course description for prerequisites for SE 626.

Course Offerings

EARLY CHILDHOOD

EC 540 Theories of Early Childhood (4)

Views of education discussed from perspectives of Montessori, Piaget, Bereiter-Englemen, British Infant Schools, behavior modification, and developmental or "traditional" schools. Analyzes diverse contemporary theories of early childhood and broader issues such as "education for future vs. education for immediate needs."

EC 541 The Family and Preschool as Educational Settings (4)

An investigation of the sociology of parent-child relationships and the influence of the relationships upon the preparation of children for preschool programs. Also, some consideration of the ways relations between parents and early childhood educator are affected by professionalism.

EC 542 (a, b) Applied Developmental Principles — Early Childhood (4)

In-depth exploration of the relation of learning processes to development of infants, toddlers, preschoolers, and kindergartners as seen from pediatric, developmental, and educational perspectives. EC 542a is an overview of all age levels and topics. EC 542b focuses on a developmental topic.

Prerequisite: Permission of instructor.

EC 543 Teacher as Child Advocate and Adult Educator — Early Childhood (4)

Exploration of parental and community forces in meeting needs of young children and of teachers in child advocacy issues. Includes methods for working with parents, para-professionals, volunteers in the classroom, home, diverse community team members, and referral resources.

Prerequisite: EC 540, 542, or permission of instructor.

EC 544 Play as a Learning Medium (4)

Role of play in development of logical and creative thought processes and in socio-emotional development, past and present theories of play and games, and methods for using play in the early childhood curriculum.

EC 545 Administration and Direction of Early Childhood Programs (4)

Administrative aspects such as budgeting, legislation, rules, and employee concerns. Includes procedures for developing programs, writing proposals, and identifying funding sources. Examination of agencies involved in early childhood programs, child-care trends in the community, and problems in direction of centers.

Prerequisite: EC 540, 542, or permission of instructor.

EC 546 Workshop in Early Childhood Curriculum (4 or 8)

Special areas of curriculum — mathematics, science, language, music, art, and sensory-motor — are emphasized, and methods for development of workshops and learning centers in these areas are stressed. Includes special uses of audiovisual and programmed materials in the learning center and in workshop presentations.

EC 547 Infants: Normal and Exceptional Development and Programming (4)

Research on infants to 15 months, including exceptional infants; analysis of appropriate play environments and learning experiences. Students work with infants in small groups and interact with infants and parents at the Lowry Infant/Parent Program for at least 32 hours.

Prerequisite: EC 542a or PSY 510 or equivalent.

EC 548 Toddlers: Normal and Exceptional Development and Programming (4)

Developmental/intellectual aspects unique to toddlers (15 to 36 months), including the handicapped. Evaluate research on toddlers and analyze appropriate play environments and learning experiences. Students work with toddlers and their parents at least 32 hours per semester and evaluate toddler and parent development and behavior.

Prerequisite: EC 542a or PSY 510 or equivalent.

EC 549 Development of the Young Exceptional Child (4)

Overview of child development research applied to exceptional children in early childhood classrooms. Views the child from a developmental perspective and includes, along with study of normal behaviors in all preprimary children, curriculum strategies for mainstreamed and special education settings.

EC 550 Special Problems in Education — Early Childhood (2, 4, or 8)

Special problems in early childhood, applied development, or parent education. Specific topics will be based on student and/or community needs. May be taken more than once for a total of no more than 8 credits. May be elected for independent study. Seminar may be required. Prerequisite: Permission of instructor.

EC 644 Play and Development of the Hospitalized Child (4)

The hospitalized child's developmental problems and methods of utilizing play in a pediatric program. Addresses children's developmental needs and the relationship of illness to development; the procedures and routines in hospital care; and the effects of hospitalization. Includes practicum in hospital pediatric setting. Prerequisite: EC 542a or PSY 510 or equivalent, and EC 544.

EC 645 Assessment of the Young Exceptional Child (4)

Assessment of young exceptional children, with training in interpreting standardized tests for young children. Critical evaluation and actual use of these tests are included. Emphasizes examining and using appropriate developmental tests and alternative assessment procedures.

EC 650 Practicum in Early Childhood (4)

Students write a proposal, select appropriate materials and methods, and implement and evaluate the action phase. An "on-site" course individually related to the student's area of specialization or particular interest. Proposals may be related to program development, materials development, or action research. Seminars may be required. Prerequisite: Completion of all other degree requirements.

EC 651 Gifted and Talented Young Children (4)

Compares an overview of average development in young children with the characteristics of young, gifted children. Examines environmental factors which influence gifted children and educational programs which can influence their development. Includes site visits.

FOUNDATIONS OF EDUCATION**FE 503 Major Theorists in Education (4)**

Intensive study of the works of one or more major figures in the development of educational theories.

FE 520 Applied Developmental Principles: Middle Childhood (4)

Study of the physical, social, emotional, and intellectual development of the 10- to 14-year-old child. Examines changes in body structure and function, self concept and peer group identity, and sexual awareness.

FE 590 Special Problems in Professional Issues and Practices (2, 4, 6 or 8)

Problems concerning learners' needs and capacities, in formal or informal settings are selected for study according to each student's professional experience and advancement goals. Preference is given to problems that call for understanding foundational and multi-disciplinary approaches to practices and programs. May be taken more than once for a total of 8 credits, or may be elected for independent study. Seminars may be required. Prerequisite: Permission of instructor.

FE 591 Ecology of the Classroom (4)

Deals with the ecological context for learning in classroom, school, and community. The primary task will be to describe, to analyze, and to make inferences about the structure of the ecological environment. These findings will then be related to pupil learning.

FE 592 Foundations of Research and Evaluation Methods, Techniques and Designs (4)

Examination of assumptions, concepts and premises underlying various methodologies, qualitative and quantitative techniques and strategies, types of evidence, and relations between goals and methods. Applications will be undertaken in relation to students' professional experience and plans for study.

Prerequisite: Permission of instructor.

FE 593 Research Techniques in Education (4)

Study of research techniques in the behavioral sciences and education, methods of gathering evidence, elementary statistical concepts in education, research design, etc. Especially useful for students preparing to start their terminal projects.

FE 599 Workshop in Professional Problems and Practices (1 to 8)

Provides an opportunity for professional staff in education to develop competency in new practices or to adapt certain teaching skills to different subjects or age groups. Is offered under different topics based upon current needs identified or requested by professional educators. May be taken more than once for a maximum of 8 credits. May be applied toward degree programs only with permission of adviser. (Graded S/N.)

Prerequisite: Experience as a professional educator.

FE 601 History in Education (4)

Study of the historical development of educational institutions in Western society, emphasizing one or more of the following themes: teaching as a profession; changing conceptions of the student-teacher relationship; the learning process; future as history.

FE 602 Philosophy in Education (4)

Study of philosophical issues in education and their relevance to the personal and professional lives of teachers, emphasizing one or more of the following themes: knowledge and values; human nature and teaching; moral education; analysis of concepts.

FE 603 Cross-Cultural Studies in Education (4)

Explorations into the problems created by ethnocentricity within education and the effects of cultural currents on educational development, emphasizing one or more of the following themes: learning; cognition; development; school-community relations; school policy and cultural pluralism; international education policies; current issues.

FE 604 Sociology in Education (4)

Study of schools as social systems, the environmental effect of schools on students and teachers, and the impact of schooling on American society, emphasizing one or more of the following themes: sociological implications of work; social norms and schooling; cultural pluralism; educational alternatives and social change.

FE 605 Politics in Education (4)

Study of political issues in education and the theory and practice of politics in schools, emphasizing one or more of the following themes: legal, human and civil rights in education; equal educational opportunity; national educational policy; justice and education.

FE 606 Psychology in Education (4)

Study of personhood throughout the life cycle, including concepts of mind, intelligence, cognition, consciousness, meaning awareness, and competence in the context of behavioral analysis, situation analysis, and psychoanalysis.

FE 608 Philosophy for Children (2 or 4)

Development of basic reasoning skills within a coherent, tested curriculum. Appropriate for social studies, language arts, science or gifted instruction in grades 5-8. Requires permission of school principal to purchase student books and teach curriculum two hours/week for 30 weeks.

FE 611 Issues in Social Foundations (4)

Study of enduring issues that reflect social values and controversies with historical roots. Examination of cultural assumptions and expectations for formal and informal education processes.

FE 660 Change Models in Education (4)

Examines one or more key perspectives on evaluation and change within schools and other educational settings. Theories of change, educational reform movements, and approaches to educational innovation are studied.

FE 680 Learning Models (4)

An overview of theories of learning including cognitive, cybernetic, ecological, and phenomenological approaches as they relate to learning in a variety of settings and at several developmental levels. The student will examine applications of these theories in terms of variations in various learning environment problem solving strategies and tasks, and educational programs.

Prerequisite: FE 606.

FE 699 Terminal Project (4)

Planning and execution of significant research or project in accordance with student's advisory committee.

Prerequisite: Admission to a graduate program and written approval of the student's advisory committee. Students should request such approval from their advisers early in the fall semester for registration in the winter semester and early in the winter semester for registration in spring, summer, or fall. Students must present the completed project at least two weeks before the end of classes in the semester of graduation.

SPECIAL EDUCATION**SE 501 Introduction to the Education of Exceptional Children (4)**

Introduction to special education that presents the characteristics and problems of each of the different clusters of atypical children. Individual differences — interindividual and intraindividual — are stressed. The environment of the learner and curricular and instructional adaptations are discussed.

Prerequisite: Graduate standing.

SE 502 Legal Issues in Educating Exceptional Children (4)

Intensive study of PL-94-142 and the Michigan Special Education Code and its implications for educating handicapped children. Evaluation, IEP's, related services, free and appropriate education, placement options, adequate referral and evaluation, investigation, and due process hearings highlighted.

Prerequisite: Graduate standing.

SE 519 Issues and Trends in Special Education (4)

In-depth coverage of relevant issues in areas of learning disabilities, emotional, mental, sensory impairment, speech and language impairment, and gifted. Students will research current topics of interest and be exposed to nationally prominent figures in the field.

Prerequisite: SE 501 or equivalent.

SE 521 Special Education in the Regular Classroom (4)

Assists regular classroom teachers needing additional training to teach children with mild and moderate learning and behavioral problems. Implications of Public Law 94-142, delivery of educational services to handicapped children, diagnostic, prescriptive teaching techniques, and writing performance objectives are emphasized.

Prerequisite: Graduate standing.

SE 523 Educational Procedures for Children with Learning Disabilities (4)

Addresses the seven legally defined areas of learning disability in terms of informal assessment, appropriate instructional materials, and curricular modification. Application includes observation, diagnostic teaching, and case studies.

Prerequisite: SE 501, 502 or permission of instructor.

SE 524 Assessment in the School Setting (4)

Introduces assessment terminology. Students learn to administer, score, and interpret selected standardized educational tests typically used with exceptional students.

Prerequisite: SE 501, 502, or permission of instructor.

SE 526 Secondary Assessment Procedures in Special Education (4)

Basic concepts for interpreting standardized assessment instruments. Students become familiar with a number of assessment instruments commonly used with secondary special education students. Vocational and pre-vocational assessment is included.

Prerequisite: SE 501 or 502 and SE 619 or permission of instructor.

SE 527 Educational Procedures for Autistic Students (4)

Emphasizes evaluation and instruction of autistic students. Relates informal assessment to instructional planning in the cognitive, motor, and affective domains with special attention to communication and pre-vocational/vocational skills.

Prerequisite: SE 559, 578, 579.

SE 529 Modification and Adaptation of Materials for Exceptional Children (4)

Study of existing curricula for exceptional children. Modification and adaptation of materials and instructional methodology emphasized. Includes affective domain as well as various content areas appropriate for K-12.

Prerequisite: SE 501 or permission of instructor.

SE 559 Autistic Children and Youth (4)

Addresses the characteristics of autistic children and youth through a review of historical perspectives, theories of autism and current research. Emphasis is placed on the effects of autism on communication, cognition, and learning.

Prerequisite: Admission into the AI endorsement program.

SE 578 Language Problems and Autism (4)

Provides an overview of normal language acquisition as the foundation for understanding language problems of autistic individuals. Emphasis is placed on differential diagnosis of language problems and specialized intervention techniques.

Prerequisite: SE 559.

SE 579 Behavior Management in the Autistic Classroom (4)

Focuses on constructive management plans with special emphasis on behavior therapy with autistic children.

Prerequisite: SE 559, 578.

SE 596 Consultation Skills for Teachers of Autistic Students (4)

Designed to develop consultation skills of teachers who work with autistic students. Includes home-school interactions, family and community support services.

Prerequisites: SE 559, 578, 579, 527.

SE 607 Practicum in Special Education — Autistic Students (4)

Specialized experience in a special education setting for autistic students. Application of informal assessment techniques, management strategies, and curriculum planning and implementation are included.

Prerequisite: Completion of all other course work in planned program.

SE 616 Consultation Skills for Special Educators (4)

Designed to develop the consultation skills used by special education teachers with members of allied professions and classroom teachers involved in evaluation, remediation and education of exceptional students to translate consultations into educational programs.

SE 617 Language Disabilities (4)

Research in the area of language and learning disabilities is covered, with emphasis on assessment and intervention strategies. Both oral and written language is considered, preschool through adult.

Prerequisite: SE 523 or permission of instructor.

SE 618 Behavior Management (4)

This course is designed to expose students to a variety of behavior management techniques for the exceptional child. Emphasis is on application.

SE 619 Theoretical Foundations of Exceptionality (4)

Introduction to the theoretical and conceptual models of emotional disturbance (the psychodynamic, biological, behavioral, sociological, ecological, and counter theoretical) and learning disabilities (neurological, perceptual-motor, behavioral).

SE 620 Social Deviancy in Special and Regular Education (4)

Analyzes social deviance from individual, institutional, and societal perspectives. Sociocultural factors which directly influence the perceptions of deviant behavior are examined. Assisting techniques are provided to classroom teachers who deal with students who manifest deviant behaviors in the classroom.

SE 621 Educational Procedures for Emotionally Impaired Children (4)

Focuses on identifying effective helping strategies, available and ideal service delivery modes, roles of instructional personnel, parent education, and behavior management techniques.

Prerequisite: SE 501 or 502 or permission of instructor.

SE 622 Practicum in Special Education — Emotionally Impaired Children (4)

Specialized experience in a special education setting for emotionally impaired children. Observation, tutoring, diagnostic and prescriptive teaching, and use of materials and equipment are part of the experience. The student receives individual, small group, and total group responsibility.

Prerequisite: Completion of all course requirements for M.A.T. and/or endorsement in special education and permission of instructor. Practicum applications must be returned to the Office of Field Services, 527 O'Dowd Hall, by January 15 of the year the student wishes to complete the practicum.

SE 623 Project in Special Education (1 to 8)

An action-research project. Field testing intervention techniques, designing new education models, or evaluating special education instruments are examples of projects. Seminars may be required.

SE 626 Practicum in Special Education — Learning Disabled Children (4)

Specialized experience in a special education setting for learning disabled children. Includes observation, tutoring, diagnostic and prescriptive teaching, and use of materials and equipment. The student receives individual, small group, and total group responsibility. Seminars may be required.

Prerequisite: Completion of all course requirements for M.A.T. and/or endorsement in special education and permission of instructor. Practicum applications must be submitted to the Office of Field Services, 527 O'Dowd Hall, by January 15 of the year the student wishes to complete the practicum.

SE 627 Behavioral and Emotional Disorders in Children (4)

Addresses the characteristics of emotionally impaired students, related etiologies, and educational implications.

Prerequisite: SE 501 or 502 or permission of instructor.

SE 628 Advanced Practicum in Special Education (4)

Geared to the education, background, and training of the student, designed to provide in-depth experience other than at a classroom level.

Prerequisite: Recommendation by at least two special education faculty, three years teaching experience (one of which must be in special education), and completion of all course work.

SE 655 Practicum in Special Education/Early Childhood (combined) (4)

Culminating experience for the joint endorsements of early childhood and special education. Includes a specialized experience in a special education/early childhood setting for LD or EI children. Includes writing a proposal relating to the specialization and evaluating its usefulness in the special education/early childhood classroom.

Prerequisite: Completion of all other requirements of the combined program. Practicum applications must be obtained from Field Services Office, 527 O'Dowd, and returned to that office by January 15 of the year the student wishes to complete the practicum.

DEPARTMENT OF READING AND LANGUAGE ARTS

Chairperson: *George E. Coon*

Professors: *Jane M. Bingham, Harold C. Cafone, George E. Coon, Ronald L. Cramer, Harry T. Hahn, W. Dorsey Hammond*

Associate professors: *Richard F. Barron, Gloria T. Blatt, Robert J. Christina, Anne P. Jaworski, Robert M. Schwartz, Keith E. Stanovich*

The Department of Reading and Language Arts offers a program leading to a Doctor of Philosophy (Ph.D.) degree in Reading and Language Arts, a Master of Arts in Teaching (M.A.T.) degree, and a combined program leading to an M.A.T. with endorsement in learning disabilities. The department also offers Michigan certification planned programs in reading and language arts, a certificate program in microcomputer applications, and professional development opportunities for practicing teachers.

The Doctor of Philosophy in Reading

Coordinator: *Richard F. Barron*

Reading education draws its theoretical underpinnings from diverse domains of knowledge including linguistics, psychology, and statistics. Knowledge is also required in literature and composition, as well as classroom and clinical instruction practices for children and adults. Reading is a specialized field, but its successful application in schools, universities, governmental agencies, and private business requires a knowledge of related disciplines, an understanding of theoretical applications, and the ability to conduct research.

Admission

Admission to the Ph.D. program is a two-step process. First, the screening committee evaluates candidates in four areas: letters of recommendation, prior course work at the undergraduate and graduate levels, writing ability as revealed through two personal statements, and scores on the Miller Analogies Test.

Second, applicants who successfully pass the screening step meet with the interview committee which makes recommendations in conjunction with the department.

Residence

Students benefit from, and make significant contributions to, the program when engaged in the concentrated effort demanded by full-time study. Although students may begin doctoral study on a part-time basis, all students must complete two full-time semesters in residence, earning 12 credits in each of the two semesters. The combined spring/summer sessions can constitute one semester toward residency. During this period of time, students will be assigned additional experiences not ordinarily available through course work. Examples of these activities include, but are not limited to, tutoring children and adults in the reading clinic, assisting faculty in the conduct of research and other scholarly undertakings, and teaching undergraduate or graduate level courses under departmental supervision. Graduate assistantships, which include a stipend and tuition waivers, are available to students pursuing full-time study. Assistantships will not be granted to students who are employed full time.

Advisory committees

Initial advising

Upon acceptance into the program, students will be advised by the Ph.D. program coordinator, who assists them in the development of an interim program plan. This plan, subject to departmental approval, tentatively specifies the course work to be undertaken in partial fulfillment of degree requirements.

Academic advising

Following approval of the interim program plan, students will be assigned an academic adviser who serves as their primary program contact person and continues to provide academic counseling. After completing one year (24-36 credits), students, in consultation with their academic advisers or, if selected as described below, the dissertation chairperson, must submit a final program plan to the department for approval. The final program plan is an agreement between the student and faculty which specifies transfer credits accepted and the course work that the student must complete. After the completion of 48 credits toward the degree, students may request that their advisers form a committee to conduct the qualifying examination. This committee will consist of a minimum of three Oakland University faculty members, including the student's adviser, one member from the department, and one member from the student's area of minor concentration.

Dissertation committee

At the point a student begins to engage in the development of a dissertation proposal, he or she should nominate a dissertation committee chairperson. The dissertation committee will then be formed in consultation with the student's dissertation adviser. This committee will consist of five Oakland University faculty members, including at least three members from the Department of Reading and Language Arts, one member from the student's area of minor specialization, and one member-at-large. Students' nominees are always considered subject to availability, number of doctoral advisees a faculty member may be directing, and other constraints. The director of the doctoral program, the Dean of the School of Human and Educational Services, and the Dean of Graduate Study must approve the selection of the dissertation committee.

Course of study

The Ph.D. program has three components. The reading core component provides a background of educational experiences and course work for developmental reading instruction, literature, and composition, as well as diagnosis and correction of reading disabilities. In addition, cognate courses in linguistics and psychology are required as part of the core component. The minor specialization component consists of 28 semester hours of study in a discipline related to reading either in terms of its theoretical contributions to the field (e.g., linguistics, psychology) or in terms of its potential for practical application (e.g., English, learning disabilities, counseling, business/industrial training and development). In the investigative processes component students receive education in statistics, research design, and applied research culminating in a dissertation. Emphasis is placed on investigation of theoretical and practical problems in reading acquisition.

Course credits

At least 76 credits must be earned beyond the master's degree, including the dissertation. Graduate credits earned in a master's degree program at Oakland University or another accredited university may be applied toward the Ph.D. degree upon recommendation of the reading department faculty. However, program requirements are such that transfer credit is seldom granted.

Qualifying examination

Before admission to candidacy, each student must pass a written and oral qualifying examination to certify the student's ability to apply theoretical and practical information obtained in areas of study.

The examination will be administered at least once per academic year, usually in February. The qualifying examination committee, in conjunction with the student, decides when the student is prepared to take the examination. However, it must be completed successfully before the student engages in the dissertation defense.

The written examination will be administered over three days. It will test three areas: reading and language arts content, special interest content, and minor specialization content. The committee assembles the examination questions and evaluates the student's work. The oral examination, administered by the qualifying committee, can be taken only after successfully completing the written test.

Students may elect to write a position paper on a topic agreed upon in advance by the student and the committee faculty members. Election of this option will result in the waiver of special interest questions. Students choosing the position paper option will have a period of four weeks to complete it. The position paper must be submitted to the committee prior to administration of the written examination.

The committee may permit a student to repeat the qualifying examination. Should a student fail the examination three times, the committee will recommend (via the reading department to the Graduate Study dean) that the student's Ph.D. program be terminated. Passing evaluations on either the written or oral portions of the examination do not preclude specification for additional courses or learning experiences if the committee deems such action is warranted.

Dissertation

Each candidate must complete a dissertation that makes a worthwhile contribution to the major field of study. The dissertation committee chairperson will direct the candidate through the stages of dissertation preparation.

Dissertation proposal review

When the proposed dissertation committee chairperson and the candidate have agreed on a dissertation topic, the candidate must submit a written dissertation proposal containing a description of the topic problem, justification for selection of the problem, and a description of the procedures to be used in the investigation. The candidate must orally defend the proposal before the dissertation committee and any other interested faculty and Ph.D. student, insuring that all questions relevant to the selected topic, justification, and procedures are considered ahead of time. Once the dissertation committee approves the proposal, the candidate may initiate the study.

A draft of the dissertation must be submitted to the committee for modification and approval before the final copy is prepared and approved by the dissertation committee.

Dissertation research credits

Students with approved dissertation proposals who are conducting dissertation research should register for RDG 799. At least 24 credits in RDG 799 are required of all doctoral students, and no more than 12 credits can be taken prior to the approval of the proposal. However, merely amassing credits does not indicate satisfactory progress toward or completion of the dissertation. The dissertation is deemed completed only after successful oral defense and after final approval of the document by the dissertation committee.

Oral examination

Each candidate must orally defend the dissertation before the dissertation committee. The examination is scheduled after the dissertation committee has approved the dissertation. While interested faculty and outside observers may be involved in the defense, only the dissertation committee certifies approval of the dissertation.

The dissertation committee may permit re-examination once if the initial dissertation defense is deemed inadequate.

Time limits

All requirements, including the dissertation, must be completed within five years after admission to candidacy or within eight years after admission to the program. If four consecutive semesters elapse without a student accumulating credits toward the degree, the student will be dropped from the program. Students may petition the reading department faculty to waive this requirement, or to seek readmission, should this be necessary.

Graduation

Students expecting to graduate in a given semester must file an application for degree card at the Office of the Registrar and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

The Master of Arts in Teaching: Reading and Language Arts

The reading and language arts Master of Arts in Teaching program prepares teachers with the knowledge and skills required to serve as reading consultants, reading specialists, or remedial reading teachers, either in these specialized roles or in their own classrooms. Although most graduates continue as classroom teachers, many apply the reading and language arts theory and research they have learned in the program to qualify for positions as college teachers of reading, supervisors, principals, curriculum directors, or reading resource center teachers.

Requirements

The requirement for the M.A.T. is 36 credits. This includes 24 credits in the core program, and 12 elective credits.

Core program (24 credits)

RDG 500	Foundations of Reading Instruction
RDG 571	Foundations of Literature for Young People
RDG 575	Teaching Writing in the Elementary and Secondary Schools
RDG 632	Diagnosis of Reading Disabilities
RDG 633	Correction of Reading Disabilities
*RDG 699	Terminal Project

*Or students may elect the following two-course option in lieu of RDG 699. This option necessitates 40 credits for graduation:

RDG 534	Reading and Language Arts Instruction in the Elementary School
RDG 570	The Author's and Illustrator's Art and Craft

Elective program (12 credits)

The student must select 12 credits from the two blocks shown below. A minimum of 4 credits must be selected from each block. Candidates for the Michigan Elementary Continuing Certificate must elect RDG 534 if they need additional credits to meet new state certification reading requirements. Candidates for the Michigan Secondary Continuing Certificate must elect RDG 538 in order to meet state certification requirements.

Block I — Reading, language arts, and literature: RDG 505, 514, 531, 532, 533, 534, 536, 538, 570, 572, 573, 574, 590, 598, 630, 631, 654, and 711. Additional options may be offered at the discretion of the student's adviser and require written approval of the adviser.

Block II — Open: Students may elect any courses numbered 500 or above for which they have prerequisites. The selection must be approved in advance by the student's adviser.

M.A.T. in Reading and Language Arts and Certificate Endorsement in Learning Disabilities

The reading and language arts department and the special education department offer a combined program leading to the M.A.T. in reading and language arts and a Michigan teaching certificate endorsement in learning disabilities and reading. The dual program consists of 48 credits.

Courses are selected from two blocks:

Block I — Reading foundations: RDG 500, 571, 575, 632, 633, and 699 (candidates may substitute RDG 534 and 570 for RDG 699).

Block II — Learning disabilities: SE 501, 502, 523, 524, 618 and 626.

This program involves a dual admission/advising process. Following admission to graduate studies, an advising interview should be scheduled with both the reading and language arts department and the human development and child studies department. Failure to arrange both interviews may result in loss of completed credits and/or suspension from the program. See course description for prerequisites for SE 626.

Certificate Program in Microcomputer Applications in Education

Oakland University's School of Human and Educational Services offers a 16-credit certificate indicating focused training in microcomputer applications for teachers, administrators, and professional staff interested in educational and training activities with microcomputers at a variety of educational levels. The certificate is designed to be responsive to the emerging needs of educational professionals in the challenging and rapidly changing field of microcomputers in education. This is a nondegree program available to certification status students. The required courses are RDG 594, 595, 779 and 781, or equivalent, with approval of adviser. Those reading and language arts students wishing to use the certificate program in microcomputer applications in education as their elective program should contact their reading and language arts adviser.

Planned Program in Reading and Language Arts

Required courses are: RDG 500, 534 or 538, 571, 575, and one elective. The elective course and application of transfer credits, if any, require approval from an adviser.

Planned Program in Microcomputer Applications in Education

Required courses are: RDG 594, 595, 779, 781 (or equivalents with approval of faculty adviser) and one elective.

Course Offerings

RDG 500 Foundations of Reading Instruction (4)

Provides an overview of the reading process including reading readiness, comprehension, word recognition, diagnosis, methods of instruction, and related language acquisition processes.

RDG 505 Reading as a Language Process (4)

Focuses on language acquisition, language and thought, dialects, and the interrelation of the language process and the implications for teaching reading.

RDG 514 Classroom Diagnosis and Correction (4)

Emphasizes diagnosis and correction of reading problems in group settings. Students learn to select, administer, and score appropriate testing instruments, interpret test data, and develop instructional programs based on diagnostic information.

RDG 530 Workshop in Reading (2, 4, or 8)

Emphasizes the development of materials and resources for reading and language arts instruction based on an open education philosophy. Includes workshops on drawing, painting, photography, and other arts and crafts areas. Teaching strategies are stressed.

RDG 531 Current Trends in the Teaching of Reading (4)

Recent trends, practices, problems, and research in reading are examined and evaluated to determine their applicability to reading instruction.

RDG 532 Teaching Reading in the Primary Grades (4)

Examines principles, practices, and research related to early reading instruction. Includes analysis of the relationships of the various language arts to reading skills and emphasizes the developmental skills of pupils, starting with kindergarten.

RDG 533 Teaching Reading in the Middle School (4)

Examines principles, practices, and research related to teaching reading in middle schools. Emphasizes reading in the content areas, developmental reading instruction, and adjustment of instruction to individual needs.

RDG 534 Reading-Language Arts Instruction in the Elementary School (4)

Emphasizes the teaching of writing, reading, listening, speaking, and spelling. Develops a coordinated approach to teaching all language arts skills.

RDG 535 Forum on Reading and the Language Arts (2 or 4)

Distinguished educators present their research, experience, and insights on issues in reading, language arts, and literature. Students interact with educators invited to participate in this forum. May be elected with a different subtopic for a total of 8 credits.

RDG 536 Teaching Reading to the Special Child (4)

Focuses on the reading process as it relates to slow learners, emotionally disturbed, handicapped, learning impaired, and gifted children. Includes study of diagnostic, remedial, and corrective instructional resources and procedures.

RDG 538 Guiding Reading-Learning in Content Subjects (4)

Stresses the reading processes and skills students need to independently acquire and apply content understandings. Intended for middle-grade, junior high, and senior high school teachers who work primarily in subject areas of the curriculum.

RDG 570 The Author's and Illustrator's Art and Craft (4)

Selected authors' and illustrators' work will be read and criticized in light of psychological, sociological, historical, literary, and curricular factors. Examines ways to use literature with young people in elementary and secondary schools.

RDG 571 Foundations of Literature for Children and Young Adults (4)

Presents criteria for selecting and evaluating literature for children and young adults. Examines specific ways of incorporating worthwhile literature into the school curriculum.

RDG 572 Storytelling and Creative Dramatics (4)

Focuses on methods of encouraging children to use imaginative and dramatic skills to interpret literature, and to create plays and other drama. Provides opportunities to select, learn, and tell stories and to develop a storytelling program.

RDG 573 Adolescent Literature in Middle Schools, Junior and Senior High Schools (4)

Introduces literature and other relevant materials suitable for adolescent youth. Topics include: trends in literature and publishing, methods of presenting books, stimulating reluctant readers, and the use of trade books in content areas.

RDG 574 Literature for the Young Child (4)

Preparation for the selection and use of appropriate books, rhymes, stories, records, and filmstrips with preschool and early elementary school children.

RDG 575 Teaching Writing in the Elementary and Secondary Schools (4)

Emphasizes the teaching of both functional and creative writing. Topics include: poetry, story writing, evaluation, revision, report writing, basic writing skills, and other related writing activities.

RDG 590 Special Problems in Reading (2, 4, 6, or 8)

Depending on clientele and staff needs, specific topics may differ each semester. This course may be taken more than once, but for no more than a total of 8 credits, or may be elected for independent study.

RDG 594 Computer Literacy and Personal Computing (4)

An evaluation of the use of computers and their role in education at the elementary and secondary school levels. Includes personal computing, computer-aided instruction and computer-managed instruction. Enrollment limited to majors in the School of Human and Educational Services.

RDG 595 Computer Applications in Education (4)

An in-depth examination of the characteristics of computer-aided instruction and computer-managed instruction as they relate to learning in the classroom. The student will acquire proficiency in the programming language BASIC and this skill will be applied to the development of programs for classroom applications. The course stresses use and operation of microcomputers. Enrollment is limited to majors in the School of Human and Educational Services.

Prerequisite: RDG 594.

RDG 598 Using Microcomputers in the Elementary Reading and Language Arts Program (4)

This course is designed to introduce classroom teachers and other educators to the use of existing microcomputer techniques and materials in an elementary-level reading and language arts program. No previous work with microcomputers is required.

RDG 630 Seminar in Reading (4)

The validity, reliability, results, and conclusions of research and other literature in selected areas of reading and language arts are analyzed.

Prerequisite: Two courses in reading instruction.

RDG 631 Problems in Reading Instruction (4 or 8)

Analyzes diagnostic, methodological, organizational, and administrative issues in reading instruction.

Prerequisite: One course in reading instruction.

RDG 632 Diagnosis of Reading Disabilities (4)

A laboratory course to analyze factors which contribute to or cause reading disabilities in elementary and secondary school pupils. Selection and administration of formal and informal tests are included as well as preparation and evaluation of case reports.

Prerequisite: Admission to the M.A.T. program, RDG 500, and permission of instructor. Must sign up for this course with the reading area one semester prior to registration and have completed 20-24 credits in Reading or LD program.

RDG 633 Correction of Reading Disabilities (4)

A laboratory course focusing on methods, materials, and practice of reading instruction. Provides opportunities to plan, organize, and conduct developmental, remedial, and corrective instruction for children under supervision of the instructor.

Prerequisite: Admission to the M.A.T. program, RDG 632, and permission of instructor.

RDG 654 Teaching Reading to the Gifted (4)

Examines the nature of language, reading, and writing with implications for gifted education. The course will also focus on cognitive development and taxonomies of thinking with implications for developing reading and the related language arts competencies of gifted students.

RDG 699 Terminal Project in Reading and Language Arts (4)

Planning and execution of significant research or project in accordance with student's advisory committee.

Prerequisite: Admission to the graduate program in reading instruction, and written approval of the student's adviser. Students should request such approval from their advisers early in the fall semester for registration in the winter semester and early in the winter semester for registration in spring, summer, or fall. Students must present the completed project at least two weeks before the end of classes in the semester of graduation.

RDG 700 Introduction to Educational Statistics and Research Design in Reading and Language Arts (8)

Two-semester sequence (700 A and B) focusing on the design and analysis of educational research in reading and language arts. Topics include: scientific reasoning, descriptive and inferential statistics, experimental design, research methods, measurement concepts, and an introduction to computer analysis and multivariate procedures.

Prerequisite: Admission to Ph.D. program or instructor permission.

RDG 701 Doctoral Seminar in Reading (4 to 8)

Advanced topics in reading selected by the instructor in consideration of the needs and interests of doctoral students. Research and other significant writing relevant to the topic will be analyzed and interpreted. Research designs, procedures, and findings will be discussed.

RDG 702 Applied Research in Reading and Language Arts (4)

The research emphasis of the course is focused on preparing, designing, piloting, and analyzing a study which may lead to a doctoral thesis. Students will present pilot data in a manner suitable for publication, and a proposal to their doctoral committees for discussion and evaluation.

Prerequisite: Admission to the Ph.D. program and/or the instructor's permission.

RDG 703 Advanced Diagnostic and Corrective Reading (4)

Diagnosis and remediation of reading difficulties of diverse learners. The student's work in the Reading Language Arts Center will be determined by both the center's needs and student interest.

Prerequisite: Admission to Ph.D. program, successful completion of RDG 632 and 633, or instructor permission.

RDG 704 Perspectives in Literature (4)

Examines selected perspectives of literature for young readers in terms of literature as an art, trends in today's literature and responses of readers to the stories and poems they read. Implications for teaching and research are also studied.

Prerequisite: Admission to the Ph.D. program and/or the instructor's permission.

RDG 705 Perspectives in Writing (4)

Examines significant topics in writing. Research in writing theory and philosophy of writing, the teaching of composition, relationship of composition and reading, and other pertinent topics will be studied.

Prerequisite: Admission to the Ph.D. program and/or the instructor's permission.

RDG 706 Evaluation of Reading Programs and Materials (4)

Theory, problems, and procedures of evaluating reading programs and materials.

Prerequisite: Admission to Ph.D. program or instructor permission.

RDG 710 Advanced Analysis and Design Procedures in Reading/Language Arts (4)

Presents a general data analytic system closely related to theoretical and inferential methods and procedures involved in reading/language arts research. Focus is on multivariate techniques that provide a means of investigating complex educational problems.

Prerequisite: ED 700 and instructor permission.

RDG 711 Topics in Literature for Children (4)

Focuses on the application of literary criteria to selected children's books, the history of children's literature, children's responses to literature, and controversial issues. Intended to broaden knowledge and appreciation of children's literature.

RDG 775 Learning Models: Applications in Computer-Assisted Learning (4)

An overview of theories of learning including stimulus response, cognitive, cybernetic, and integrative approaches as they relate to learning in the classroom. The student will examine applications of these theories in terms of variations of physical and social aspects of various learning environments. Capabilities of the computer and its use with respect to the various learning theories will be examined.

Prerequisite: RDG 595.

RDG 779 Instructional Design (4)

An introduction to instructional design. The student will become familiar with the procedures for analysis, development, and management of learning. The student will apply design skills to the development of a computer assisted learning experience.

Prerequisite: RDG 594 or permission of instructor.

RDG 780 Independent Investigations in Reading/Language Arts (2, 4, 6, or 8)

This course is designed to allow doctoral students to investigate a topic under the direction of an appropriate faculty member. Student needs will determine the topics, but diagnostic, methodological, organizational, and administrative issues in reading will be encouraged.

Prerequisite: Admission to the Ph.D. program and instructor permission.

RDG 781 Instructional Design Applications (4)

Application of instructional design principles covered in ED 779. The student will participate in a team to solve school building or district level problems relating to the use of computers.

RDG 790 Independent Study (2, 4, or 8)

Directed readings for doctoral degree students on any appropriate subject that is not available through regular course offerings. May be taken more than once for a total of 8 credits.

Prerequisite: Permission of the program director.

RDG 799 Thesis Research (4 to 24)

Preparation of a research project culminating in the doctoral thesis.

EDUCATION SPECIALIST IN SCHOOL ADMINISTRATION

Coordinator: James Clatworthy

Faculty Council: William Macauley, Gerald J. Pine, Roderic Righter, Jacqueline Scherer, Howard Splete

The Educational Specialist in School Administration program is designed for teachers interested in administrative positions; administrators and other school personnel who desire professional development beyond a master's degree and school personnel who seek the necessary retraining to change positions, or for administrative certification.

Admission

The faculty council for the school administration program will screen candidates in five areas after the following have been received by the Office of Graduate Admissions: 1) official transcripts of undergraduate and graduate work with a master's degree from an accredited institution; 2) two letters of recommendation from professional colleagues or supervisors familiar with the candidate's current position; 3) one letter of recommendation from a faculty member associated with the candidate's graduate level work; 4) a personal goals and evaluation statement indicating willingness to make a two-year commitment, personal goals after completing the school administration program and an assessment of personal strengths and weaknesses for roles in educational leadership; 5) score results on the Miller Analogies Test.

Candidates may be interviewed by members of the faculty council, which will make admission recommendations to the dean of Graduate Study. Admission to the program will be made only for the fall semester. Therefore, all application materials must be received by the Office of Graduate Admissions no later than May 1.

Degree Requirements

Forty credits are required for the Education Specialist in School Administration degree. One required course will be offered during the evening or late afternoon of each term (fall, winter and spring). The summer session of the first year will require two courses, but the second summer will be free to prepare for the Internship/Practicum project. Students should be able to complete the program in eight semesters.

First year core program:

EA 740	School as a Formal Organization	4
EA 741	Educational Finance	2
EA 742	Educational Law	2
EA 743	Administrative Leadership Skills	4
EA 744	Long-Range Planning	4
EA 745	Quantitative Techniques for School Administration	4

Completion of first year core program is a prerequisite, except with permission of the program director, for the second year program.

EA 746	Curriculum Development K-12	4
EA 747	Program Evaluation	4
EA 748	Seminar on School-Community Development	4
or		
EA 749	Seminar on Quality of Learning Life	4
EA 750	Internship/Practicum	8

Students begin and end the program with the fall semester. The following schedule will normally be followed, although there may be sequence variations:

Year 1

Fall, EA 740	Winter, EA 741/42	Spring, EA 743	Summer, EA 744 EA 745
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Year 2

Fall, EA 746	Winter, EA 747	Spring, EA 748 or EA 749	Fall, EA 750
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Internship/Practicum

Students will be required to develop a significant school improvement project. Each student will be required to make a written report and present his/her findings to appropriate school or local representatives.

Course Offerings

EA 740 School as a Formal Organization (4)

An overview of organizational theory and research will be applied to educational organizations. Students will be expected to complete an action research project in conjunction with case studies on organizational change.

Prerequisite: Admission to Ed.S. program.

EA 741 Educational Finance (2)

In-depth analysis of funding public, private and parochial schools at the local and state level.

Prerequisite: Admission to Ed.S. program.

EA 742 Educational Law (2)

Analysis of Michigan legislation and its impact on the maintenance and operation of local school systems.

Prerequisite: Admission to Ed.S. program.

EA 743 Administrative Leadership Skills (4)

Basic communications skills, use of these skills in collaborative consulting relationships and practice of these skills in field settings related to administrative concerns for school improvement will be modeled, researched and evaluated. One to one, small group and organizational collaborative consultation models will be utilized in this action research seminar.

Prerequisite: Admission to Ed.S. program.

EA 744 Long-Range Planning (4)

Theoretical and social foundations of long range planning are explored in conjunction with a student initiated long range planning project for preferred futuring for school improvement.

Prerequisite: Admission to Ed.S. program.

EA 745 Quantitative Techniques for School Administrators (4)

A study of quantitative methods for use in school administration. Emphasis on data analysis for decision making and attention to common computer techniques are included.

Prerequisite: Admission to Ed.S. program.

EA 746 Curriculum Development K-12 (4)

An analysis of curricular problems and innovative programs such as ITIP, Effective Schools, Critical Thinking, and effective classroom interaction skills. A problem-solving process model devel-

oped and implemented through group and individualized workshop sessions will be utilized in a seminar/research format.

Prerequisite: Core program, or permission of program director and admission to the Ed.S. program.

EA 747 Program Evaluation (4)

The basic theories, techniques and issues in program evaluation and planning are presented through lectures and seminars of case analyses. Students will be expected to conduct some original research.

Prerequisite: Core program, or permission of program director, and admission to the Ed.S. program.

EA 748 Seminar on School/Community Development (4)

Topics will be selected from a range of school/community development issues. Students will be required to prepare presentations and a position paper on their topic in conjunction with a forum or other appropriate community service outlet. Opportunities for collaborative action research will be encouraged to facilitate the Internship/Practicum experience.

Prerequisite: Core program, or permission of program director, and admission to the Ed.S. program.

EA 749 Seminar on Quality of Learning Life (4)

Topics will be identified in collaboration with school and community leaders as well as students within the program. Students will prepare position papers and research proposals for implementation during the Internship/Practicum.

Prerequisite: Core program, or permission of program director, and admission to the Ed.S. program.

EA 750 Internship/Practicum (8)

A culminating internship field experience in which a practicum project on school improvement will be researched and implemented. Students will submit a project report and will be asked to make a presentation to appropriate school or community representatives.

Prerequisite: ED 748 or ED 749.

SPECIAL COURSES

In addition to degree and certification programs, the School of Human and Educational Services offers interdepartmental courses, staffed by faculty from the various departments. Other courses of special interest to education students are offered by departments which do not have graduate programs. These courses have been approved by the Graduate Council and carry graduate credit.

Course Offerings

EDUCATION

ED 593 Evaluation and Accountability in Education (4)

Examines educational accountability and evaluation from historical, sociological, and philosophical perspectives. Studies various approaches to accountability and evaluation, national evaluation standards, and issues of validity and reliability in accountability.

ED 599 Workshop in Education (1 to 8)

Provides an opportunity for professional staff in education to develop competency in new practices or to adapt certain teaching skills to different subjects or age groups. Is offered under different topics based upon current needs identified or requested by professional educators. May be taken more than once for a maximum of 8 credits. May be applied toward degree programs only with permission of adviser. (Graded S/N.)

Prerequisite: Experience as a professional educator.

ED 691 Applied Problems in Education (2 to 4)

Students analyze a specific educational problem and develop strategic plans for making changes to address the problem.

ED 692 Research Problems in Education (2 to 4)

Students plan procedures for evaluating aspects of educational change strategies or conduct research on a current problem in education.

ED 693 Field Study in Education (2 to 4)

Students design and implement a field based study for a school or educational agency.

VOCATIONAL EDUCATION

VTE 510 Design of Vocational Courses (2 or 4)

Covers instructional design models, needs analysis, occupational task analysis, development of learning objectives, determination of appropriate training approach, organization of modules and lessons, development or selection and evaluation of instructional materials and media for vocational-technical education.

VTE 511 Vocational Laboratory Planning (2)

Construction, design to comply with program standards of quality, learning stations, equipment, planning for access of materials and tools, safety considerations, storage of student projects, and computer access as pertaining to occupational specialization of each student in consultation with appropriate experts.

VTE 520 Instructional Methods and Media (4)

Methods of instruction in vocational education in conjunction with the use of instructional materials and media. Application of learning theory in classroom management approaches. Evaluation of student learning based upon performance objectives. Includes teacher-student interaction, laboratory experience, and use of audio-visual equipment.

VTE 530 Vocational Guidance and Placement (2)

A study of educational/vocational development processes, pre-employment skills, experiential influences, and life-work planning leading to employment. Covers assessment of learner abilities; interests and vocational skills; career awareness and decision-making process; and job placement systems.

VTE 540 Issues and Trends in Vocational Education (2 or 4)

Topics on research studies and current trends and issues in vocational education, study of related laws and regulations. Research methodology is studied by example. The instructor provides direction in scope and content. Class members conduct research on selected topics and present and discuss findings and applications in practice.

PSYCHOLOGY**PSY 510 Developmental Psychology (4)**

Description and evaluation of principles and theories of development from birth to maturity. Maturation processes, learning, and emotional disturbances are considered. Prerequisite: Permission of instructor or acceptance into the M.A.T. program.

PSY 552 Sensation and Perception (4)

Approaches to the basic sensory systems and perceptual processes. Prerequisite: Permission of instructor.

PSY 553 Cognitive Psychology (4)

The information processing approach to problems in pattern recognition, selective attention, mental operations, short- and long-term memory, the psychology of reading, problem solving, and probabilistic reasoning. Prerequisite: Permission of instructor.

PSY 590 Seminar: The Psychology of Reading (4)

Cognitive models of reading and reading-related information processing tasks. Empirical studies of the adult reading process. Prerequisite: Admission to Ph.D. program in reading.

PSY 591 Seminar: The Development of Reading Ability, Individual Differences, and Learning Disabilities (4)

Empirical and theoretical studies of the causes and correlates of differences in reading skill. Developmental models of reading acquisition and individual differences. Analysis of the concept of learning disability. Prerequisite: Admission to the Ph.D. program in reading; PSY 590 or permission of instructor.

RHETORIC, COMMUNICATIONS AND JOURNALISM**RCJ 515 Summer Institute (2 or 4)**

Concentrated two or four week institutes on topics of interest to high school teachers and post-baccalaureate students. May be cross-listed with ENG 515.

SCHOOL OF NURSING

Dean: *Andrea R. Lindell*

Graduate program director: *Diane R. Wilson*

Professors:

Anna Dugan, Ph.D., Bryn Mawr College

Andrea R. Lindell, D.N.Sc., Catholic University of America

Associate professor:

Lorraine Wilson, Ph.D., Wayne State University

Assistant professors:

Penny Cass, M.S., University of Michigan

Mary Eddy, Ph.D., University of Connecticut

Kathleen Emrich, M.S., University of Michigan

Rita Munley Gallagher, M.S.N., Wayne State University

Frances Jackson, M.S., University of Michigan

Norman Kloosterman, M.S.N., Wayne State University

Mary Ann Krammin, Ph.D., Wayne State University

Gary Moore, Ph.D., Wayne State University

Dolores Solosky, M.S.N., University of Texas at San Antonio

Diane Wilson, Ph.D., Michigan State University

Carol Zenas, Ph.D., University of Michigan

Instructors:

Richard Boortz-Marx, M.S.N., Brigham Young University

Servonia Jones, M.S., University of Michigan

Robin Krieger, M.S.N., New York University

Visiting instructors:

Linda Drobish, M.S.N., University of North Carolina — Chapel Hill

Jean Mohan, M.S.N., Wayne State University

Barbara Russol, M.S.N., University of Texas at Galveston

Patricia Tackitt, M.S., University of Michigan

Lecturer:

Joann Richards, M.S.N., Wayne State University; M.B.A., Oakland University

Adjunct Faculty:

Cyril Akpom, M.D., Case Western Reserve; M.P.H., Harvard School of Public Health

Joanne Napiewocki, J.D., M.S.N., Wayne State University

Sharon Wilkerson, Ph.D., Wayne State University

The Master of Science in Nursing

The Master of Science in Nursing program prepares professional nurses for advanced practice in the specialty areas of nursing administration and adult health nursing.

The specialty area in nursing administration prepares nurses for roles in middle management within the health care system. The administration focus and the provision for a clinical practicum in a variety of health care settings provide the opportunity for students to develop expert nursing practice in an area of their choice. The graduate will be able to use nursing theory, administration theory and the research process to positively influence nursing practice and the delivery of health care. Nursing content

specific to administration, nursing theory and research is the focus of the nursing courses. Concurrent study of economics, management and public administration is provided in cognate courses. Students will choose electives from a variety of disciplines to fulfill their specific needs.

The program of study in adult health nursing prepares nurses as specialists in a variety of clinical leadership roles including practitioner, teacher, researcher, manager and consultant. The clinical focus of nursing courses in a variety of health care settings provides the opportunity for students to develop expert nursing practice in an area of their choice. The graduate will be able to integrate theories and concepts related to health behaviors and acute and chronic illness. The knowledge base in adult health nursing is drawn from nursing and the physical, social and behavioral sciences and is combined with role theory in a variety of clinical settings. Emphasis on the use and generation of knowledge through the research process is provided in cognate and nursing courses. In addition to adult health nursing courses, students select functional role preparation as either an educator or nursing administrator. Students will choose electives from a variety of disciplines in relation to their specific goals.

Admission

An applicant for admission to the Master of Science in Nursing program must have a Bachelor of Science degree in nursing from an institution accredited by the National League for Nursing, with an undergraduate cumulative grade point average of 3.00 or above. Applicants should show satisfactory achievement on the Graduate Record Examination general test and must have completed STA 225 and NRS 322 (adult health specialty only) or their equivalents as determined by the School of Nursing. Individuals must have a current license to practice as a registered nurse in the state of Michigan and carry minimum malpractice insurance of \$1,000,000. It is preferred that the applicant have at least one year of prior clinical experience.

Admission to the program will be considered when the following materials have been received by the university: 1) an application for admission to graduate study, accompanied by the appropriate fee, 2) transcripts of all graduate and undergraduate course work, 3) three recommendations from supervisors or colleagues who are able to attest to the applicant's skill in both theory and practice, and 4) Graduate Record Examination results. In addition applicants are required to submit a goal statement of 500 to 1,000 words that sketches academic and professional work biography with special attention given to the following: In what ways this program will help to extend the applicant's professional goals and experience and what sort of leadership contributions the applicant expects to make to the field of nursing with the aid of this program.

Admission to the program is selective with preference given to applicants judged to be best qualified to undertake the program of study. Applications are reviewed as soon as all materials are received. An interview with members of the Graduate Admission Committee of the School of Nursing may be required.

Academic advising

Every student admitted to the M.S.N. program is assigned a faculty adviser with teaching responsibilities in the graduate program. The adviser meets with the student to determine an individualized plan of study that will assure orderly progress toward satisfying degree requirements.

Requirements for the degree

This program consists of 48 semester hours of course work, including a thesis, beyond the bachelor's degree. Prior graduate level course work (both nursing and

nonnursing) will be evaluated by the faculty for equivalency to Oakland University School of Nursing requirements for the Master of Science in Nursing degree. A maximum of nine semester hours can be transferred. The program of study is designed so that full-time students can complete the requirements within two academic years. Part-time students can complete the program within three to four academic years. A maximum of six years is allowed for completion of all degree requirements.

The 48 credits of graduate course work are distributed as follows:

Core Courses

NRS 500	Theoretical Foundations of Nursing (3)
NRS 530	Research Methods in Nursing (3)
NRS 550	Seminar in Proposal Development (2)
NRS 600	Advanced Concepts of Clinical Nursing Practice (3)
STA 501	Statistical Methods in Research and Production (4)

Nursing Administration

NRS 610	Economics in Nursing Administration (3)
NRS 620	Issues in Nursing Administration (3)
NRS 630	Management Process in Nursing Administration (3)
NRS 640	Practicum in Nursing Administration (6)
ACC 511	Financial Accounting (3)
ACC 512	Managerial Accounting (3)
PA 569	Organization and Administration of Health and Medical Care Programs (4)

Adult Health Nursing

NRS 611	Pathophysiologic Dimensions of Adult Health (3)
NRS 612	Nursing Management of the Acutely Ill Adult (3)
NRS 614	Nursing Management of the Chronically Ill Adult (3)
NRS 622	Sociocultural Milieus and Adult Health (3)
NRS 642	Practicum in Adult Health (3)
AN 501	Social Anthropology (4)

Functional Role

NRS 620 and PA 569	Issues in Nursing Administration (3)
or NRS 632 and NRS 634	Organization and Administration of Health and Medical Care Programs (4)
	Curriculum and Instruction in Nursing Education (3)
	Evaluation in Nursing Education (3)

Electives:

Five or six credits of course work selected from within the School of Nursing and other departments within the university. One elective must be taken outside the School of Nursing.

Course Offerings

NRS 500 Theoretical Foundations in Nursing (3)

Discussion of current conceptual and theoretical frameworks in nursing practice. Emphasis is placed on the analysis and utilization of existing theory as a basis for nursing practice and research. Prerequisite: Permission of the instructor.

NRS 530 Research Methods in Nursing (3)

A study of the formulation of research problems and hypotheses and an in-depth analysis of the problems encountered in applying classic research designs to practice settings. Prerequisite: Permission of the instructor.

NRS 550 Seminar in Proposal Development (2)

Practical issues involved in the development of a research proposal. A research proposal for the master's thesis will be developed.

Prerequisite: NRS 530; Prerequisite or corequisite: STA 501.

NRS 599 Topical Seminar in Nursing (2, 3)

Discussion of a selected topic relevant to the practice of a master's prepared nurse. Example: Current legislation and lobbying in the health field.

Prerequisite: Permission of the instructor.

NRS 600 Advanced Concepts of Clinical Nursing Practice (3)

Guided experience in a health care agency to design clinical practice based on selected nursing models. Emphasis is on the application and evaluation of a conceptual framework when providing direct nursing care.

Prerequisite: NRS 500.

NRS 610 Economics in Nursing Administration (3)

A study of fiscal resources in health care agencies. Emphasis is on principles of fiscal management, budgeting process, health care reimbursement and its effects on decisions. A fiscal budget for a selected health care setting is required.

Prerequisite: NRS 500, ACC 511 and ACC 512.

NRS 611 Pathophysiologic Dimensions of Adult Health (3)

Advanced physiological concepts related to alterations in adult health.

Prerequisite: Admission to M.S.N. program.

NRS 612 Nursing Management of the Acutely Ill Adult (3)

Advanced nursing care of adult clients experiencing acute psychophysiological crises. A clinical component is included.

Prerequisite: NRS 611.

NRS 614 Nursing Management of the Chronically Ill Adult (3)

Advanced nursing care of post-acute and chronically ill adult in multiple settings in the community. A clinical component is included.

Prerequisite: NRS 611.

NRS 620 Issues in Nursing Administration (3)

Seminar exploring current issues impacting on the administration of nursing services and the development of effective strategies for dealing with them.

Prerequisite: NRS 600.

NRS 622 Sociocultural Milieus and Adult Health (3)

Psychosocial dimensions of health-seeking adults within diverse health service delivery modalities in the United States. Case study method is utilized. A clinical component is included.

Prerequisite: AN 501.

NRS 630 Management Process in Nursing Administration (3)

Content from system theory, role theory, organizational behavior, learning and change theories. Various nurse management roles will be explored and commonalities analyzed.

Prerequisite: NRS 500, ACC 511 and ACC 512.

NRS 632 Curriculum and Instruction in Nursing Education (3)

Concepts related to curriculum development in nursing education and their use in determining philosophy, objectives and selection of learning experiences. Issues and developments in planning nursing curricula.

Prerequisite: NRS 500.

NRS 634 Evaluation in Nursing Education (3)

Concepts of evaluation as a basis for the selection, development, and use of appropriate evaluation methods.

Prerequisite: NRS 632.

NRS 640 Practicum in Nursing Administration (6)

Guided experience in health care agency to integrate administrative theory and practice. Concurrent seminar focuses on the functions unique to nurse manager roles. An investigative analysis of nursing administrative problems or role function is required.

Prerequisite: All required courses with the exception of NRS 630 and NRS 690. Prerequisite or corequisite NRS 630.

NRS 642 Practicum in Adult Health (3)

Study of advanced nursing practice in the care of adults experiencing acute and chronic alterations in health status. Clinical experience in selected agencies is required.

Prerequisite: Completion of all program requirements with the exception of master's thesis and electives.

NRS 650 Independent Study in Nursing (2, 3)

Advanced independent study in a specialty area.

Prerequisite: Permission of the instructor.

NRS 690 Master's Thesis (2)

Preparation of a thesis is required. The research process must apply to nursing and solution of nursing problems and include development of a theoretical framework and rationale. An oral defense of the thesis may be required.

Prerequisite: NRS 550.

INDEX

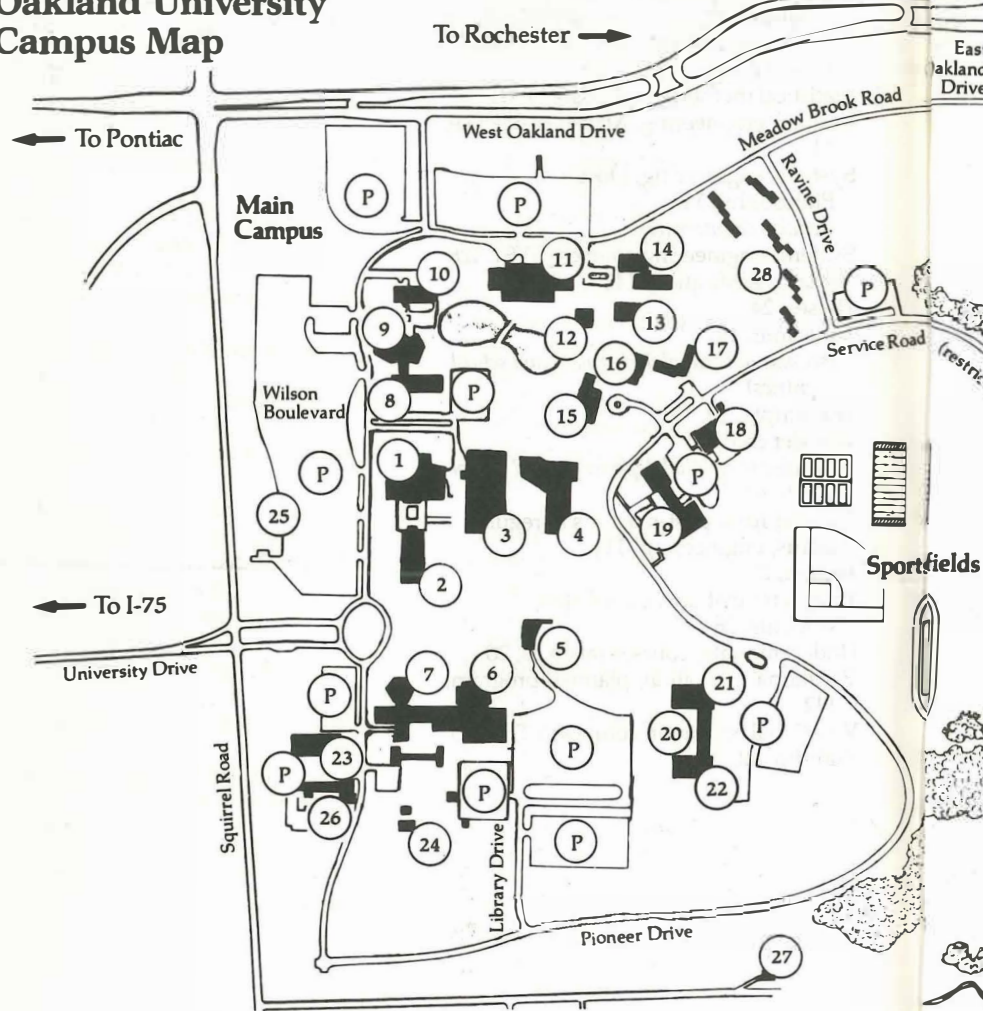
- Academic probation, 20
- Accounting courses (ACC), 102
- Accreditation, 13
- Add/drop form, 20
- Admission:
 - certificate status, 17
 - conditional admission, 17
 - international students, 18
 - post-baccalaureate status, 18
 - post-graduate status, 18
 - special graduate status, 17
- Admission to program, *see individual department and school entries*
- Affiliations, 13
- Anthropology courses (AN), 88
(*see also sociology program*)
- Appeal procedure, 22
- Application fee, 24
- Application for degree, 24
- Applied language studies courses (ALS), 57
- Applied mathematics, Master of Science, 61
(*see also mathematics*)
- Applied mathematics courses (APM), 65
- Applied music courses (MUA), 72
- Applied statistics, Master of Science, 62
- Applied statistics courses (STA), 66
- Arts and Sciences, College of, 29
- Assistantships, 27
- Biological Sciences, Department of, 32
- Biology, Master of Science, 33
- Biology courses (BIO), 34
- Biomedical sciences, doctoral program (College of Arts and Sciences), 29
 - cellular biology of aging specialization, 29, 32
 - health and environmental science specialization, 29, 38
 - medical physics specialization, 29, 76
- Board of visitors, School of Business Administration, 93
- Business Administration, Master of, 92
- Business Administration, School of, 91
- Cellular biology of aging specialization, biomedical sciences, Doctor of Philosophy, 32
- Certificate status, 17
- Changes in enrollments, 20
- Chemistry, Department of, 38
- Chemistry, Master of Science, 39
- Chemistry courses (CHM), 40
- Combined programs, education, 159
- Competency credit, 20
- Computer Science, School of Engineering and, 109
- Computer science and engineering, Master of Science, 122
- Computer science and engineering courses (CSE), 130
- Computer services office, 15
- Concentrations:
 - cellular biology of aging (biomedical sciences), 32
 - curriculum and instruction (education), 150
 - English language, 44
 - health and environmental chemistry (biomedical sciences), 38
 - leadership (education), 150
 - medical physics (biomedical sciences), 76
- Conditional admission, 17
(*see also individual department and school entries*)
- Continuing certificate planned programs:
 - counseling, 145
 - early childhood, 157
 - elementary education, 151
 - microcomputer applications in education, 171
 - music, 70
 - reading/language arts, 172
 - special education, 159
 - vocational education, 142
- Counseling, Master of Arts, 144
- Counseling, planned program, 145
- Counseling and psychology clinic, 16
- Counseling courses (CNS), 146
- Course classification, English, 45
- Course competency credit, 20
- Course fees, 25
- Course numbering system, 22
- Courses taken as an undergraduate, 20
- Credit system, 22
- Curriculum, instruction and leadership, Master of Arts in Teaching, 149

- Degree application, 24
- Degrees offered, 12
- Dismissal from the university, 22
- Dissertation: systems engineering, 113
- Doctor of Philosophy
 - biomedical sciences, 29
 - reading, 167
 - systems engineering, 110
- Doctoral theses, 24
 - biomedical sciences, 31
 - reading, 169
- Early childhood, Master of Arts in Teaching, 156
- Early childhood, Master of Arts in Teaching, combined program, 159
- Early childhood planned program, 157
- Economics courses (ECN), 102
- Education, combined programs, 159
- Education courses (ED), 179
- Education Specialist in School Administration degree, 176
- Electrical and computer engineering, Master of Science, 116
- Electrical and computer engineering courses (EE), 124
- Elementary education, Master of Arts in Teaching, *see curriculum, instruction and leadership*, 151
- Elementary education, planned program, 151
- Employment, part-time, 27
- Endorsement, education, 143
- Energy engineering, 121
- Engineering, Doctor of Philosophy, 110
- Engineering, Master of Science, 114
- Engineering and Computer Science, School of, 109
- Engineering courses (EGR), 124
- English, Department of, 43
- English, Master of Arts, 44
- English, Master of Arts in Teaching, 45
- English courses (ENG), 46
- English language concentration, Master of Arts with, 44
- Enrollment fee, 25
- Ensembles courses (MUE), 73
- Equality of opportunity, 13
- Evaluation and grading (business administration), 101
- Exception, petition of, 19
- Exercise Science, Master of Science, 135
- Exercise science courses (EXS), 137
- Eye Research Institute, 14
- Family Rights and Privacy Act, 13
- Fees, 24
- Finance courses (FIN), 103
- Financial aid, 27
- General information, 9
- Grading, 23
 - business administration, 101
- Graduate degrees offered, 12
- Graduate Management Admission Test, 93
- Graduate tests required for admissions, *see individual school and department entries*
- Handicapped student services, 13
- Health and environmental sciences specialization, biomedical sciences, Doctor of Philosophy, 38
- Health Sciences, School of, 134
- History, Department of, 49
- History, Master of Arts, 49
- History courses (HST), 50
- Housing fees, 25
- Human and Educational Services, School of, 140
- Inactive status, 18
- Institutional Research, Office of, 15
- International students, admission of, 18
- Jobs, part-time, 27
- Late registration fee, 25
- Learning disabilities endorsement, Master of Arts in Teaching, 171
- Library, 15
- Linguistics, Department of, 55
- Linguistics, Master of Arts, 55
- Linguistics courses (LIN), 58
- Loans, 27
- Management courses (MGT), 103
- Management information system courses (MIS), 104
- Marketing courses (MKT), 105
- Master of Arts:
 - counseling, 144
 - English, 44
 - history, 49
 - linguistics, 55
 - sociology, 85
- Master of Arts in Teaching:
 - curriculum, instruction and leadership, 149
 - early childhood, 156
 - English, 45
 - mathematics, 61
 - reading/language arts, 170
 - special education, 157
- Master of Business Administration, 92

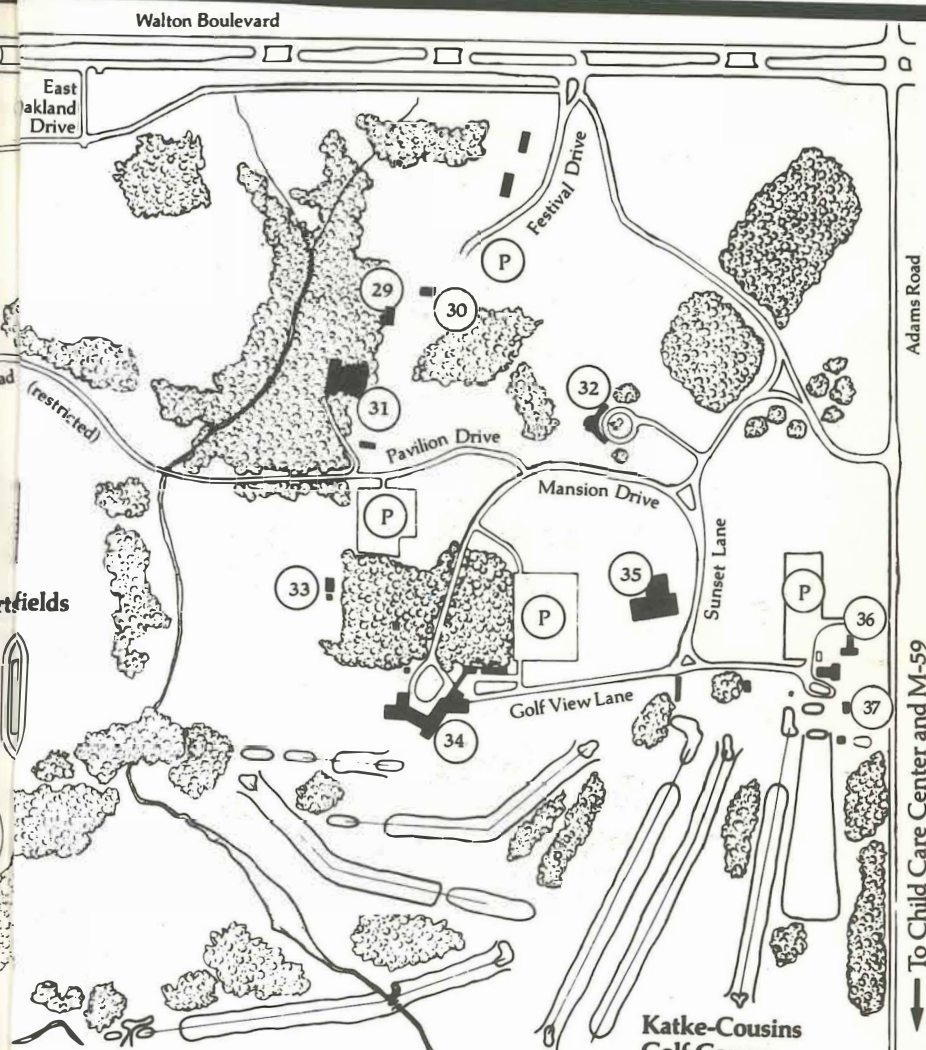
- Master of Music, 70
- Master of Public Administration, 81
- Master of Science:
 - applied mathematics, 61
 - applied statistics, 62
 - biology, 33
 - chemistry, 39
 - computer science and engineering, 122
 - electrical and computer engineering, 116
 - exercise science, 135
 - mechanical engineering, 116
 - physics, 77
 - systems and industrial engineering, 116
- Master of Science in Nursing, 181
- Master's theses, 24
 - (see also *individual department and school entries*)
- Mathematical Sciences, Department of, 60
- Mathematics, Master of Arts in
 - Teaching (secondary education), 61
- Mathematics, Master of Science, 61
- Mathematics courses (MTH), 64
- Mathematics for secondary teaching courses (MTS), 67
- Mechanical engineering, Master of Science, 116
- Mechanical engineering courses (ME), 126
- Medical physics specialization,
 - biomedical sciences, Doctor of Philosophy, 76
- Michigan Continuing Certificate planned programs, 141
- Michigan Intercollegiate Graduate Studies (MIGS), 13
- Microcomputer applications in education, 171
- Midwestern Association of Graduate Schools affiliation, 13
- Music, Department of, 69
- Music, Master of, 70
- Music, planned program, 70
- Music courses, applied (MUA), 72
- Music education courses (MUS), 73
- Music ensemble courses (MUE), 73
- Music history, literature and appreciation courses (MUS), 73
- Music theory courses (MUT), 73
- Nursing, Master of Science, 181
- Nursing, School of, 181
- Nursing courses (NRS), 183
- Organizational behavior courses (ORG), 106
- Out-of-state tuition regulations, 26
- Part-time status, business
 - administration, 94
- Performing Arts Library, 14
- Petition of exception, 19
- Physics, Department of, 76
- Physics, Master of Science, 77
- Physics, medical, 76
- Physics courses (PHY), 78
- Planned programs, *see continuing certificate planned programs*
- Political Science, Department of, 81
- Post-baccalaureate status, 18
- Post-master's status, 18
- Privacy Act, Family Rights and, 13
- Probation, academic, 20
- Public Administration, Master of, 81
- Public administration courses (PA), 83
- Quantitative methods courses (QMM), 107
- Reading, Doctor of Philosophy, 167
- Reading/language arts, Master of Arts in
 - Teaching, 170
- Reading/language arts, planned program, 172
- Reading/language arts courses, *see education courses*
- Recital requirements, music, 71
- Records, restriction of, 19
- Refund of fees, 25
- Residence halls fees, 25
- Residence requirements, Ph.D.:
 - biomedical sciences, 31
 - reading, 167
 - systems engineering, 112
- Resource Center, School of Human and Educational Services, 15
- Role and mission, institutional, 10
- Scholarships, 27
- Secondary teaching mathematics courses (MTS), 67
- Sociology, Master of Arts, 85
- Sociology and Anthropology,
 - Department of, 85
- Sociology courses (SOC), 86
- Special Advising, 16
- Special courses, 89, 179
- Special education, Master of Arts in
 - Teaching, 157
- Special education, planned program, 159

- Special education specialization, 157
- Special fees, 25
- Special graduate status, 17
 - (see also *department and school entries*)
- Specializations, *see concentrations and continuing certificate planned programs*
- Statistics courses (STA), 66
- Statistical methods, certificate of, 63
- Systems engineering, Master of Science, 116
- Systems engineering, Doctor of
 - Philosophy, 110
 - (see also *engineering*)
- Systems engineering courses (SYS), 128
- Teacher certification, 141
- Theses, 24
- Time limit, 19
 - (see also *individual department and school entries*)
- Transcripts, 19
- Transfer credit, 19
 - (see also *individual department and school entries*)
- Transfer from post-master's to regular status, engineering, 111
- Tuition, 25
- Tuition regulations, out-of-state students, 26
- Undergraduate, courses taken as, 20
- Vocational education, planned program, 142
- Vocational education courses (VTE), 179
- Withdrawal, 20

Oakland University Campus Map



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|------------------------------|---------------------------|---------------------------|
| 1. North Foundation Hall | 10. Graham Health Center | 19. Lepley Sports Center |
| 2. South Foundation Hall | 11. Vandenberg Hall | 20. Varner Hall |
| 3. Oakland Center | 12. Hill House | 21. Varner Recital Hall |
| 4. O'Dowd Hall | 13. Van Wagoner House | 22. Studio Theatre |
| 5. Kresge Library | 14. Hamlin Hall | 23. Public Safety |
| 6. Dodge Hall of Engineering | 15. Fitzgerald House | 24. Barn Theatre |
| 7. Hannah Hall of Science | 16. Anibal House | 25. Purchasing Trailer |
| 8. Wilson Hall | 17. Pryale House | 26. Grounds Building |
| 9. Meadow Brook Theatre | 18. Central Heating Plant | 27. Clinical Research Lab |



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| 28. George T. Matthews Apartments |
| 29. Trumbull Terrace |
| 30. Meadow Brook Music Festival Box Office |
| 31. Baldwin Pavilion |
| 32. Sunset Terrace |
| 33. Knoke Cottage |
| 34. Meadow Brook Hall |
| 35. Meadow Brook Center |

Katke-Cousins Golf Course

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| 36. Greenhouse |
| 37. Club House |

Unidentified buildings are the original barns and stables of the Meadow Brook Farms Estate, which are used for storage and special activities.