

OAKLAND UNIVERSITY



1995-97 Graduate Catalog



OAKLAND UNIVERSITY

1995-97 GRADUATE CATALOG



April 1995

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For Information

Oakland University
Rochester, MI 48309-4401
(810) 370-2100

Academic units

- Dean of the College of Arts and Sciences, 370-2140
- Dean of the School of Business Administration, 370-3286
- 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 Education and Human Services, 370-3050
- Dean of the School of Nursing, 370-4081

Admissions information

- Office of Graduate Study, 370-3168

Business matters

- Vice President for Finance and Administration, 370-2445

Career services and graduate placement

- Director of Placement and Cooperative Programs, 370-3250

Continuing Education

- Director of Continuing Education, 370-3120

Schedule of classes

- Registrar, 370-3450

Transcripts and academic reports

- Academic Records, 370-3452

Catalogs

- University Services, 370-2281

Loans and on-campus employment

- Financial Aid Officer, 370-3370

Scholarships and grants

- Office of Graduate Study, 370-3168

Graduate student affairs and services

- Office of Graduate Study, 370-3168

Student housing

- Director of Residence Halls, 370-3570

Oakland University is a legally autonomous state institution of higher learning. Legislation creating Oakland University as an independent institution, separate from Michigan State University, was established under Act No. 35, Public Acts of 1970. The university is governed by an eight-member board of trustees appointed by the governor with the advice and consent of the Michigan Senate.

As an equal opportunity and affirmative action institution, Oakland University 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, Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. 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 should be addressed to: Director, Office of Equal Opportunity, 148 North Foundation Hall, Oakland University, Rochester, Michigan 48309-4401.

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 *Claire Rammel, *Assistant to the Dean of Graduate Study*

**ex officio*

Service Offices

General Information: (810) 370-2100

College and Schools

Arts and Sciences: 370-2140
 Business Administration: 370-3282
 Education and Human Services: 370-3050
 Engineering and Computer Science: 370-2217
 Health Sciences: 370-3562
 Nursing: 370-4081

Academic Services, Virginia Allen, *Director*: 370-3229

Academic Skills Center, Lynn R. Hockenberger, *Director*: 370-4215

Admissions and Scholarships (Undergraduate), William Headley and Stacy Penkala,

Assistant Directors: 370-3360

Alumni Relations, Jill K. Dunphy, *Director*: 370-2158

Bookcenter, Denise McGee, *Manager*: 370-2404

Campus Facilities and Operations, Alan F. Miller, *Director*: 370-2160

Continuing Education, Pamela A. Marin, *Director*: 370-3120

Controller, Thomas C. Evans, *Controller*: 370-2296

Counseling (Psychological), Robert S. Fink, *Director*: 370-3465

Employee Relations, Willard C. Kendall, Jr., *Director*: 370-3480

Equal Opportunity, Edward Perez, *Acting Director*: 370-3496

Financial Aid and Employment, Lee Anderson, *Director*: 370-3370

Graduate Office, Claire Rammel, *Assistant to the Dean*: 370-3168

Grants, Contracts and Sponsored Research, Donald A. McCrimmon, *Director*: 370-3222

Handicapped and International Students, Lisa McGill, *Director*: 370-3266

Health Service, Sharon Long, *Coordinator*: 370-2341

Library, Suzanne O. Frankie, *Dean*: 370-2492

Minority Equity, Glenn McIntosh, *Director*: 370-4404

Placement and Career Services, Robert B. Thomas, *Director*: 370-3250

Public Safety and Police, Richard W. Leonard, *Director*: 370-3331

Registration and Transcripts, Lawrence R. Bartalucci, *Registrar*: 370-3450

Residency, Priscilla A. Hildum, *Assistant to the Vice President for Academic Affairs*: 370-2190

Student Accounts, Laurel Strong, *Supervisor*: 370-2292

Student Housing, Eleanor L. Reynolds, *Director*: 370-3570

Student Life, David E. Herman, *Dean*: 370-3352

Academic Calendar

Fall 1995

Registration	Thursday	August 31
Labor Day holiday	Monday	September 4
Classes begin	7:30 a.m., Tue	September 5
Fall commencement	2 p.m., Sun	September 17
Thanksgiving recess begins	10 p.m., Wed	November 22
Classes resume	7:30 a.m., Mon	November 27
Classes end	10 p.m., Tue	December 12
Study period	Wednesday	December 13
Exams begin	7:30 a.m., Thur	December 14
Exams end	10 p.m., Wed	December 20

Winter 1996

Registration	Wednesday	January 3
Classes begin	7:30 a.m., Thur	January 4
Winter recess begins	10 p.m., Sat	February 24
Classes resume	7:30 a.m., Mon	March 4
Classes end	10 p.m., Wed	April 17
Study period	Thursday	April 18
Exams begin	7:30 a.m., Fri	April 19
Exams end	10 p.m., Thur	April 25

Spring 1996

Registration	Monday	April 29
Classes begin	7:30 a.m., Tue	April 30
Memorial Day holiday	Monday	May 27
Spring commencement	Saturday	June 1
Classes end	10 p.m., Wed	June 19
Final exams	Thur, Fri	June 20, 21

Summer 1996

Registration	Monday	June 24
Classes begin	7:30 a.m., Tue	June 25
Independence Day recess	10 p.m., Wed	July 3
Classes resume	7:30 a.m., Mon	July 8
Classes end	10 p.m., Wed	August 14
Final exams	Thur, Fri	August 15, 16

Fall 1996

Registration	Tue, Wed	August 27, 28
Labor Day holiday	Monday	September 2
Classes begin	7:30 a.m., Tue	September 3
Fall commencement	Sunday	September 8
Thanksgiving recess begins	10 p.m., Wed	November 27
Classes resume	7:30 a.m., Mon	December 2
Classes end	10 p.m., Mon	December 9
Study period	Tuesday	December 10
Exams begin	7:30 a.m., Wed	December 11
Exams end	10 p.m. Tue	December 17

Winter 1997

Registration	Thursday	January 2
Classes begin	7:30 a.m., Mon	January 6
Winter recess begins	10 p.m., Sat	February 22
Classes resume	7:30 a.m., Mon	March 3
Classes end	10 p.m., Thur	April 17
Study day	Friday	April 18
Exams begin	7:30 a.m., Sat	April 19
Exams end	10 p.m., Fri	April 25

Spring 1997

Registration	Monday	April 28
Classes begin	7:30 a.m., Tue	April 29
Memorial Day holiday	Monday	May 26
Spring commencement	Saturday	June 7
Classes end	10 p.m., Wed	June 18
Final exams	Thur, Fri	June 19, 20

Summer 1997

Registration	Monday	June 23
Classes begin	7:30 a.m., Tue	June 24
Independence Day holiday	Friday	July 4
Classes resume	7:30 a.m., Mon	July 7
Classes end	10 p.m., Wed	August 13
Final exams	Thur, Fri	August 14, 15

Admission Schedule

This is a general guide for submission of application material. International applicants should consult page 20 of this catalog for application deadlines. 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, all application material must be in the Office of Graduate Study by:	For special graduate or post-master's admission, application materials must be postmarked by:
Spring 1995	March 15, 1995	April 5, 1995
Summer 1995	May 15, 1995	June 5, 1995
Fall 1995	July 15, 1995	August 5, 1995
Winter 1996	November 15, 1995	December 5, 1995
Spring 1996	March 15, 1996	April 5, 1996
Summer 1996	May 15, 1996	June 5, 1996
Fall 1996	July 15, 1996	August 5, 1996
Winter 1997	November 15, 1996	December 5, 1996
Spring 1997	March 15, 1997	April 5, 1997
Summer 1997	May 15, 1997	June 5, 1997
Fall 1997	July 15, 1997	August 5, 1997

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 postmarked 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 so desire. However, they should be aware that a \$35 late registration fee will be assessed.

Applicants for special graduate or post-master status must submit an application for admission, application fee and transcript that posts evidence of a bachelor's/master's degree.

Admitted applicants to degree programs who do not enroll for the term in which they were admitted must contact the Office of Graduate Study. If done within one year of the date of original admission term, no readmission fee is charged; thereafter, a new application, documentation and application fee are required. Inactive application files are destroyed after one year.

GENERAL INFORMATION

Oakland University is a comprehensive, state-assisted institution of approximately 13,000 students that offers a diverse set of academic programs, from baccalaureate to doctoral levels. In all its activities, Oakland University strives to exemplify educational leadership. Anchored by a strong liberal arts program, the university is organized into the College of Arts and Sciences, schools of Business Administration, Education and Human Services, Engineering and Computer Science, Health Sciences, Nursing, the Office of Graduate Study, and programs in continuing education. All academic programs of the university are accredited by the North Central Association of Colleges and Schools.

The university's faculty, which now numbers more than 350, has a distinguished record of research and scholarship. Faculty members have won some of the most prestigious awards made by government agencies and private foundations. External funding support for academic, student, and university projects now totals more than \$8 million. Studies in biological and physical sciences and nondestructive testing attract national and international attention to Oakland University, and its highly recognized Eye Research Institute is the only major eye research center in the United States not associated with a medical school. The Institute for Biochemistry and Biotechnology of the College of Arts and Sciences is gaining a national reputation in diverse fields within biomedical sciences. The university 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; the results of research and scholarship are integrated into related courses of instruction. An unusually high proportion of Oakland University alumni have gone on to earn doctoral degrees or other distinction in their fields.

Resources available to support scholarly activities of students and faculty include both library and computing facilities. The central university library is Kresge Library which has additional specialized collections and services in performing arts and education. Computing facilities include a comprehensive distributed environment involving 40 processors and several hundred microcomputers, linked by a fiber optic backbone.

Complementing its academic programs, 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 brings a summer program of world-class entertainment to campus. Meadow Brook Hall, former home of the university's benefactors, now serves as a conference and cultural center; Meadow Brook Art Gallery houses the university's permanent collection of African art and presents a variety of special exhibits annually.

Oakland University was created in 1957 when the late Alfred G. and Matilda R. Wilson donated their 1500-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, its name was changed to Oakland University and in 1970 the Michigan Legislature recognized the maturity and stature of the university by granting it autonomy. The governor appointed Oakland University's first board of trustees in 1970. From its beginnings, the university has emphasized academic quality, concentrating on providing its students with a broad liberal education by a faculty of dedicated scholar-teachers.

Located in suburban Oakland County, Michigan, Oakland University is easily accessible to millions of Detroit metropolitan area residents. 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 1,200 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 and promotes the arts through research, scholarship, and creative activity; and it renders significant public service. In all 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 excellence. 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, ensuring equal opportunity to all 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 its diverse students, 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 is expressed through the attraction of qualified students.

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 of the populous southeastern sector. Application of research and scholarship to problems and concerns of the state's business and industry and to its scientific, educational, governmental 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 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 particular 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. It makes its facilities available for a multitude of activities of agencies and community groups whose purposes are compatible with the mission of the university. It provides access to its programs and campus, insofar as is consistent with the role and scope of the institution, for the recreational and physical enrichment of area citizens. Cultural enrichment is provided for the community through the Meadow Brook enterprises, on- and off-campus presentations by faculty and students, and other campus events. The university aims to provide a model of socially responsible decision making and ethical institutional behavior, Recognizing that institutional strength derives from an effective interaction with the institution's diverse 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 those personal 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 governance system in which students play a meaningful role in the 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

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 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.

Graduate Degree Programs

Doctor of Philosophy: biomedical sciences (health and environmental chemistry, medical physics), reading, systems engineering

Education Specialist: school administration

Master of Arts: counseling, English, history, linguistics, mathematics

Master of Arts in Teaching: reading and language arts

Master of Business Administration

Master of Education: curriculum, instruction and leadership; early childhood education; special education

Master of Music

Master of Physical Therapy

Master of Public Administration

Master of Science: applied statistics, biology, chemistry, computer science and engineering, electrical and computer engineering, engineering management, exercise science, industrial applied mathematics, mechanical engineering, physics, systems engineering

Master of Science in Nursing: nursing administration track, adult health track, nurse anesthetist track

Graduate Certificate Programs

Statistical Methods

Microcomputer Applications in Education

Orthopedic Manual Physical Therapy

Post-Master Certificate in Reading, Language Arts and Literature

Post-Master Certificate in Family Nurse Practitioner

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 Office of Graduate Study. It includes evaluation by and endorsement from several designated internal and external bodies. Once in place, graduate programs are reviewed by faculty program review committees and the Office of Graduate Study 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. Students should maintain contact with their advisers and the Office of Graduate Study to be fully aware of the current status of programs to which they have been admitted.

Family Educational Rights and Privacy Act, 1974

The federal Family Educational Rights and Privacy Act of 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.

Oakland University complies with the Family Educational Rights and Privacy Act as indicated in the *Schedule of Classes*, and in the undergraduate and graduate catalogs.

A full statement of students' rights is available in the Office of the Dean of Students (144 Oakland Center, 370-3352). The director of CIPO 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 (Director of CIPO, 49 Oakland Center, Oakland University, Rochester, Michigan 48309-4401, 370-2020) and/or filed with the U.S. Department of Education.

Accreditation

All Oakland University graduate and undergraduate programs are accredited by the North Central Association of Colleges and Schools. All programs of the School of Business Administration are accredited by the American Assembly of Collegiate Schools of Business. All graduate programs in the School of Education and Human Services are accredited by the National Council for Accreditation of Teacher Education. The Master of Public Administration program is accredited by the Commission on Peer Review and Accreditation of the National Association of Schools of Public Affairs and Administration. Many accrediting associations either do not accredit graduate programs or limit accreditation to only one degree level per institution. Where they exist Oakland University programs are accredited by the prevailing professional organization. As examples, the undergraduate programs in computer, electrical, mechanical and systems engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology and the undergraduate program in computer science is accredited by the Computer Science Accreditation Board; the undergraduate program in chemistry meets the criteria established by the Committee on Professional Training of the American Chemical Society; the graduate program of the School of Nursing is accredited by the National League of Nursing and has approval of the Michigan State Board of Nursing; the physical therapy program is accredited by the American Physical Therapy Association.

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 other participating institutions 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 graded courses (not graded P/F, S/U or CR/NC) 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 Andrews University, Central Michigan University, Eastern Michigan University, Grand Valley State University, Michigan State University, Michigan Technological University, Northern Michigan University, Oakland University, Siena Heights College, University of Detroit-Mercy, University of Michigan, Wayne State University and Western Michigan University. Additional information is available in the Office of Graduate Study and from program directors.

Centralized and Specialized Research Facilities

Office of Grants, Contracts and Sponsored Research

The Office of Grants, Contracts and Sponsored Research supports research and scholarship at Oakland University. In particular, the office acts as the coordinating office between Oakland University and the federal and state agencies, foundations and public and private corporations that provide funds for research, education, training and service programs. In addition to providing information and assistance on sponsored programs, the office is responsible for insuring that ethical and legal guidelines are adhered to in the completion of all research projects. Research involving human subjects must be reviewed and approved by the university's Institutional Review Board. The board insures that research protocols are designed to protect the rights of individuals who participate as subjects in research projects. The university is responsible for the humane care and use of laboratory animals in research and does so through the Institutional Animal Care and Use Committee. This committee monitors research projects involving laboratory animals to ensure that the provisions of all applicable laws and regulations are followed. A Biosafety Committee, which also operates out of the Office of Grants, Contracts and Sponsored Research, is responsible for evaluating all research and teaching that involves recombinant DNA molecules and infectious materials. The Radiation Safety Committee reviews, approves and monitors all use of radiation in research and teaching on the Oakland campus.

The Office of Grants, Contracts and Sponsored Research also oversees the internal awards of research funds to faculty and students. The Research Committee of the University Senate reviews research applications and recommends funding for individual faculty projects and research related activities and, with a representative from the Alumni Association, reviews student applications each fall and makes recommendations for funding. The Alumni Association funds a graduate and undergraduate student research program to support and encourage student research. The Research Committee of the University Senate, with a representative from the Alumni Association, reviews student applications each fall and makes recommendations for funding. Students and faculty may contact the Office of Grants, Contracts and Sponsored Research for guidelines and application cover sheets.

Eye Research Institute

The Eye Research Institute, with laboratories and offices on the fourth floor of Dodge Hall, conducts studies on the eye in health and disease. Current faculty research activities are extensively funded by the National Institutes of Health. The research involves a multidisciplinary approach to the study of lens and cataract, glaucoma and the biochemistry, physiology and pharmacology of the cornea, retina and their genetic disorders.

The institute's major resources are its CORE facilities funded by the National Eye Institute which include tissue culture laboratories and transmission and scanning electron microscopes.

Several members of the Department of Ophthalmology at William Beaumont Hospital, which is affiliated with the institute, are members of the institute's clinical faculty. This affiliation provides enhanced educational experience for ophthalmology residents and fellows. The institute also offers qualified graduate students opportunities for research experience.

The programs of the Eye Research Institute are regularly reviewed by a scientific advisory board, whose members are nationally recognized leaders in eye research and distinguished ophthalmologists.

Further information may be obtained by contacting the Office of the Director.

University Library

Library facilities

Most university library materials and services are housed in Kresge Library. The library's automated catalog allows patrons to identify titles held, not only in the Kresge Library, but also in the collections at Wayne State University, the University of Detroit, Detroit Public Library and a number of other libraries in the area.

The Instructional Technology Center located in Varner Hall provides media services for the university's faculty and staff. The center staff designs and produces instructional visual aids ranging from slide to video tape and film presentations.

The Performing Arts Library located in Varner Hall 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 Kresge Library collection includes 1.6 million items: 2,000 journal titles, 1 million microforms, 14,000 records and phonotapes, 68,000 periodical volumes and 320,000 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.

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*. Since 1991, information regarding the 206,000 titles in the collection can be accessed using the automated catalog.

Library services

Reference librarians help students find materials and use the library. Lectures and demonstrations for using the library are offered regularly. 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 borrow materials owned by other libraries.

Office of Computer and Information Services

The Office of Computer and Information Services (OCIS) provides both centralized and decentralized computers as well as personnel services to support the instructional, research, administrative and public service activities of Oakland University. Its Department of Academic Computer Services (ACS) is responsible for the delivery of those services to the academic community's programs.

OCIS provides modern, current technology resources involving a distributed computing environment (DCE) with 40 processors using OSF/1, VMS, and the Windows NT operating systems. These machines are connected broadly across the campus by a high speed fiber optic network, providing inter-machine communications between them and a bevy of personal computers and advanced "workstations" (very fast personal computers with excellent graphics equipment). Software resources are equally impressive.

These distributed resources are offered in a number of attractive public terminal rooms, where adequate user work space, reference materials and consultant help is readily available. Faculty and students are encouraged to avail themselves of these extensive resources and services, and doing so is further facilitated by a series of non-credit short courses offered by ACS.

Office of Institutional Research and Assessment

The Office of Institutional Research and Assessment (OIRA) provides student-related information such as enrollment, credit hours, degrees, curriculum, etc., to internal and external data-users and decision makers. Internal requests for information are utilized for academic planning, student program development and budgetary purposes. Externally, the Office of Institutional Research and Assessment is charged with the responsibility for compliance with state and federal statistical reporting requirements for public universities, such as the annual state budget request and the Integrated Postsecondary Educational Data System (IPEDS) submission, among others. OIRA is also responsible for coordination and support of activities related to the assessment of student academic achievement, as specified in the Oakland University Assessment Plan submitted to the NCA.

OIRA routinely conducts social science research projects related to the university's overall educational mission, such as student retention tracking and the annual survey of new freshmen which provides data on career goals at time of admission and other descriptive items.

All information housed in the Office of Institutional Research and Assessment is in the aggregate; therefore, all information is public and available to administrators, faculty, students and the university community at large. Interested persons are encouraged to contact OIRA for student-related information. There is no charge for OIRA information.

SEHS Educational Resources Lab

The Educational Resource Lab (ERL) of the School of Education and Human Services (SEHS) provides resources and support for the school's activities. The center is a functional setting for the examination, study, research, development and evaluation of instructional materials and technologies.

Resources include a variety of print materials such as books, curriculum guides, manuals and periodicals. In addition, non-print materials such as sound filmstrips, recordings and multi-media kits are available. Collections of special interest include the Children's Trade Book Examination Center and the Aviation and Space Center.

The ERL has two labs available to students and faculty. The graphics lab has equipment for laminating, spiral binding, lettering, and making transparencies and duplicating masters. The technology lab has microcomputers and educational software available for in-lab examination and use.

Graham Health Center

Graham Health Center provides health care services to faculty, staff and students. The Health Center serves as a primary care facility to enrolled students and offers general episodic care to the remainder of the university community.

All records are confidential. No records are released without written authorization from the patient. Services available to students, faculty and staff include:

1. Clinical treatment of acute illness, prevention of illness and promotion of wellness. This includes physical exams, gynecological exams, evaluations and treatment of medical problems. Minor surgery and treatment of minor injuries.
2. The Health Center staff is available to students and staff for health education programs.
3. Allergy injections.
4. Laboratory services.
5. Influenza vaccine available during fall and early winter semesters.
6. TB screening, tetanus and Hep B vaccinations.
7. Confidential HIV testing.

Appointments

Pre-employment, gynecological and annual physicals must be scheduled through the Graham Health Center. Walk-ins are welcome.

Fees

Fees may be paid by check, cash or charged to student account. Graham Health Center may bill insurance carriers for appropriate services. Please call about services covered.

Hours

Open Monday thru Friday. Hours vary; call (810) 370-2341.

Counseling Center of the Graham Health Center

The Counseling Center provides counseling, psychotherapy, testing and consultations to university students.

The psychotherapy service provides treatment for relationship difficulties, depression and anxiety, stress disorders, underachievement, and child, family or marital problems. Psychological testing services provides identification and understanding of learning disabilities as well as

emotional problems. Assessment, counseling and referral services are available for students with alcohol or drug problems; specialized counseling is provided for family members of substance abusers. Career counseling is provided for family members of substance abusers. Specialized loss and trauma counseling is available to help students overcome the emotional effects of such experiences. Career testing and counseling helps students to identify potential career major or educational directions through the clarification of their abilities, interests and personal needs.

Strict rules of confidentiality are observed. No notation is made in any university record regarding a student's voluntary use of the clinic services.

All services are available to full-time students at a nominal cost. Part-time students and community members are charged on a sliding scale according to their income.

For more information or to schedule an appointment, phone 370-3465. The Counseling Center is located in the Graham Health Center.

The Office of Handicapped and International Student Services

The Office of Handicapped and International Student Services (144 Oakland Center, (810) 370-3266) provides a variety of services for handicapped students, international students and exchange visitors.

Handicapped Student Services

Advocacy and support services are provided through the Office of Handicapped and International Student Services located in 144 Oakland Center. Services include but are not limited to priority registration, assistance in identifying volunteer notetakers, special testing arrangements, assistance with sign language interpreter services, assistance in identifying volunteer readers, loaning of equipment, referral services to outside agencies, and assistance with general needs and/or concerns. Students with special needs are encouraged to utilize the services provided. Anyone requiring additional information may contact the office at (810) 370-3266 (voice) or (810) 370-3268 (TDD).

The Equal Opportunity Office (148 North Foundation Hall, (810) 370-3496) is also available to assist students with disabilities.

International Student Services

Services are provided for international students and scholars by the Office of Handicapped and International Student Services located in 144 Oakland Center. Assistance with preparing documents for the U.S. Immigration and Naturalization Service, sponsoring agencies and home country governments is available as well as insurance coverage, orientation and other programs. International students are required to meet with a staff member prior to registration. Any international student and/or exchange visitor requiring assistance may contact the office at (810) 370-3266.

Placement and Career Services

The Department of Placement and Career Services (275 Vandenberg Hall West, (810) 370-3250) provides individual placement advising and career information to all Oakland University students and alumni. Special seminars are provided to assist students in developing job search skills and a variety of job fair/career information programs are offered throughout the academic year.

The department assists students and alumni in identifying career-related permanent, part-time and summer employment opportunities. Direct access to these job opportunities is provided through on-campus interviews, job vacancy postings, job referral activities and the publication of a weekly job bulletin.

The department maintains an extensive placement library for the distribution and display of printed and videotaped employer literature, job search information, and career publications and periodicals. Information and testing applications on graduate and professional programs are also available. Testing application materials include, but are not limited to, the following: Graduate Record Examination (GRE), Law School Admission Test (LSAT), Medical College Admission Test (MCAT), and Graduate Management Admission Test (GMAT).

The department also provides opportunities for students to gain professional-level, career-related work experience before they graduate. This is partially accomplished through the Cooperative Education Program and the Oakland University Student Internship Program. In addition, the department publicizes information about internship/fellowship opportunities generated outside the university.

Continuing Education

The Office of Continuing Education serves individuals at various stages of their careers, from students applying for graduate study to professionals intent on career advancement. The office offers workshops in preparing students for the Graduate Record Examination (GRE), the Graduate Management Admission Test (GMAT), the Law School Admission Test (LSAT), the Medical College Admission Test (MCAT), and stages additional workshops in writing, power reading, and refresher mathematics. Detailed program information may be obtained from the Continuing Education Office, 265 South Foundation Hall, or by calling (810) 370-3120.

POLICIES AND PROCEDURES

Admissions

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 recommendations sent directly by their originators to the Office of Graduate Study. Detailed instructions are included in the "Application for Admission to Graduate Study." 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 for a definite term 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, including advanced (subject) tests when available, are required from those students who graduated from schools not accredited by one of the regional accrediting agencies. 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 housed in the Office of Graduate Study.

Conditional admission

Applicants currently completing undergraduate requirements or degree holders whose preparation is judged deficient by the Dean of Graduate Study may be eligible for conditional admission. Deficiencies of conditionally admitted students must be rectified in a time and manner specified by the Dean of Graduate Study. 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

Students who are seeking professional certification, additional endorsements or are working for a graduate certificate or post-master's certificate should refer to department 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 must submit a copy of a transcript providing evidence of a bachelor degree awarded. 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 Office of Graduate Study and provide official transcripts, recommendations and any additional credentials specified by the program area. A recommendation on admission is then made by the academic department or school to the Dean of Graduate Study, who then makes the final decision. 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 Office of Graduate Study 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. Please contact the Office of Admissions and Scholarships (undergraduate) for a post-baccalaureate application.

Application for admission by international students

International applicants should submit both a university application and an international student application at least one year before the date they hope to enter the university. Applications will be reviewed for fall and winter admission only. All application materials must be submitted by May 1 for fall admission and by September 1 for winter admission. Application materials include: a university application, the application fee, recommendations, official transcripts, official test scores, an international student application and a notarized bank statement attesting to the applicant's financial standing. Fees paid to Oakland University must be made in U.S. funds drawn from U.S. banks. If this application is approved, students will receive a letter 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 MBA 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 at their current institutions. International students who do not enroll during the semester of admission must submit an application for readmission at least eight weeks prior to the start of the term (fall or winter) in which they wish to enroll.

Academic Procedures

Inactive status and readmission

Oakland University classifies inactive students into three categories that require reapplication or readmission. The categories are as follows:

1. Admitted applicants who do not enroll for the term in which they were admitted must apply for readmission to graduate study. If done within one year of the original admission term, no readmission fee is charged; thereafter, a new application, documentation, transcripts and application fee are required. Inactive files are destroyed after one year.

2. Students who have been admitted to a graduate program and have completed course work but subsequently have not enrolled at Oakland University for a period of one to five years must apply for readmission and pay the readmission fee. Readmission is not automatic. The readmission request is reviewed by the appropriate admissions committee and the Dean of Graduate Study. Each request is evaluated in terms of the six-year time limit for completing degree requirements, performance in course work and progress toward the degree. Students will 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.
3. Students who have not registered for an Oakland University graduate course for five years are considered inactive and their graduate folders are destroyed. Students who wish to take classes subsequently must follow the regular admission procedure. The student's Oakland University transcripts remain available in the Academic Records Office.

Transcripts

Academic records are maintained in the Academic Records Office, 102 O'Dowd Hall. Grade reports are mailed to each enrolled student's permanent 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 Academic Records Office or by writing to: Transcript Request, Office of the Registrar, Oakland University, Rochester, Michigan 48309-4401. Requests should include the name under which the student attended, the student's Oakland University student number, the date the student last attended and date of degree (if applicable), and the address to which the transcript is to be sent.

A check or money order for \$5 per transcript must accompany the request. Transcripts will not be issued for students who have delinquent indebtedness to the university or who are delinquent in repaying a National Direct Student Loan (NDSL), Perkins Loan or Nursing Student Loan (NSL).

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 Dean of Graduate Study, who will review the petition and notify students of any action taken. Petitions of Exception forms may be obtained in the Office of Graduate Study.

Restriction of student records

Students may not register for classes if their records have been restricted because they failed to pay fees, to submit complete application forms or to satisfy admission or retention conditions.

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 1993 may be used toward a degree only until the end of the fall 1999 semester. Time limits for doctoral programs will be found within the program descriptions.

Doctoral residency requirement

All doctoral programs have residency requirements. Students are advised to consult the appropriate section of this catalog which pertains to their particular degree program. All doctoral students are required to register for at least one credit of work every fall and winter semester after their admission to a program. In cases where the student has completed all of the formal course work for the degree, the student may register for doctoral or dissertation research.

Transfer credit

Students who are in good standing (not probationary or conditional) in a master's degree program and wish to transfer courses from other accredited U.S. 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 (500 level and above) with a grade of at least 3.0 (or B) and not be graded pass/fail, satisfactory/unsatisfactory or credit/non-credit; 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. In accordance with policies set by the Michigan Council of Graduate Deans, no more than one credit will be awarded per week of instruction. 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 have official transcripts of the work on file in the Office of Graduate Study. Transfer of credit applications are available in the Office of Graduate Study.

A maximum of 9 semester hours of credit is acceptable toward a graduate degree. 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 (400 level and above) taken as an Oakland University 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 Office of Graduate Study. (See also the joint baccalaureate/MBA degree program on page 97.)

Courses applied to an earlier graduate degree

Except in the case of the doctor of philosophy degree, where up to 32 credits from a previous master's degree may be applied, credit earned in one master's degree program cannot be used again in a second master's program.

However, course requirements in a second master's program may be satisfied by courses taken in an earlier master's program, provided that the credit was earned within the specified time limit. In this case, the student, in consultation with his/her adviser, must elect a substitute course as a replacement for the required course and file a Petition of Exception with the Office of Graduate Study.

Course competency credit

Competency examinations are offered by some departments and with the approval of the Dean of Graduate Study 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 Registration Office 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 Registration Office 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 filing an official withdrawal notice with the Registration Office. This may be done in person, by FAX, or by

certified mail. Information about each option is provided in greater detail in each term's *Schedule of Classes*. The withdrawal is recorded by the Registration Office and the amount of refund, excluding the non-refundable enrollment fee, is determined. If a refund is due, it will be mailed to the student. See grading policy, page 25.

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 University are expected to practice and uphold standards of academic integrity and honesty. Academic integrity means representing oneself and one's work honestly. Misrepresentation is cheating since it means students are claiming credit for ideas or work not actually theirs and are thereby seeking a grade that is not actually earned. Following are some examples of academic dishonesty:

1. Cheating on examinations. This includes using materials such as books and/or notes when not authorized by the instructor, copying from someone else's paper, helping someone else copy work, substituting another's work as one's own, theft of exam copies, or other forms of misconduct on exams.
2. Plagiarizing the work of others. Plagiarism is using someone else's work or ideas without giving that person credit; by doing this students are, in effect, claiming credit for someone else's thinking. Whether students have read or heard the information used, they must document the source of information. When dealing with 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 digest the source of information and produce it in the student's own words). Both direct quotations and paraphrases must be documented. Even if students rephrase, condense or select 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's ideas. Buying a paper and handing it in as one's own work is plagiarism.
3. Cheating on lab reports by falsifying data or submitting data not based on the student's own work.
4. Falsifying records or providing misinformation regarding one's credentials.
5. Unauthorized collaboration on computer assignments and unauthorized access to and use of computer programs, including modifying computer files created by others and representing that work as one's own.

Unless they specifically indicate otherwise, instructors expect individual, unaided work on homework assignments, exams, lab reports and computer exercises, and documentation of sources when used. If instructors assign a special project other than or in addition to exams, such as a research paper, or original essay or a book review, they intend that work to be completed for that course only. Students must not submit work completed for a course taken in the past or for a concurrent course unless they have explicit permission to do so.

Instructors are expected to maintain the following standards in the context of academic conduct:

1. To inform and instruct students about the procedures and standards of research and documentation required to complete work in a particular course or in the context of a particular discipline.
2. To take practical steps to prevent and detect cheating.

3. To report suspected academic misconduct to the Dean of Students, 144 Oakland Center, for consideration by the Academic Conduct Committee of the University Senate.
4. To present evidence of plagiarism, cheating on exams or lab reports, falsification of records, or other forms of academic conduct before the Academic Conduct Committee

Students are expected to maintain the following standards in the context of academic conduct:

1. To be aware of and practice the standards of honest scholarship.
2. To follow faculty instructions regarding exams and assignments to avoid inadvertent misrepresentation of work.
3. To be certain that special rules regarding documentation of term papers, examination procedures, use of computer-based information and programs, etc., are clearly understood.
4. To avoid the appearance of cheating.

If students believe that practices by the instructor are conducive to cheating, they may convey this message to the instructor, to the chairperson of the department, or to any member of the student/faculty Academic Conduct Committee (either directly or through the Office of the Dean of Students).

If academic misconduct is determined by the Academic Conduct Committee, the committee assesses penalties ranging from academic disciplinary reprimand, to academic probation, to suspension or expulsion (dismissal) from the university. All conduct records are maintained in the Office of the Dean of Students.

Dismissal from the university

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

Appeal procedures for dismissals and denial of admission

Responsibility for denial of admission of an applicant to a graduate degree or certificate program or dismissal of a student from a graduate program resides with the Dean of Graduate Study. The graduate dean, in deciding to deny admission or to dismiss a student, is guided by the recommendations of the faculty of the program involved.

Denial of admission

An applicant seeking an appeal must do so within 15 working days of the date of the denial letter and make such request in writing to the program department (chair, coordinator or admissions committee). The appeal must be based on new information not included in the original application or on extenuating circumstances not known to the department or to the Dean of Graduate Study at the time of the initial decision. Within 15 working days of receipt of the written appeal, the department will submit a recommendation to the graduate dean either to admit the applicant or to sustain the original denial. The Dean of Graduate Study shall review the recommendation and notify the student in writing of the final decision within 10 working days of the departmental recommendation. The graduate dean's decision is final.

Dismissal for academic performance

A student must formally request reconsideration from the program department (chair, coordinator or admissions committee) within three months of a notice of dismissal, with such request being submitted in writing and including the basis for the appeal, e.g., new supporting information and/or reference to violations of university procedures. Within 15 working days of receipt of the written appeal, the department must submit to the Dean of Graduate Study a

recommendation either to reinstate the student to the program (with or without conditions imposed) or to uphold the original dismissal. The graduate dean shall review the recommendation and notify the student in writing of the decision within 10 working days.

If the original dismissal is sustained, the student may submit a written request for an appointment with the Dean of Graduate Study to discuss the decision. After the meeting with the dean the student may submit a written request to the graduate dean to refer the matter to the chair of the Student Conduct Committee of the Graduate Council for a second review. Such referral shall be forwarded by the dean within five working days. The committee will conduct its review within the procedures established by the Graduate Council. A recommendation either to sustain the denial or to reinstate the student (with or without conditions imposed) shall be forwarded to the graduate dean. The dean may accept or reject the committee recommendation and a letter notifying the student of the dean's decision shall be forwarded to the student within five working days of receipt of the committee recommendation. The decision of the Dean of Graduate Study shall be final.

Credit system

The unit of credit is the semester hour. No graduate student may register for more than 12 credits in fall or winter semester, or 8 credits in spring or summer, without written authorization of his/her adviser.

Course numbering system

Courses numbered 100-299 are introductory or intermediate undergraduate courses and cannot be used toward graduate degrees. Courses numbered 300-499 are advanced courses primarily for undergraduates. Graduate students, with the approval of a departmental adviser, may use up to 12 credits of 400-499 courses taken at Oakland University toward a graduate degree. In interdisciplinary programs graduate students, with the approval of a departmental adviser, may use up to 12 credits of 300-499 courses taken at Oakland University toward a graduate degree. Courses numbered 500 and above are primarily for graduate students. Qualified undergraduates may enroll in courses 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 graduate degree, a student must have an overall 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, implemented 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 (one week in the spring and summer sessions) 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. The W (Withdraw) grade 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 the last day for withdrawal specified in the Schedule of Classes each term.
 - b. The I (Incomplete) grade is temporary and may be given only after the cut-off date for use of the "W" grade. It is used in the case of severe hardship beyond the control of a student that prevents him or her from completing course requirements.

Course work to remove an "I" grade must be completed during the first eight weeks of the next semester (fall or winter) for which the student registers unless a student-initiated extension is approved by the instructor and the graduate dean. If course requirements are not completed within one year and no semester has been registered for, the "I" grade shall become permanent. A student who wishes to receive an Incomplete grade in a course must present a Student Request for Incomplete (I) Grade form to the instructor by the day of the scheduled final examination. This form, which indicates the instructor's willingness or unwillingness to grant the "I" and the schedule he or she sets for completing the term's work, is available in department offices.

- c. The P (Progress) grade is a temporary grade that may be given only in a course that cannot be completed in one semester or session. Prior approval must be obtained from the appropriate committee on instruction and the Dean of Graduate Study 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 a permanent "I" which remains on the transcript. This rule does not apply to doctoral dissertation 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 and implies a non-passing grade of less than 3.00.
- 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. Regular tuition and fees apply to all courses.
4. All grades and marks assigned will appear on a student's transcript. However, only numerical grades are used in computing the student's grade point average.

Appeal of Grade

Students desiring to appeal a grade should first contact the instructor who issued the grade. If satisfaction is not received the student may further appeal, in turn, to the program coordinator, the department chair, the school dean and, finally, to the Dean of Graduate Study, whose decision is final.

Repeating courses

With the permission of the program area and the Dean of Graduate Study, 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. The student must file a "Repeat Course Form" at the time of registration for a course previously taken. Filing of this form is the responsibility of the student and will ensure that proper adjustments to grade point average and degree credits are made.

Master's thesis and doctoral dissertation

Three copies of the approved manuscript must be delivered to the Office of Graduate Study prior to the last day of classes of the term in which the student expects to graduate. Students must obtain a copy of the publication "A Guide to the Preparation of Graduate Dissertations/

Theses" from the Office of Graduate Study and make an appointment to assure that the manuscript conforms to university standards.

The university considers student theses and dissertations to be public statements of research findings. Therefore, students who submit such work in fulfillment of degree requirements shall be deemed to have consented to disclosure of the work.

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 \$30 processing fee either when registering for the last term or by the dates listed below. A candidate who does not graduate in that term must reapply. Students may not graduate in the semester or session in which they were admitted.

Expected term of graduation	Last date for applying for degree
Spring 1995	May 12, 1995
Summer 1995	July 7, 1995
Fall 1995	October 5, 1995
Winter 1996	February 2, 1996
Spring 1996	May 10, 1996
Summer 1996	July 12, 1996
Fall 1996	October 4, 1996
Winter 1997	February 7, 1997
Spring 1997	May 9, 1997
Summer 1997	July 11, 1997
Fall 1997	October 3, 1997

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.

Tuition and Fees

The Oakland University Board of Trustees reserves the right to change any and all tuition and fees when circumstances make such a change necessary. Tuition and fees quoted in this catalog are from the 1994-95 academic year. The *Schedule of Classes* for each semester or session carries a listing of current charges.

All fees are assessed at registration and are payable in U.S. dollars. Non-payment of fees may result in cancellation of registration. Checks returned by the bank also will place students in a non-payment status.

Application fee

A fee of \$30 must accompany an application for admission. This is a nonrefundable processing fee.

General service fee

All students who register are assessed a \$100 general service fee each term, of which \$48 is nonrefundable. In addition to funding the cost of registration and student records maintenance, this fee is also used to support such student services as the Oakland Center, Graham Health Center, athletics and maintenance of the parking lots, roads and walkways on campus.

Tuition

Tuition for each semester is assessed on the basis of the credit value of the course. One credit is the equivalent of one semester hour. On-campus graduate tuition for Michigan residents is \$178.50 per credit while nonresidents are assessed \$395 per credit. Some courses have additional special fees which are published in the class schedule for the term. All fees are subject to change by the Board of Trustees.

Course fee

A course fee of \$9 per credit hour (\$36 per 4 credit hour course) is charged for some specialized courses. See the current *Schedule of Classes* for a complete listing of applicable courses.

Student activities fees

Students who register for on-campus credits are charged an activities fee of \$15.

Late registration fee

Students registering during the late registration period must pay an additional nonrefundable late registration fee of \$35. Students who take courses exclusively within a program scheduled to register after the beginning of classes will not be required to pay this fee if they register during the special registration session scheduled for such groups. Tuition checks returned by the bank will be considered as nonpayment and may result in cancellation.

Course competency by examination fee

Students who register for degree credit by course competency examination will be assessed \$50 per credit. Consult page 22 for information on the use of competency credit.

Late add fee

Registered students who add classes after the end of the second week of classes (first week for spring and summer sessions) must pay a nonrefundable fee of \$10 per class in addition to the cost of the credits added. Classes may not be added after the end of the third week of a semester (seventh day for spring and summer sessions and half-semester courses).

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 \$10 per billing. Balances due paid by checks that are returned by the bank are considered nonpayment and will result in assessment of a \$15 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 1994-95 rate for room and board is \$4,030 for the academic year. Special options such as the Wellness Hall, the Scholar's Tower, the 24-hour quiet floor, the upper-division hall and a limited number of single rooms are available to graduate students. Residence halls contracts signed before or during the fall semester are binding for both the fall and winter semesters. If the contract is signed during the winter semester or the spring and summer sessions, it is binding for the single semester or session only. If a student withdraws from the university, housing funds are refunded on a prorated basis.

For students with families, a limited number of apartments are available on campus. These apartments are a two-bedroom townhouse style. The 1994-95 rate for apartment rent is \$485/month plus utilities. A lease is typically for a one-year period.

Applications for both residence halls and apartment-style housing may be picked up in the residence halls office or you may mail requests to: Residence Halls Office, Oakland University, 448 Hamlin Hall, Rochester, Michigan 48309-4401.

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. Failure to drop or withdraw formally will result in forfeiture of any refund. Graduate students dropping courses or withdrawing from the university must apply to the Registration Office. The refund percent available on the date withdrawal is filed 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 also be given to the residence halls office.

Out-of-state tuition regulations

Students enrolling at Oakland University shall be classified as in-state or out-of-state students for purposes of assessing tuition charges. It is the student's responsibility to register each semester or session under the proper in-state or out-of-state classification. For the purpose of these regulations, an in-state student shall be defined as one of the following:

1. A person who has a lawful Michigan domicile and has lived in Michigan six (6) months immediately preceding his or her enrollment, where "enrollment" means the earlier of either the day fees are due and payable or the first class meeting; or
2. A person who was domiciled and resided in Michigan for a consecutive period of at least five years, who subsequently left the state for a period no longer than one year, and has returned and established a Michigan domicile and resides in the state.

A student who was originally classified as an out-of-state student may be reclassified as an in-state student only if he or she has been a bona fide domiciliary of Michigan for at least six (6) consecutive months. A student shall not be considered a bona fide domiciliary of Michigan unless he or she has continuous physical presence in Michigan and intends to make Michigan a permanent home, not only while in attendance as a student at the university, but indefinitely thereafter.

An alien who has been lawfully admitted for permanent residence in the United States shall be treated for classification purposes as if he or she were a citizen of the United States. An alien who is present in the United States on a student visa shall not be eligible for classification as an in-state student, regardless of length of stay in Michigan, except that this disqualification shall not be automatic in the case of a person on a lawful student visa whose parent(s) are simultaneously resident in the state on a visa other than a student visa. In this latter instance and in the case of an alien lawfully present in the United States on any other non-immigrant visa, the determination of classification shall be made on a case-by-case basis by the President or designee after the six-month durational requirement has been met, taking into consideration the appropriate enumerated factors in the following paragraph.

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 of residency status" from the Office of Academic Affairs, 205 Wilson Hall. The student shall complete the application and list in detail the reason(s) he or she is a bona fide domiciliary of Michigan, and attach documentary data in support thereof, and return the application to the Office of Academic Affairs within 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 for reclassification after the six-month durational requirement has been met:

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 relatives or persons legally responsible for the student.
4. Maintenance of significant connections within Michigan while temporarily absent from the state and a continued intent to retain Michigan as a domicile.
5. Ownership of a home.
6. Long-term military commitments in Michigan.
7. Acceptance of offer of permanent employment in Michigan.
8. In the case of aliens on temporary non-student visas, length of stay in Michigan and sources of economic support.

9. 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 under these regulations:

1. Voting or registration 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, including birth and marriage certificates.

Any student desiring to challenge his or her classification under the foregoing regulations of the Board of Trustees shall have the right to appeal the determination. Petitions of Appeal and inquiries regarding these out-of-state tuition regulations should be addressed to: Chairman, Out-of-State Tuition Committee, Office of Academic Affairs, 205 Wilson Hall, Oakland University, Rochester, Michigan 48309-4401.

Financial Aid, Assistantships and Scholarships

Financial Aid

The purpose of the financial aid program at Oakland University is to help pay the educational costs of qualified students who do not have sufficient funds to attend school. The program is operated under the assumption that the primary responsibility for financing a college education rests with students and their families. Aid offered by the university supplements, but does not replace, funds provided by students and their families.

In order to assist eligible graduate students in financing their education, the university participates in the following programs: the Perkins Loan program, the Federal College Work Study program, and the William Ford Federal Direct Loan Program.

Financial Aid Application Procedures

Students wishing to apply for financial aid should complete a Free Application for Federal Student Aid (FAFSA) as soon as possible after January 1 and mail it for processing. In addition, applicants must file with the Financial Aid Office an Oakland University Application for Financial Aid and a copy of their most recent Federal Income Tax Form 1040. Additional details concerning the application process are listed on the Oakland University Application for Financial Aid, which is available from the Financial Aid Office, 161 North Foundation Hall.

Federal Financial Aid Programs

Perkins Loan: The Perkins Loan is a low interest (5 percent) loan to assist students in meeting their educational expenses. A student must demonstrate financial need and must be a U.S. citizen or an eligible non-citizen to be eligible for a loan.

College Work Study: The College Work Study Program provides jobs for students who wish to work to earn money to assist in meeting their educational expenses. To be eligible for employment through the work study program, a student must demonstrate financial need and must be a U.S. citizen or an eligible non-citizen.

William D. Ford Federal Direct Loan: The Ford Federal Direct Loan Program is designed to provide loans to assist students in meeting their educational expenses. Loans are made by Oakland University to eligible students. Students interested in obtaining this loan must first complete the financial aid application process.

Part-time employment

On-campus jobs of varying kinds and durations are provided for students registered at least half-time 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 posts 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 and fees are available on a competitive basis. Both assistantship and scholarship nominations are made by the individual departments offering graduate programs. To be eligible, students may not be in a conditional admission or probationary status. 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 Dean of Graduate Study.

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 \$1,200 to cover their expenses until the end of the first month.

Extremely well-qualified students are invited to apply to the Department of Chemistry for consideration for the Bennett Scholarship in Chemistry. 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.

Graduate students who may be physically challenged and confined to a wheelchair may apply to the Steven R. and Leah P. Vartanian Endowment Scholarship fund for financial assistance. Applicants for admission to Oakland University who wish to be considered for this scholarship should file a scholarship application with the Office of Graduate Study prior to April 1.

Additional scholarships and fellowships are available to qualified students through the Martin Luther King, Jr./Cesar Chavez/Rosa Park Future Faculty Program which is a joint venture between the State of Michigan and Oakland University. Its primary purpose is to increase the pool of minority candidates pursuing academic careers in postsecondary education in Michigan. Interested students may obtain additional information from the Office of Graduate Study.

Graduate assistantship time limit policy

Master's degree students may be supported by Office of Graduate Study funds for a maximum of two years; for doctoral students the limit is five years. In no case may a student be supported from this fund source for more than a total of five years.

COLLEGE OF ARTS AND SCIENCES

Acting Dean: David J. Downing

Acting Associate Deans: Jacqueline R. Scherer and Michael D. Sevilla

The Doctor of Philosophy in Biomedical Sciences

Biomedical Sciences Doctoral Program Committee: Michael D. Sevilla, chair; Frank M. Butterworth, Professor of Biological Sciences; Arthur W. Bull, Associate Professor of Chemistry; Abraham Liboff, Professor of Physics

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

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

Two specialization committees, appointed by the Dean of Graduate Study on recommendations from the chairs of the 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 dissertation adviser, will be chosen by the specialization committee and the student in question and approved by the Dean of Graduate Study. The student's dissertation adviser will be chairperson of the committee. The committee is charged with the guidance of the student in course selection, review of dissertation 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 demonstrate 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: 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 comprehensive written examination may consist of a single examination or a series of examinations. 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 within one year. 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. All theses/dissertations must conform to university standards (see "master's thesis and doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

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

Chair: Egbert W. Henry

Professor emeritus:

William C. Forbes, Ph.D., University of Connecticut, Ed. D., Columbia University

Professors:

Frank M. Butterworth, Ph.D., Northwestern University
George J. Gamboa, Ph.D., University of Kansas
Esther M. Goudsmit, Ph.D., University of Michigan
Egbert W. Henry, Ph.D., The City University of New York
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
John R. Reddan, Ph.D., University of Vermont
Nalin J. Unakar, Ph.D., Brown University

Associate professors:

Keith A. Berven, Ph.D., University of Maryland
John D. Cowlshaw, Ph.D., Pennsylvania State University
Sheldon R. Gordon, Ph.D., University of Vermont
Thaddeus A. Grudzien, Jr., Ph.D., Virginia Polytechnic Institute and State University
Feona M. Hansen-Smith, Ph.D., Medical College of Wisconsin
Satish K. Walia, Ph.D., Maharshi Dayanand University
Jon A. Yates, Ph.D., Tulane University

Adjunct professors:

Tom Madhavan, M.D., University of Madra (India)
Donald A. McCrimmon, Ph.D., North Carolina State University
M. Dave Poulik, M.D., University of Toronto Medical School
James R. Wells, Ph.D., Ohio State University

Adjunct assistant professors:

Stan A. Beyler, Ph.D., University of Illinois
Naomi Eliezer, Ph.D., Hebrew University (Jerusalem)
Gerard R. Joswiak, Ph.D., Wayne State University

Consulting professor:

Julius Rutzky, M.D., New York University School of Medicine

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 in biology 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 the GPA 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 stipulation that the deficiencies will be corrected. Applicants must send, together with their application, a biographical sketch stating career goals and provide transcripts of all college-level work, two letters of reference and scores on the Graduate Record Examination (both the general and biology subject test scores) to the Office of Graduate Study.

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 four areas (developmental biology-morphology, biochemistry-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, physics, mathematics, psychology, education, and environmental science.

During the first semester the candidate must choose a thesis adviser with whom he or she will plan and conduct the thesis research. The adviser and candidate will then select a thesis committee. A thesis proposal and a thesis are required for both tracks. The thesis proposal must be approved by the thesis committee and the department graduate committee before the end of the student's second semester. When completed the thesis must also be approved by both committees before it can be submitted to the Dean of Graduate Study for approval. All theses/dissertations must conform to university standards (see "master's thesis and doctoral dissertation" section in the *Policies and Procedures* section of this catalog). Students of both tracks must attend department seminars each semester. All M.S. students are required to enroll in BIO 691 and present a departmental seminar on their thesis work prior to graduation.

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, parasitology, molecular biology, 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, darkrooms, x-ray facilities, herbarium collection, greenhouse, animal facilities, coldrooms, tissue culture rooms, environmental growth chambers and gene cloning facilities. Available equipment includes scintillation and gamma counters, field sampling and testing equipment, recording spectrophotometers, amino acid analyzer, clinical, high speed and ultracentrifuges, high speed cine camera and motion analyzer, two VAX time-sharing computers, a densitometer, an oxygraph, a Coulter Counter, marine aquaria, telethermometers, autoclaves, high performance liquid chromatograph, gas chromatograph, mass spectrometer, DNA synthesizer, DNA polymerase chain reaction apparatus, DNA sequencing equipment and software, and various types of 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 400-level courses recommended to the student by the departmental graduate committee may carry graduate level credit if the courses are not used to redress undergraduate deficiencies.

BIO 501 Physiology and Pathophysiology I (4)

Application of physiological principles to pathological and clinical alterations in the nervous and respiratory systems.

Prerequisites: BIO 207 or BIO 321.

BIO 502 Physiology and Pathophysiology II (4)

Application of physiological principles to pathological and clinical alterations in the cardiovascular, renal, gastrointestinal and endocrine systems.

Prerequisite: BIO 501.

BIO 503 Gross Anatomical Dissection (3)

Human gross anatomy as it relates to the practice of anesthesiology. Includes a laboratory with cadaver dissection.

Prerequisites: BIO 501, 502.

Corequisite: NRS 635.

BIO 507 Cellular Biochemistry (4)

Advanced discussion on cellular control mechanisms emphasizing recent developments in the biochemistry of proteins and nucleic acids.

Prerequisite: BIO 325, CHM 204, and PHY 102.

BIO 508 Cellular Biochemistry Laboratory (1)

Modern research techniques: chromatography (paper, column, thin layers, etc.) electrophoresis, immunoelectrophoresis, ultracentrifugation and cell fractionation, isolation and density gradient analysis of the nucleic acids, etc. To accompany BIO 507.

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 521 Medical Microbiology (4)

Bacterial and viral human pathogens, emphasizing their etiology, physiology, pathogenesis, epidemiology, control and diagnosis.

Prerequisite: BIO 111.

BIO 522 Medical Microbiology Laboratory (2)

Basic skills of handling pathogenic bacteria and their diagnosis.

Prerequisite: BIO 521 or permission of instructor.

BIO 523 Immunology (3)

The human immune system. Topics include antigens, antibodies, immunophysiology, serology, immunochemistry, immunobiology, immunogenetics, hypersensitivity, immunities to infectious agents and disorders of the immune system.

Prerequisite: BIO 207 or BIO 321.

BIO 541 Microbial Biotechnology (4)

Microbial genetics, emphasizing the basic aspects of bacteriophage and plasmid genetics applied to biotechnology.

Prerequisite: BIO 341 or BIO 319 or permission of instructor.

BIO 545 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 546 Ultrastructure Laboratory (2)

To accompany BIO 545.

BIO 563 Cell Biology (4)

Prerequisite: BIO 305 and permission of instructor.

BIO 565 Medical Parasitology and Mycology (3)

An introduction to the medically important mycotic, protozoal and helminthic parasites; morphology, biology, life cycles, clinical manifestations, pathogenesis, immunology, epidemiology and control.

Prerequisite: BIO 111, 113. Recommended: BIO 207 or 321.

BIO 566 Medical Parasitology Laboratory (1)

Laboratory methods for identification of the medically important protozoan and helminthic parasites.

Corequisite: BIO 565.

BIO 581 Topics in Physiological Ecology (3)

Physiological responses of individual organisms and populations to their environment including plant/animal interactions, growth, regulation of internal environment, desert adaptations, bioenergetics and chemical ecology.

Prerequisite: One course in ecology or physiology.

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 or permission of instructor.

BIO 601 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 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 691 Thesis Seminar (1)

A departmental seminar by M.S. candidates on their thesis research. The seminar is normally presented the last semester of graduate study.

DEPARTMENT OF CHEMISTRY

Chair: Paul Tomboulia

Professors emeriti:

Steven R. Miller, Ph.D., Massachusetts Institute of Technology
Lewis N. Pino, Ph.D., University of Buffalo

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
Tadeusz Malinski, Ph.D., University of Poznan (Poland)
Joel W. Russell, Ph.D., University of California (Berkeley)
Michael D. Sevilla, Ph.D., University of Washington
R. Craig Taylor, Ph.D., Princeton University
Paul Tomboulia, Ph.D., University of Illinois

Associate professors:

Maria Bryant, Ph.D., University of Wroclaw (Poland)
Arthur W. Bull, Ph.D., Wayne State University
Julien Gendell, Ph.D., University of Nebraska (Lincoln)
Kathleen H. Moore, Ph.D., Wayne State University
Mark W. Severson, Ph.D., University of Minnesota
Robert L. Stern, Ph.D., Johns Hopkins University

Adjunct professors:

Donald MacArthur, Ph.D., McMaster University (Ontario)
Parbury P. Schmidt, Ph.D., University of Michigan

Adjunct associate professors:

David Becker, Ph.D., University of Washington
Fazlul H. Sarkar, Ph.D., Banaras University (India)
Cynthia L. Sevilla, Ph.D., University of Washington

Adjunct assistant professors:

Janet Bennett, Ph.D., Oakland University
Gerald Compton, M.S., Oakland University
Naomi Eliezer, Ph.D., Hebrew University (Jerusalem)

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

Coordinator: Mark W. Severson

The College of Arts and Sciences offers a doctoral degree in biomedical sciences 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 dissertation 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 (CHM 685) and nine credits of advanced course work related to the dissertation topic are required. Attendance at departmental seminars (CHM 400 and 685) is required.

For information on admission criteria, procedures and general degree requirements see page 32.

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, pharmacology, toxicology, 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 and seminar components 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 (including general, organic, physical, analytical and inorganic chemistry), 8 credits in calculus 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 a degree from a regionally accredited institution.

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 24 credits must be in chemistry. Of these 24 credits, 16 to 18 must be from four of the following areas: biochemistry (or approved biology courses), inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry and analytical chemistry. At least 8 credits must be in CHM 690. Participation in departmental seminars (CHM 400) is required. The candidate must have demonstrated accomplishment in research and must complete a thesis approved by a depart-

mental thesis committee before receiving the degree. All theses/dissertations must conform to university standards (see "master's thesis and doctoral dissertation" section in the *Policies and Procedures* section of this catalog). 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

The current research activities of the staff include high-resolution infrared spectroscopy, photochemistry of natural products, biochemistry, immunochemistry, bioelectrochemistry, electron spin resonance of solid-state and biological systems, quantum mechanical models, hydrogen bonding, molecular metals, molecular structure and dynamics, limnological chemistry, ultra-trace analysis, theoretical quantum mechanics, non-equilibrium statistical mechanics, organophosphorus chemistry, coordination chemistry, electrochemistry conductive polymers, biosensors, trace environmental analyses and environmental modeling.

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.

CHM 427 Electrochemistry (3)

Selected topics in synthetic, structural and physical-organic chemistry.
Prerequisite: CHM 235.

CHM 432 Advanced Organic Chemistry (3)

Selected topics in synthetic, structural and physical-organic chemistry.
Prerequisite: CHM 235.

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 MTH 254.

CHM 453 Biochemistry I (3)

First course in a comprehensive biochemistry sequence. Structure and function of proteins, carbohydrates and lipids; enzyme mechanisms, kinetics and regulation; bioenergetics and catabolism. Identical with BCM 453.
Prerequisite: CHM 235.

CHM 454 Biochemistry II (3)

Metabolic pathways and control; nucleic acid structure, function and processing, including regulation of gene expression. Selected topics in molecular physiology. Identical with BCM 454.
Prerequisite: CHM/BCM 453.

CHM 457 Biochemistry Laboratory (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/BCM 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 235.

CHM 472 Physical Chemistry of Macromolecules (3)

The molecular principles governing the physical behavior of macromolecules in solution and in the glassy and crystalline states. The mechanical behavior and structure of macromolecules.

Prerequisite: CHM 471 and CHM 343 or instructor's permission.

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.

Prerequisite: Permission of instructor.

CHM 521 Advanced Analytical Chemistry (3)

Detailed treatment of theory and applications of modern analytical methods.

Prerequisite: CHM 426.

CHM 522 Topics in Analytical Chemistry (3)

Selected subjects chosen from current analytical chemical areas, such as separation methods, instrumentation and electrochemistry. May be repeated for credit.

Prerequisite: CHM 426.

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. May be repeated for credit.
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. May be repeated for credit.
Prerequisite: CHM 343.

CHM 553 Advanced Biochemistry (3)

Detailed treatment of aspects of biochemistry.
Prerequisite: CHM/BCM 454.

CHM 554 Topics in Biochemistry (3)

Selected subjects drawn from the current fields of interest, such as immunochemistry, biotechnology and molecular biology. May be repeated for credit.
Prerequisite: CHM/BCM 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. May be repeated for credit.
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/BCM 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. For doctoral students only. Graded S/U.

CHM 690 Graduate Research (1, 2, 3, 4, 5, 6 or 8)

Prerequisite: Admission to regular graduate status and permission of department. Graded S/U.

CHM 799 Doctoral Research in Chemistry (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12)

Prerequisite: Approval of dissertation topic and 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 toxodynamic phases; dose-effect relationships; factors influencing toxicity. Environmental partitioning, pathways, transformations and fate.
Prerequisite: BIO 111, BIO 113; CHM 235; biochemistry desirable.

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 111, BIO 113; CHM 234.

DEPARTMENT OF ENGLISH

Chair: Joan G. Rosen

Distinguished professor emerita:

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

Professors emeriti:

Thomas Fitzsimmons, M.A., Columbia University

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

Professors:

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

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

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

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

Associate professors:

Natalie B. Cole, Ph.D., SUNY at Buffalo

Brian A. Connery, Ph.D., University of Arizona

Kevin T. Grimm, Ph.D., University of Virginia

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

Nigel Hampton, Ph.D., University of Connecticut

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

Edward Haworth Hoeftner, Ph.D., University of Iowa

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

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

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

Mary A. Papazian, Ph.D., University of California (Los Angeles)

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

Assistant professors:

Philip Gould, Ph.D., University of Wisconsin (Madison)

Niels Herold, Ph.D., University of California (Berkeley)

The Department of English offers a program leading to the degree of Master of Arts in English.

Admission

Admission to the department's advanced degree program 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 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 12 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. 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.

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 (36 credits) are required, beginning with the three courses comprising *The Literary Studies Core*: 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). The remaining six courses, chosen in consultation with an adviser, must include two 600-level seminars, or a 600-level seminar and ENG 690, the Master's Project. Completion of *The Literary Studies Core* must occur before a student is considered for candidacy and is a prerequisite for all 600-level English courses. 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.

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-level course offerings or, in rare cases, from 400-level courses exclusive of 498 and 499. This option exists primarily to prepare students for seminars in areas of language and literature for which they are not adequately trained. No undergraduate writing courses may be applied to the graduate program. 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 because they prepare the student for the more specialized work of the seminars. (ENG 500, 510 and 534 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. Completion of *The Literary Studies Core* is a prerequisite for enrollment in a 600-level course. Seminars are limited to 12 students. ENG 690, The Master's Project (optional), involves completion of a project of a 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 prior to the beginning of the semester in which they will complete the project.

4. Summer workshops

Concentrated four-week workshops on literature, language, writing and other topics of interest to high school teachers and post-baccalaureate students are offered in the summer session. They are designed as refresher courses or as introductions to topics of particular contemporary concern. Workshops grant one to four hours of graduate credit. Students may not offer more than 4 credits of workshops 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 workshops.

When there is significant change in content, graduate courses may be repeated with permission of the chair of the Graduate Program Committee.

Cognate courses

Students in the M.A. program may, with written approval of the chairperson of the Graduate Program 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 **The Teaching of Literature and Composition (4)**
Focus on pedagogy, emphasizing practical applications to literature, language or composition.

ENG 515 **Summer Workshop (1 to 4)**
Concentrated four-week workshops on literature, language, writing, and other topics of interest to high school teachers and post-baccalaureate students. See listing above on "Summer Workshops."

ENG 533 **Critical Theory and Practice (4)**
Introduction to critical methodology, emphasizing practical applications. 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.

SEMINARS (Prerequisite: Completion of The Literary Studies Core)

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 680 **Children's Literature Project (4)**
Restricted to qualified students in the Children's Literature minor specialization for Ph.D. in Reading. Prerequisite: Permission of instructor.

ENG 690 **The Master's Project (4)**
Completion of a modest project of a scholarly or pedagogical nature proposed by the degree candidate. Prerequisite: Permission of the Graduate Program Committee.

DEPARTMENT OF HISTORY

Chair: *Ronald C. Finucane*

Distinguished professor emeritus:

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

Professors emeriti:

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

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

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

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

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

Associate professor emeritus:

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

Professors:

John Barnard, Ph.D., University of Chicago

Ronald C. Finucane, Ph.D., Stanford University

Mary C. Karasch, Ph.D., University of Wisconsin (Madison)

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

Associate professors:

Linda Benson, Ph.D., University of Leeds

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

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

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

Assistant professors:

L. Jane Graham, Ph.D., Johns Hopkins University

Karen A.J. Miller, Ph.D., Columbia University

Sean Farrell Moran, Ph.D., American University

Geoffrey D.W. Wawro, Ph.D., Yale University

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

Admission to the Master of Arts program in history is selective. 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. A one page statement of purpose or justification for entering the graduate program, and evidence of mastery of scholarly research techniques in history (such as the submission of a research paper or the completion of an undergraduate history seminar or history research course), are required as part of the application. An undergraduate major in history is not an absolute requirement for admission, but a significant number of undergraduate history courses—for example, a history minor or its equivalent—should appear on the applicant's records.

A grade point average of 3.20 (on a 4.00 scale) in undergraduate history courses and a GPA of 3.00 in all undergraduate work will ordinarily be considered the minimum standards for admission. Students of superior promise but with deficient preparation in history may be admitted on condition of completing additional undergraduate history courses or earning grades of 3.00 or above in each of the first two graduate history courses, or both. The department reserves the right to waive any of its requirements in exceptional circumstances with the concurrence of the Dean of Graduate Study.

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), or two research tutorials (HST 681), or one of each, 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, 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 research seminars or tutorials 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. All theses/dissertations must conform to university standards (see "master's thesis and doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

Candidates who do not elect to offer a thesis will fulfill all the requirements listed above; they must take at least 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 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 505 The History of American Mass Media (4)

The establishment and growth of mass communication in the United States, focusing on the development of print, film, radio and television and their impact on society and popular culture.

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 English conquest of the continent; the American Revolution; and the establishment of national government under the U.S. Constitution.

- HST 510 The Young Republic and the Age of Jackson, 1787-1850 (4)**
Covers the political, economic and social development of the new nation, with emphasis on American commercial and territorial expansion, social protest and sectionalism.
- 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, 1928-1945 (4)**
A history of the Great Depression and World War II. Topics will include the One Hundred Days, the foundation of the modern welfare state, the foundation of the modern civil rights movement, the reorganization of American corporate enterprise, and the role of the United States in international peacekeeping.
- HST 516 The American Mind to 1861 (4)**
American thought from the colonial period to the Civil War, emphasizing Puritanism, evangelical religion, the Enlightenment, republicanism, democracy, and sectional conflict.
- HST 517 The American Mind since 1861 (4)**
Major intellectual trends in the United States from the Civil War to the 1970s, including the conflict between nationalism and localism, the impact of evolutionism, and responses to the challenges of modernity, inequality, global involvement, and war.
- 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 History of American Foreign Relations 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 African American History (4)**
The economic, social, and political activities, status, organizations and institutions of African-American people, emphasizing the twentieth century.
- HST 524 Ancient Greece and Rome (4)**
An overview of the various intellectual, political and cultural legacies of ancient Greece and Rome, ranging in aspect from Homeric warfare, the mysteries of Dionysus and Delphi, Platonic and Aristotelian inquiry, Hellenic artistic ideals and Athenian democracy, to Roman legalism and jurisprudence, ideologies of imperial political control and Christianity.
- 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 Reformation (4)**
European humanism, with emphasis on the Lowlands, France and Germany; the background, development and impact of the Protestant Reformation.
- 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 530 England, 1066-1485 (4)**
Emphasizes the history of England between the Conquest and the Tudors, including cultural and social trends as well as political and dynastic developments and conflicts, domestic and foreign.
- HST 534 Victorian and Edwardian Britain (4)**
Political, cultural and intellectual life of Britain from 1815 to 1911.
- HST 535 Twentieth Century Britain (4)**
An analysis of British political, cultural, and social history from the era of World War I to the present.
- HST 536 The History of Ireland (4)**
A history of Ireland from ancient Ireland to the present. Emphasis will be placed on the development of indigenous institutions and cultures and their roles in the development of an independent state.
- HST 539 History of Women: Modern Europe (4)**
Women in the family, society and culture of preindustrial Europe; changing economic and social roles for women in the nineteenth century; rise of feminism; women and war, socialism, fascism and the welfare state in the twentieth century.
- HST 541 Europe since 1914 (4)**
An analysis of Europe in world perspective since World War I.
- HST 543 Germany since 1740 (4)**
German politics, society and diplomacy from Frederick the Great to the present.
- HST 544 Modern Italy: National Unification and the 20th Century (4)**
An examination stressing political and institutional history, of early efforts to create Italian national unity, the means by which Italy was held together following unification of 1861, and the fate of the Republic from 1946 onward.
- HST 545 France since 1789 (4)**
French politics, society and international relations from the Great Revolution to the present.
- 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 547 The French Revolution (4)**
Survey of the revolutionary era in France beginning with the reign of Louis XVI (1774) and ending with the Battle of Waterloo (1815). Course will examine the origins, development and impact of the French Revolution with an emphasis on topics in political and cultural history.
- 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 regime* 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 European Thought and Ideology, 1797 to Present (4)

A topical and thematic history of modern European thought and ideology: romanticism; liberalism and progress; science and technology; socialism; conservatism, pessimism, and the "revolt against reason"; fin de siècle culture; the effects of the Great War; fascism, genocide and totalitarianism; religious and existentialist thought.

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 561 History of American Families (4)

History of American families as social institutions emphasizing the impact of historical events and trends upon family composition, family functions and family life. Includes research in the student's personal family history.

HST 562 History of African American Women (4)

Covers the collective and individual experiences of African American women from slavery to the present, including the quality of family life, economic roles, and their activities in women's, civil rights and political organizations.

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 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 573 China's Last Dynasty: The Qing, 1644-1911 (4)

History of China's last great dynasty, from its founding by the Manchus in 1644, through its powerful early emperors, to its collapse in 1911. Course includes discussion of traditional Chinese culture and institutions, territorial expansion, the Opium Wars and the 19th century revolutionary movement.

HST 574 China in Revolution, 1911-1949 (4)

China's 20th century revolutionary experience, focusing on the 1911, 1928 and 1949 revolutions. Topics include the struggle between China's two revolutionary parties, the Nationalists and Communists; social change under the young republic; World War II in Asia; and the civil war which brought the Chinese Communist party to power in 1949.

HST 576 Contemporary China: The People's Republic from 1949 to the Present (4)

History of contemporary China from the 1949 revolution to the present, focusing on major social and political issues facing the Chinese Communist Party and attempted solutions. Topics include economic development, political and social change and the 1980's era of reform.

HST 581 History of India (4)

The evolution of politics, social structure and the economy of India, from early Hindu Kingdoms through Muslim conquests and British colonialism to the era of independence since 1947.

HST 584 Modern Environmental History (4)

Global depletion of natural resources since 1500, in relation to European empires and modern world economy; the environmental implications of America's global interests; the tension between economic development and damage to major ecosystems.

HST 585 Kinship and Kingdoms in Historic Africa (4)

A social and political history of Africa from ancient to modern times (c. 3100 B.C.-1900 A.D.). Particular societies and states from different eras and regions provide foci for the study of specific ethnic and national histories.

HST 586 African History Since 1900 (4)

A socio-cultural and political history of 20th-century Africa, focusing particularly on social change, nationalist leaders and constructive critics in such modern nations as Ghana, Senegal, Kenya and Tanzania.

HST 587 History of Southern Africa (4)

A regional introduction to historical trends in the development of ethnic conflicts, economic classes, political ideologies and family relationships in southern Africa since 1500, with special emphasis on such trends during the development of apartheid in South Africa since 1948.

HST 588 Cultural History of Africa to 1900 (4)

A cultural history of Africa prior to 1900, with special reference to ancient Egypt, medieval Mali and different nineteenth-century nations in tropical Africa. African systems of religious thought and artistic expression are analyzed, both specifically and generally, in historic context.

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 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.

HST 681 Research Tutorial (4)

Directed individual research leading to the writing of a scholarly paper of substantial length. May be repeated for credit.

DEPARTMENT OF LINGUISTICS

Chair: Peter J. Binkert

Professors emeriti:

Don R. Iodice (French and Linguistics), M.A.T., Yale University
William Schwab (Linguistics and English), Ph.D., University of Wisconsin

Professor:

Peter J. Binkert (Linguistics and Classics), Ph.D., University of Michigan

Associate professors:

Daniel H. Fullmer (Linguistics and English), Ph.D., University of Michigan
Michael B. Smith (Linguistics), Ph.D., University of California (San Diego)

Assistant professor:

Richard G. Campbell, Ph.D., University of California (Los Angeles)

Associated faculty professors:

Carlo Coppola (Modern Languages and Literature, Linguistics), Ph.D., University of Chicago
Donald C. Hildum (Rhetoric, Communications and Journalism, Linguistics),
Ph.D., Harvard University
Alice S. Horning (Rhetoric, Communications and Journalism, Linguistics),
Ph.D., Michigan State 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 teaching language arts or to teaching English to 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 to the Office of Graduate Study 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 must 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 of proficiency); or 2) have completed two semesters of studying the structures of particular languages, one Indo-European, and one non-Indo-European (LIN 410).

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. All theses/dissertations must conform to university standards (see "master's thesis and doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

When graduate courses are cross listed with undergraduate courses, graduate students will be required to complete additional work at the graduate level, usually an essay or a project decided in conjunction with the professor.

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 610 Contrastive Analysis
- 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
- LIN 404 Syntactic Theory
- or LIN 604 Advanced Syntax
- Two (2) electives

Course Offerings

APPLIED LANGUAGE STUDIES

ALS 420 Linguistics and Reading (4)

Linguistic description and analysis of the process of getting meaning from print. The course will review competing linguistic models of the reading process and insights from first and second language acquisition, psycholinguistics, reading disorders and studies in writing.
Prerequisite: LIN 301 or 501.

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

Approaches, methods and techniques of teaching pronunciation, grammar and vocabulary. The use of language tests and laboratory techniques.
Prerequisite: LIN 301 or 501.

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: LIN 301 or 501.

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.

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: LIN 501 or one course in psychology.

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: LIN 501 or one course in psychology.

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: LIN 501 or one course in biology.

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: LIN 501 or one course in biology.

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: LIN 501 or one course in anthropology.

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: LIN 501 or one course in anthropology.

ALS 575 Language and 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: LIN 501 or one course in anthropology.

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: LIN 501 or one course in sociology.

LINGUISTICS

LIN 401 Phonetic Theory (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.
Prerequisite: LIN 301 or 501.

LIN 403 Phonological Theory (4)

Theory and application of phonological analysis, with emphasis on original work.
Prerequisite: LIN 301 or 501.

LIN 404 Syntactic Theory (4)

Theory and application of morphological and syntactic analysis, with emphasis on original work.
Prerequisite: LIN 301 or 501.

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 or 501.

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 or 501.

LIN 480 Seminar in Linguistics (4)

Topics and problems selected by the instructor.
Prerequisite: LIN 301 or 501.

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 515 Computer Parsing of Natural Language (4)

An examination of the syntactic and semantic properties of natural language and a survey of the techniques for computer parsing. Student projects in the computer analysis of language.

Prerequisite: LIN 115 or ALS 176 and CSE 130.

LIN 580 Proseminar in Linguistics (4)

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

Prerequisite: LIN 501.

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 615 Problems in Computational Linguistics (4)

Directed research projects on special topics in computational linguistics.

Prerequisite: Permission of instructor.

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

Chair: James H. McKay

Professors emeriti:

Harvey J. Arnold, Ph.D., Princeton University
John W. Dettman, Ph.D., Carnegie Institute of Technology
George F. Feeman, Ph.D., Lehigh University
William C. Hoffman, Ph.D., University of California (Los Angeles)
G. Philip Johnson, Ph.D., University of Minnesota
Donald G. Malm, Ph.D., Brown University

Professors:

Kevin T. Andrews, Ph.D., University of Illinois
Louis R. Bragg, Ph.D., University of Wisconsin
Baruch Cahlon, Ph.D., Tel Aviv University
Charles Ching-an Cheng, Ph.D., Rutgers University
J. Curtis Chipman, Ph.D., Dartmouth College
Jerrold W. Grossman, Ph.D., Massachusetts Institute of Technology
James H. McKay, Ph.D., University of Washington
Louis J. Nachman, Ph.D., Ohio State University
Subbaiah Perla, Ph.D., University of Rochester
Darrell P. Schmidt, Ph.D., Montana State University
Irwin E. Schochetman, Ph.D., University of Maryland
Meir Shillor, Ph.D., Hebrew University
Sze-kai Tsui, Ph.D., University of Pennsylvania
J. Barry Turett, Ph.D., University of Illinois
Stuart S. Wang, Ph.D., Cornell University
Stephen J. Wright, Ph.D., Indiana University

Associate professors:

David J. Downing, Ph.D., University of Iowa
Jon Froemke, Ph.D., University of California (Berkeley)
Ravindra Khatree, Ph.D., University of Pittsburgh
Devadatta Kulkarni, Ph.D., Purdue University
Robert Kushler, Ph.D., University of Michigan
Peter Shi, Ph.D., University of Delaware
Winson Taam, Ph.D., University of Wisconsin

Assistant professors:

Theophilus Ogunyemi, Ph.D., Kansas State University
Guohua Pan, Ph.D., Ohio State University
Ananda Sen, Ph.D., University of Wisconsin

Visiting assistant professors:

Sandra Reuben Kingan, Ph.D., Louisiana State University
Stephen Mellendorf, Ph.D., University of Wisconsin

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

The Department of Mathematical Sciences offers programs leading to the degrees of Master of Arts in mathematics, Master of Science in industrial 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 Mathematics

The program leading to the degree of Master of Arts in mathematics provides students with a sound theoretical knowledge of modern mathematical sciences and ample opportunity to learn something of the applications of the mathematical sciences, the construction of mathematical models and the art of problem solving. The program is designed to serve those who wish to enter a Ph.D. program in mathematical sciences or to teach in secondary schools or community colleges.

Admission

Admission is selective. The requirements for regular admission into the program include a baccalaureate from an accredited institution with a 3.00 grade point average. Exceptions to this requirement may be made if evidence of the capacity for graduate study is provided. Normally the mathematical preparation requires at least 30 semester credits in undergraduate mathematics including calculus, multivariable calculus, linear algebra and differential equations. Students who have not had an undergraduate course in abstract algebra or advanced calculus may be required to complete one or both of these courses as a prerequisite to regular admission.

Requirements for the degree

Candidates for the Master of Arts in mathematics will need 36 credits of graduate work. In general, they will take at least seven 4-credit courses in mathematical sciences, arranged by the department's Committee on Graduate Programs, and up to two approved electives outside of mathematical sciences. Among the courses arranged by the Department of Mathematical Sciences there must be included 4 credits in directed reading and research (MTH 590, APM 590 or MTS 590) either in mathematics or in an interdisciplinary area involving mathematics. Candidates must prepare a written report based on this reading and research. Each candidate must take a 4-credit course in analysis (MTS 517 or MTH 551) and a 4-credit course in abstract algebra (MTH 571).

In addition to these requirements, each candidate must pass a combined written and oral examination, which is devised by a candidate's committee appointed by the Committee on Graduate Programs. Details on the format of this exam can be obtained from the department's graduate coordinator.

The Master of Science in Industrial Applied Mathematics

The primary goal of this program is to provide the appropriate mathematical knowledge and experience for persons seeking positions in industry. The program focuses on those mathematical theories and techniques which are applicable in the industrial setting. Emphasis is on the construction of mathematical models of industrial problems and on the mathematical tools that can be applied to such models. Courses required for the program are offered in the late afternoon or evening to accommodate the part-time student. Assistantships for students wishing to enroll full time are available on a competitive basis.

Admission

Admission is selective. 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. The successful candidate's background should include courses in multivariable calculus, linear algebra and differential equations, and a knowledge of at least one high-level scientific programming language such as Pascal, Fortran, C or PL/I. Students admitted without some aspects of the required background will be expected to remedy the deficiency before enrolling in many of the courses of the program.

Requirements for the degree

To fulfill the requirements for a Master of Science degree in industrial applied mathematics a student must have successfully completed, with at least a 2.5 in each course and an overall grade point average of 3.00 or better, a 36-credit program consisting of:

1. Six 4-credit courses that satisfy the following conditions:
 - i. At least one course from APM 533 and APM 534.
 - ii. One course from MOR 558 and APM 585.
 - iii. At most one course in statistics from STA 427 and courses numbered STA 522 or higher.
 - iv. The remaining courses, in this six-course requirement, from MOR 554, APM 557, APM 566 and APM 634.
2. A 4-credit project course APM 595. The student should contact the graduate coordinator for information about the procedures to be followed.
3. Elective courses to complete the 36-credit requirement. These are courses in a related area that must be approved by the graduate coordinator. Generally, these courses will be engineering, statistics, computer science, applied mathematics or operations research. A student who has not completed a course in advanced calculus may be required to complete such a course as one of these elective courses.

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 in the program, in addition to a basic theoretical foundation, include design of experiments, regression analysis, discrete data, statistical computing, statistical process control, non-parametric, multivariate, reliability, sample survey and time series methodology. All applied 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; internships with industry are also available.

Admission

Admission is selective. 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 should also have some scientific computing training.

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. STA 513 and STA 514 are required unless the student has completed the equivalent course before admission. Students with the necessary mathematics background are encouraged to complete the STA 513-514 sequence in their first year in order to satisfy prerequisites for more advanced courses. The set of elective courses not labeled STA must also be approved by the student's adviser.
3. Have not included more than six credits of STA 590.
4. Have demonstrated competence in applying statistical methods and theory in the solution of a practical problem or problems. This requirement is administered by the Committee on Graduate Programs.

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, development 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 504 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

Three courses (STA 501, 502, 503) each count as two credits toward the M.S. degree. Other STA courses numbered 504 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 Master of Science in applied statistics can apply for admission to that program and complete the additional credits needed for that degree in two calendar years as a part-time student or in one calendar year as a full-time student.

Course Offerings

Courses are listed and grouped according to the following designations: MTH—mathematics; APM—applied mathematics; STA—statistics; MTS—mathematics for teachers; MOR—operations research.

MATHEMATICS

MTH 405 Special Topics (2 or 4)
Advanced study of some topic in mathematics. May be taken more than once.
Prerequisite: Permission of the instructor.

MTH 415 Foundations of Mathematics: Mathematical Logic and Set Theory (4)
An 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.
Prerequisite: MTH 302.

MTH 453 Advanced Calculus II (4)
Improper integrals, derivatives and integrals in n -dimensional Euclidean space, implicit and inverse function theorems, differential geometry and vector calculus, Fourier series.
Prerequisite: MTH 351.

MTH 461 General Topology (4)
A study of topological spaces and continuous functions. Separation and countability properties, connectedness, compactness and local properties.
Prerequisite: MTH 302.

MTH 465 Differential Geometry (4)
Theory of curves and surfaces in Euclidean space with an introduction to the theory of matrix Lie groups.
Prerequisite: MTH 453.

MTH 475 Abstract Algebra (4)
Groups, subgroups, cosets, homomorphisms; rings and ideals, integral domains; field and field extensions. Applications.
Prerequisite: MTH 302.

MTH 505 Special Topics (2 or 4)
Study of some topics in mathematics. May be taken more than once.
Prerequisite: Permission of the graduate coordinator.

MTH 551 Real Analysis (4)
Lebesgue measure, measurable functions and the Lebesgue integral; convergence theorems; monotone functions, bounded variation and absolute continuity. The L_p spaces; product measures and Fubini's theorem; the Radon-Nikodym theorem.
Prerequisite: MTH 351.

MTH 555 Complex Analysis (4)
Analytic functions and the Cauchy-Riemann equations. Cauchy Integral Theorem, Cauchy integral formula, argument principle, Rouché's theorem. Taylor and Laurent series. Singularities and residues. Conformal mapping.
Prerequisites: MTH 351 and MTH 352 is recommended.

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.
Prerequisite: MTH 461 or permission 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.
Prerequisite: MTH 475 or permission of the instructor.

MTH 590 Directed Reading and Research (2 or 4)

Prerequisite: Permission of the graduate coordinator.

MTH 651 Functional Analysis (4)

Metric spaces, category, compactness. Banach, Hilbert and Sobolev spaces. The Hahn-Banach theorem, open mapping theorem and Banach-Steinhaus theorem. Weak and weak* topologies. Elementary operator and spectral theory.

Prerequisites: MTH 551 and MTH 555.

APPLIED MATHEMATICS**APM 407 Mathematics for Engineering (4)**

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

Prerequisite: MTH 155.

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.

Prerequisites: APM 257 and MTH 351.

APM 505 Special Topics (2 or 4)

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

Prerequisite: Permission of the instructor.

APM 533 Numerical Methods (4)

Approximations and interpolations, propagation of errors, numerical differentiation and integration, solutions of equations, Newton's method, solutions of differential equations and initial value problems, Runge-Kutta and predictor-corrector methods. Credit will not be granted for both APM 533 and CSE 517.

Prerequisites: MTH 256, APM 257 and knowledge of a scientific programming language, or permission of the instructor.

APM 534 Applied Numerical Methods: Matrix Methods (4)

Systems of linear equations, Gaussian elimination, LU factorization, successive overrelaxation, approximation theory, curve fitting, eigenvalue problems, iterative techniques and non-linear systems of equations, some aspects of boundary value problems and introduction to numerical solutions of partial differential equations. Credit will not be granted for both APM 534 and CSE 518.

Prerequisites: MTH 254, MTH 256 and knowledge of a scientific programming language, or permission of the instructor.

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.

Prerequisites: MTH 254, MTH 256 and APM 257.

APM 542 Mathematical Analysis for Engineers II (4)

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

Prerequisite: APM 541.

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.

Prerequisites: APM 257 and MTH 351.

APM 557 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.

Prerequisites: APM 257 and MTH 351.

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.

Prerequisites: MTH 256 and APM 263.

APM 565 Differential Geometry (4)

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

Prerequisite: MTH 351.

APM 566 Computational Geometry (4)

A detailed study of the differential geometry of curves and surfaces in Euclidean 3-space, an introduction to several mathematical models for computer representation of curves and surfaces, and the use of the geometry of these models in computer-aided design and manufacturing systems.

Prerequisites: MTH 254 and MTH 256.

APM 567 Algorithms and Complexity (4)

A general introduction to algorithm design and analysis, including study of the following algorithmic techniques: divide-and-conquer, greedy methods, backtracking, preconditioning and precomputation, probabilistic and approximation algorithms. Topics covered also include: the fast Fourier transform, lower bound theory, reduction and NP-completeness.

Prerequisite: APM 263 and knowledge of data structures.

APM 569 Graph Theory and Applications (4)

A selected view of advanced topics in graph theory and their applications. Topics drawn from: paths, connectivity, Euler tours, Hamilton cycles, trees, matchings and coverings, vertex and edge colorings, planarity and its generalizations, Ramsey theory and extremal theory, graphical enumeration, random graphs, network flows, graphs and groups, graph algorithms.

Prerequisite: APM 563.

APM 577 Computer Algebra (4)

A study of the mathematics and algorithms which are used in symbolic algebraic manipulation packages such as MACSYMA, REDUCE, Maple, SCRATCHPAD and muMATH. Includes computer representation of symbolic mathematics, polynomial ring theory, field theory and algebraic extensions, modular and p-adic methods, subresultant algorithm for polynomial GCD's, Groebner bases for polynomial ideals and Buchberger's algorithm, factorization and zeros of polynomials, closed form solutions of systems of polynomial equations, applications to computational geometry and automatic geometric theorem proving, introduction to formal integration and analytic solutions to differential equations.

Prerequisites: MTH 256 and knowledge of a scientific programming language or permission of the instructor.

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.

Prerequisite: APM 263.

APM 585 Mathematical Modeling of Industrial Problems (4)

Modeling of selected industrial problems with emphasis on model formulation and properties.

Prerequisite: Permission of the instructor.

APM 590 Directed Reading and Research (2 or 4)

Prerequisite: Permission of the graduate coordinator.

APM 595 Master of Science Research Project (4)

This is the project course for the Master of Science in Industrial Applied Mathematics. It involves independent research under the supervision of an approved adviser, the preparation of a detailed report on the research and a presentation to a group of faculty members selected by the Committee on Graduate Programs.

Prerequisite: Permission of the graduate coordinator.

APM 634 Numerical Methods for Partial Differential Equations (4)

A study of major numerical techniques used to solve initial and boundary value problems for partial differential equations. Includes finite difference schemes, Rayleigh-Ritz and Galerkin methods, projection and steepest descent methods and finite element methods. The stability, efficiency and convergence of such methods will be considered as well as their implementation.
Prerequisite: APM 533 and APM 557.

APM 664 Combinatorial Optimization (4)

A survey of algorithmic solutions to combinatorial optimization problems. Topics drawn from: network flows, path problems, matching and covering problems, matroids, spanning trees, dynamic programming, and scheduling problems.
Prerequisites: APM 563 or permission of the instructor.

APM 673 Coding Theory (4)

Linear codes, non-linear codes, B.C.H. codes, dual codes and their weight distribution, perfect codes and cyclic codes. Additional topics drawn from Reed-Solomon codes, Justesen codes, M.D.S. codes, Reed-Muller codes, Golay codes, self-dual codes and invariant theory.
Prerequisites: MTH 571.

STATISTICS**STA 501 Statistical Methods in Research and Production (2 or 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. This course counts two credits toward the M.S. in applied statistics.
Corequisite: A first course in calculus.

STA 502 Applied Regression Analysis (2 or 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. This course counts two credits toward the M.S. in Applied Statistics.
Prerequisite: STA 501 or permission of the instructor.

STA 503 Design and Analysis of Industrial Experiments (2 or 4)

Planning of experiments; completely randomized, randomized block, Latin squares and incomplete block designs; factorial experiments, confounding, blocking, fractional factorial experiments, surface fitting designs. This course counts two credits toward the M.S. in Applied Statistics.
Prerequisite: STA 501 or permission of the instructor.

STA 504 Discrete Data Analysis (4)

Models for count data, goodness of fit statistics, association and agreement measures, matched samples, ordinal variables, association in multidimensional tables, loglinear and logit models.
Prerequisite: STA 502 or STA 503 or permission of the instructor.

STA 505 Special Topics (2 or 4)

Study of some topics in statistics. May be taken more than once.
Prerequisite: Permission of the instructor.

STA 506 Statistical Computing (4)

Floating point calculations, approximating probabilities and quantiles, random number generation for simulation, variation analysis, computational linear algebra, methods for linear models, simulated annealing, optimization and methods for nonlinear models, static and dynamic graphical methods for data analysis, and presentation graphics. (This is not a course in how to use statistical packages.)
Corequisites: One or more of STA 513, STA 502, STA 503 or permission of the instructor, and knowledge of a programming language.

STA 513-514 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.
Prerequisite: MTH 254, MTH 256 and STA 501; or permission of the instructor.

STA 515 Elements of Stochastic Processes (4)

Random walk models, Markov chains and processes, birth and death processes, queuing processes, diffusion processes and non-Markov processes.
Prerequisite: STA 513. APM 257 recommended.

STA 522 Statistical Process Control (4)

Process control charts for measurement and count data, including Shewhart, CUSUM and EWMA charts; multivariate methods; economic design issues; process capability analysis; process variation studies; analysis of means; evolutionary operation.
Corequisites: STA 513 or STA 502 or STA 503 or permission of the instructor.

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.
Corequisites: STA 514 and either STA 502 or STA 503, or permission of the instructor.

STA 526 Nonparametric Methods (4)

Exploratory data analysis, rank tests for location and scale, power of competing tests, confidence intervals, nonparametric analysis of variance methods.
Corequisites: STA 513 or STA 502 or STA 503 or permission of the instructor.

STA 527 Linear Statistical Models (4)

General linear model, multivariate normal, regression and design models, variance components.
Corequisites: STA 514 and either STA 502 or STA 503, or permission of the instructor.

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.
Corequisite: STA 514 or permission of the instructor.

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.
Prerequisite: STA 501 or permission of the instructor.

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.
Corequisite: STA 514 or permission of the instructor.

STA 590 Directed Reading and Research (2 or 4)

Prerequisite: Permission of the graduate coordinator.

STA 595 Statistical Consulting (2 or 4)

Prerequisite: Permission of the graduate coordinator.

STA 603 Advanced Design of Experiments (4)

Introduction to response surface methodology; graduating functions; least squares for response surface work; the use of steepest ascent to achieve process improvement; fitting second order models; adequacy of estimation and the use of transformations; exploration of maxima and ridge systems with second order response surfaces; links between empirical and theoretical models; response surface methods in parameter design.
Prerequisites: STA 502 and STA 503.

MATHEMATICS FOR TEACHERS**MTS 505 Special Topics (2 or 4)**

Study of some topics in mathematics. May be taken more than once.
Prerequisite: Permission of the instructor.

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.

Prerequisite: Permission of the instructor.

MTS 514 Concepts in Abstract Algebra (4)

Includes topics from groups, rings, fields, matrices, linear transformations and vector spaces.

Prerequisite: MTH 256.

MTS 517 Concepts in Analysis I (4)

Includes a study of real and complex numbers, functions, limits, differentiation, integration and infinite series, with emphasis on careful proofs of theorems.

Prerequisites: MTH 254 and MTH 256.

MTS 518 Concepts in Analysis II (4)

Improper integrals, derivatives and integrals in n -dimensional Euclidean space, implicit and inverse function theorems, differential geometry and vector calculus, Fourier series.

Prerequisite: MTS 517

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

Prerequisite: Permission of the graduate coordinator.

MTS 614 History of Mathematics (4)

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

Prerequisite: MTH 351 or MTS 514 or MTS 517.

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.

Prerequisite: MTH 351 or MTS 514 or MTS 517, or permission of the instructor.

MTS 620 Concepts of Geometry (4)

Development of elementary Euclidean geometry from an advanced standpoint; introduction to and basic properties of non-Euclidean geometry.

Prerequisite: MTH 256 or permission of the instructor.

The distribution of random variables, conditional probability and stochastic independence, special distributions and functions of random variables.

Prerequisites: MTH 254, MTH 256 and STA 226 or permission of the instructor.

MTS 635 Introduction to Numerical Analysis I (4)

Approximations and interpolations, propagation of errors, numerical differentiation and integration, solutions of equations, Newton's method, solutions of differential equations and initial value problems, Runge-Kutta and predictor-corrector methods.

Prerequisites: MTH 256, APM 257 and knowledge of a scientific programming language, or permission of the instructor.

MTS 636 Introduction to Numerical Analysis II (4)

Systems of linear equations, Gaussian elimination, LU factorization, successive overrelaxation, approximation theory, curve fitting, eigenvalue problems, iterative techniques and non-linear systems of equations, some aspects of boundary value problems and introduction to numerical solutions of partial differential equations.

Prerequisites: MTH 254, MTH 256 and knowledge of a scientific programming language, or permission of the instructor.

MTS 638 Experimental Design (4)

Planning of experiments; completely randomized, randomized block, Latin squares and incomplete block designs; factorial experiments, confounding, blocking, fractional factorial experiments, surface fitting designs.

Prerequisite: STA 501, STA 226 or permission of the instructor.

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.

Prerequisites: MTH 256 and APM 263.

MTS 672 Number Theory (4)

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

Prerequisite: MTH 155.

OPERATIONS RESEARCH**MOR 554 Mathematical Programming (4)**

Linear, integer, nonlinear and dynamic programming. Particular topics include the simplex method, duality theory, the dual simplex method, sensitivity analysis, special problem classes, total unimodularity, branch and bound techniques, unconstrained optimization, first and second order conditions, quadratic programming, separable convex programming, sequential decision process, principle of optimality, forward and backward recursion.

Prerequisites: MTH 254 and MTH 256 or permission of the instructor.

MOR 558 Mathematical Modeling in Industry: Oper. Research Models (4)

Models will be drawn from linear, integer, nonlinear and dynamic programming, stochastic processes, queuing theory, Markov chains, decision analysis, network theory and scheduling theory. Topics will vary but particular applications may include production planning and inventory control, capacity expansion, equipment replacement, optimal routing, project management, flowshop and job-shop scheduling, Markov decision models, game theory and control theory.

Prerequisite: MOR 554 or permission of the instructor.

MOR 590 Directed Reading and Research (2 or 4)

Prerequisite: Permission of the graduate coordinator.

DEPARTMENT OF MUSIC, THEATRE AND DANCE

Chair: Karl Boelter

Professors emeriti:

Adeline G. Hirschfeld-Medalia, Ph.D., Wayne State University
Stanley Hollingsworth, B.Mus., Curtis Institute of Music
and Fellow of the American Academy of Rome

Professors:

David Daniels, Ph.D., University of Iowa
Carol Halsted, Ed.D., Wayne State University
Flavio Varani, M.M., Manhattan School of Music

Associate professors:

Susan Barrett, M.A., Texas Tech University
Karl Boelter, D.M.A., University of Michigan
John Douras, M.M., Northwestern University and D.Litt. (Honorary), Alma College
Laurie Eisenhower, M.F.A., Arizona State University
Robert Facko, Ed.D., Columbia University
Michael Gillespie, Ph.D., Stanford University
John-Paul White, Dipl., Curtis Institute of Music

Assistant professors:

Lettie Beckon Alston, D.M.A., University of Michigan
Gregory Patterson, M.F.A., University of Michigan
Karen Sheridan, M.F.A., Goodman School of Drama, DePaul University
Jacqueline Wiggins, Ed.D., University of Illinois

Visiting assistant professors:

Karen Wachsmuth, D.M.A., University of Colorado

Adjunct assistant professors:

Joyce Adelson, B.M., Eastman School of Music
Janice Albright, B.Mus.Ed., Indiana University
Edith Diggory, D.M.A., Indiana University

Lecturers:

Joyce Adelson, Janice Albright, Glenn Andersen, April Arabian-Tini, Carolyn Bybee,
William Cable, Scott Petersen, Linda Speck

Applied music instructors:

Joyce Adelson (piano), Janice Albright (voice), Keith Claeys (percussion), Douglas Cornelien (clarinet), Frederic DeHaven (organ), Edith Diggory (voice), Kirkland Ferris (bassoon), Paul Finkbeiner (jazz trumpet), Beth Gilford (recorder), John Hall (classical guitar, jazz guitar), Rebecca Hammond (oboe), Maxim Janowsky (double bass), Kenneth Kellett (jazz double bass), Ronald Kischuk (trombone), Daniel Maslanka (jazz percussion), Scott Petersen (jazz saxophone), Alayne Rever (saxophone), Elizabeth Rowin (violin, viola), Robert Sherman (tuba), Gordon Simmons (trumpet), James Tatum (jazz piano), Flavio Varani (piano), John-Paul White (voice), Jeffery Zook (flute), David Wilson (accompanist)

Chief adviser:

David Daniels

The Master of Music

The Master of Music (M.M.) 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. The Master of Music program is undergoing revision during 1995. Changes to the requirements and descriptions herein will be available from the department. Please consult the department's *Graduate Handbook* for details.

Professional certification

Professional teaching certification requires 18 credits in a planned program. Any Master of Music program may be used for this purpose, or the student may develop with an adviser an individualized program, subject to the approval of the Graduate Committee. Twelve of the 18 credits must be taken at Oakland University; 6-8 credits must be in "core" courses. Non-core courses taken for such an individualized program will not necessarily be accepted toward the Master of Music degree. Grades below 3.0 will not count towards professional certification.

The State of Michigan requires that students who have not had RDG 338 or the equivalent as undergraduates must take RDG 538 in order to achieve professional certification. This may be included in the 18-credit planned program or the 36-credit Master of Music degree. (However, this course is not required for renewal of certification.)

Admission

After application materials have been filed with the Office of Graduate Study, each student will be sent a questionnaire and will be scheduled for an audition. The departmental Curriculum Committee may require 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. 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 resumes of professional experience.
3. The entrance audition or, if appropriate, a portfolio of compositions.

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 twelve credits are completed. Progress reports may be solicited from the student's primary instructor. These reports, as well as the total grade point average, will be considered in the review. 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	Introduction to Music Bibliography (2)
MUS 521-522	Seminar in Music Literature (8)
MUT 530	Graduate Seminar in Theory and Analysis (4)
MUS 600	Graduate Seminar (2)

Major concentration (16 credits)

Concentrations are offered in the following areas:

Piano Performance	Music Education
Piano Pedagogy	Vocal Performance
Instrumental or Choral Conducting	
Composition	

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

The requirements for each concentration are stated in the department's *Graduate 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 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 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.

Project or recital

Students offering a project or recital to culminate their programs should secure approval from the departmental Curriculum Committee before the beginning of the semester in which the work will take place. A project committee will be selected for each student. 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)	MUA 509	Oboe (2)
MUA 501	Piano (2)	MUA 510	Clarinet (2)
MUA 502	Organ (2)	MUA 511	Bassoon (2)
MUA 503	Harpsichord (2)	MUA 512	French Horn (2)
MUA 504	Violin (2)	MUA 513	Trumpet (2)
MUA 505	Viola (2)	MUA 514	Trombone (2)
MUA 506	Violoncello (2)	MUA 515	Tuba (2)
MUA 507	Double Bass (2)	MUA 516	Timpani (2)
MUA 508	Flute (2)	MUA 517	Percussion (2)

MUA 518	Harp (2)	MUA 531	Guitar (Jazz) (2)
MUA 519	Guitar (Classical) (2)	MUA 532	Trumpet (Jazz) (2)
MUA 522	Lute (2)	MUA 533	Saxophone (Jazz) (2)
MUA 523	Recorder (2)	MUA 534	Percussion (Jazz) (2)
MUA 524	Saxophone (2)	MUA 535	Double Bass (Jazz) (2)
MUA 530	Piano (Jazz) (2)		

MUA 601 Master's Recital (2)

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 (0 or 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 (0 or 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 (0 or 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 or 4)

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 503 The School Choral Program (2)

Principles and practices for organizing and running a successful choral program in elementary school, middle school and high school: e.g., recruiting, criteria for selection of repertoire, performance and management techniques. Emphasis on developing musical understanding through the performance experience. One hour per week field experience is required.

MUS 504 Seminar in Secondary Instrumental Materials and Methods (2)

Provides practical information related to the teaching of middle school and high school instrumental music: e.g., teaching strategies, repertoire, materials and techniques. Emphasis on developing musical understanding through the performance experience. One hour per week field experience is required.

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 541 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 551 Applied Music (1)

Independent study for graduate students in the technique and literature of a performing medium. Offered spring and summer terms.

Prerequisite: Permission of department.

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. May be repeated for a total of 6 credits.

MUS 580 Advanced Choral Interpretation and Conducting Techniques (2)

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

MUS 581 Advanced Instrumental Interpretation and Conducting Techniques (2)

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.

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. May be repeated for credit.

MUS 599 Independent Study (2 or 4)

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: Permission of instructor.

MUS 640 Piano Master Class (1 or 2)

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 or 4)

Independent or group research in music education methods, measurement and curriculum.

Prerequisite: Approval of an adviser and the departmental graduate committee.

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 or 4)

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

DEPARTMENT OF PHYSICS

Chair: Norman Tepley

Professors emeriti:

Ralph C. Mobley, Ph.D., University of Wisconsin
Paul A. Tipler, Ph.D., University of Illinois
John M. McKinley, Ph.D., University of Illinois
Robert M. Williamson, Ph.D., University of Wisconsin

Professors:

Beverly Berger, Ph.D., University of Maryland
Michael J. Chopp, Ph.D., New York University
Abraham R. Liboff, Ph.D., New York University
Norman Tepley, Ph.D., Massachusetts Institute of Technology

Associate professors:

Andrei Slavin, Ph.D., Leningrad Technical University
Gopalan Srinivasan, Ph.D., Indian Institute of Technology
William D. Wallace, Ph.D., Wayne State University

Assistant professors:

David Garfinkle, Ph.D., University of Chicago
Uma Devi Venkateswaran, Ph.D., University of Missouri
Yang Xia, Ph.D., Massey University (New Zealand)

Adjunct professors of physics:

Carl Bleil, Ph.D., University of Oklahoma
Adrian Kantrowitz, M.D., Long Island College of Medicine
Paul D. Stein, M.D., University of Cincinnati

Adjunct assistant professors of physics:

Jack E. Juni, M.D., University of Michigan
Robert Knight, Ph.D., Oakland University
Bryan P. Shumaker, M.D., Michigan State University

Adjunct professors of medical physics:

Sou-Tung Chiu-Tsao, Ph.D., State University of New York at Stony Brook
Peter M. Corry, Ph.D., University of Texas
Howard J. Dworkin, M.D., Albany Medical College
Jae Ho Kim, M.D., Kyungpook University
Harold Portnoy, M.D., Wayne State University
K.M.A. Welch, M.D., University of Bristol

Adjunct associate professors of medical physics:

Kenneth Koral, Ph.D., Case Western Reserve University
S.D. Nathanson, M.D., University of Witwatersrand (South Africa)
Joseph S. Rosenshein, Ph.D., Massachusetts Institute of Technology
Joe P. Windham, Ph.D., University of Cincinnati

Adjunct assistant professors of medical physics:

Elwood P. Armour, Ph.D., University of Texas
Elsa R. Beck, Ph.D., Colorado State University
Stephen Brown, Ph.D., University of Toronto
James R. Ewing, Ph.D., Oakland University
Yong J. Lee, Ph.D., University of Illinois

Adjunct instructor of medical physics:

Ray Carlson, M.S., Wayne State University

The Doctor of Philosophy in Biomedical Sciences: Medical Physics

Coordinator: Abraham R. Liboff

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 university. 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 31, hospitals participating in this program may provide support for qualified students. Interested students should consult the program coordinator for details.

Required areas of proficiency

Within 12 months after entering the program, each student must demonstrate proficiency at the intermediate undergraduate level in the following areas: modern physics (PHY 371); physical chemistry (CHM 343); and at least three of the following: computer sciences (CIS 327), statistics (STA 226), differential equations (APM 257), electronics (PHY 341, 347), electricity and magnetism (PHY 381), and physiology (BIO 321). Proficiency may be demonstrated through previous course work or special examinations. Students may satisfy proficiency requirements by completion with a grade of 3.0 or higher in the appropriate courses listed above.

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 theoretical physics would typically be established by taking several of the following courses: PHY 472, 482, 522, 552 and 562. Courses used to satisfy the mathematical methods area might include: STA 425, 427, or 501 and APM 533, 534. The biophysical sciences area proficiencies could be met by taking: BIO 401, CHM 234, 235, and 342, PHY 525 and 726. Laboratory proficiency may be satisfied by laboratory courses or by research.

For further information on admission criteria and general degree requirements for the biomedical sciences Ph.D. programs, see page 32.

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 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 biophysicists have 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 biomagnetism, 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 condensed matter physics group has been studying surface physics effects, silicon and germanium crystal growth, and the physics of high pressures. The theoretical group has been concerned with nuclear structure studies, magnetic materials, extragalactic radiation sources and general relativity and cosmology.

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, array, 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 10 GHz, 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. Among research facilities in neighboring hospitals available to medical physics students are 3.9 Tesla whole-body NMR systems for imaging and spectroscopy, a seven-channel SQUID neuromagnetometer, 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 and numerous 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 158 and PHY 371. Also PHY 331 or permission of instructor.

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 401 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 545 Nuclear Magnetic Resonance (4)
Basic principles, imaging techniques, in vivo spectroscopy.
Prerequisite: Permission of the instructor.

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 553 Numerical Methods in Theoretical Physics

Numerical differentiation and integration. Numerical solution of linear, transcendental and differential equations. Numerical modeling and data analysis. Accuracy and stability of algorithms.

Prerequisite: PHY 552 and knowledge of a scientific programming language (FORTRAN preferred).

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 615 Ethics and Law in Science and Engineering

The purpose of this course is to provide graduate students in the sciences and engineering with an awareness of the current activities and discussions related to the legal and ethical conduct of modern day science. This course will consist of lectures and seminars which will examine a number of specific topic areas, such as constitutional rights and protections, the U.S. and Michigan court systems, fundamental theories of contract, rights and responsibilities, conflict of interest (real and apparent), scientific fraud and misconduct, and patent rights.

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 micro dosimetry 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

Chair: William A. Macauley

Director of master of public administration program: John S. Klemanski

Professors:

- Sheldon Appleton, Ph.D., University of Minnesota
- * Thomas W. Casstevens, Ph.D., Michigan State University
- Robert J. Goldstein, Ph.D., University of Chicago
- Vincent B. Khapoya, Ph.D., University of Denver
- James R. Ozinga, Ph.D., Michigan State University
- * Carl R. Vann, Ph.D., Syracuse University

Associate professors:

- * John S. Klemanski, Ph.D., Wayne State University
- * William A. Macauley, Ph.D., University of Houston
- * C. Michelle Piskulich, Ph.D., State University of New York (Binghamton)

Assistant professors:

- * Emmett Lombard, Ph.D., Colorado State University
- * Dale Nesbary, Ph.D., Northeastern University
- * J. Patrick Piskulich, Ph.D., State University of New York (Binghamton)
- Susan L. Thomas, Ph.D., University of California (Riverside)
- Martha T. Zingo, Ph.D., University of Maryland (College Park)

Adjunct assistant professors:

- * Henry Bowers, M.A., University of Detroit
- * Rebecca Chapman, Ed.D., Wayne State University
- * Gerald W. Hall, M.P.A., Wayne State University
- * Robert Mourning, J.D., University of Michigan
- * Anthony R. Tersigni, Ed.D., Western Michigan University

*Participants in the public administration program

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

Graduate adviser: John S. Klemanski

Director of internships: J. Patrick Piskulich

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 directed 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. Conditional admission status may be granted to students who need minor improvements to their records, subject to approval by the Dean of 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. Principles of micro and macro economics
3. Principles of 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. All required courses are offered during weekday evenings. 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. All of these courses must be taken at Oakland University unless prior departmental written permission is obtained.

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
		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 12 credits of 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, students may take core courses and electives as follows:

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

Academic progress

Although credit for completion of a course in the M.P.A. program will be given for grades of 2.0 or above, the minimum satisfactory grade for graduate work is 3.0. A student's academic progress is monitored by the director of the M.P.A. program. If a student receives a grade for any M.P.A. course below 3.0, an **academic warning** letter is sent to the student. With a second grade below a 3.0, the student receives written notification that he or she is on **academic probation**. A student placed on probation may be required to meet new standards to remain in the M.P.A. program. With a third grade below a 3.0, the student is notified in writing that he or she is **subject to dismissal** pending a review of the student's entire record by the M.P.A. director and the Dean of Graduate Study. Regardless of their standing, all M.P.A. students are encouraged to consult with their individual instructors and the M.P.A. academic adviser concerning their academic progress.

Concentrations in Public Personnel Administration; Health Care Administration; Nonprofit Organization and Management; or Local Government Management

In addition to the 24 credits in the core curriculum, a student may take all 12 of his or her elective credits in either public personnel administration, health care administration, nonprofit organization and management or local government management. Such a focus in one of these concentrations can provide the student with those special skills necessary to cope with the many changes occurring in these dynamic fields.

The courses making up the Public Personnel concentration include at least:

PA 548	Administrative Ethics
PA 603	Contemporary Public Management Techniques
PA 632	Public Sector Collective Bargaining
PA 633	Workshop in Fair Employment Practices
PA 638	Public Sector Employee Relations
PA 644	Current Issues in Public Personnel Administration

The courses making up the Health Care concentration include at least:

PA 548	Administrative Ethics
PA 559	Public Policy and Health Care
PA 568	Health Planning: Policies and Processes
PA 569	Organization and Administration of Health and Medical Care Programs
PA 603	Contemporary Public Management Techniques
PA 610	Strategic Planning

The courses making up the Nonprofit Organization and Management concentration include at least:

PA 510	Nonprofit Organization and Management
PA 511	Fundraising and Philanthropy
PA 548	Administrative Ethics
PA 603	Contemporary Public Management Techniques
PA 610	Strategic Planning
PA 631	Grants: Politics and Administration

The courses making up the Local Government Management concentration include at least:

PA 503	Intergovernmental Relations
PA 542	Administrative Law: Local Perspectives
PA 548	Administrative Ethics
PA 603	Contemporary Public Management Techniques
PA 610	Strategic Planning
PA 630	Local Government Management
PA 631	Grants: Politics and Administration
PA 634	Risk Management
PA 669	Community Planning and Zoning

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 three courses in the program without formal admission to the program; to proceed further in the course sequence requires admission to the program. Upon attaining full graduate status the work done as a special graduate 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 M.P.A. director.

PA 510 Nonprofit Organization and Management (4)

Fundamentals of nonprofit organization and management. Differences between the nonprofit and the for-profit and public sectors. Board and staff relations. Management theories; leadership styles. Human resource development; financial management; planning and accounting. Marketing, public relations, and ethical issues. Case studies and specific management techniques.

PA 511 Fundraising and Philanthropy (4)

Issues of fundraising and philanthropy in the nonprofit sector. Case studies of nonprofit fundraising from a variety of nonprofit organizations. Sources of funding: government; public and private foundations; corporate giving; and individual contributions. Ethics and values in fundraising. Strategies and techniques of fundraising.

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 M.P.A. director.

PA 542 Law and Administration: Local Perspectives (2)

The relationships between local government and the legal system with special attention to: 1) legal constraints on administrative discretion; 2) tensions between corporation counsels or prosecutors and administrators; 3) civil vs. criminal procedures and their impact on local decision making; and 4) federal/local and state/local relationships and the courts.

PA 543 Law and Administration: State Perspectives (2)

State administrators and the legal system: 1) the roles of the administrative and agency hearing offices; 2) tensions between the administrative and agency hearing offices; 3) agencies and civil courts; and 4) agencies and the attorney general.

PA 548 Administrative Ethics (2)

Exploration of ethical components of administrative decision making and activities in public and not-for-profit agencies. Topics will include personnel decisions, service delivery procedures and measures of program performance. Course is designed to provide a forum for judging ethical behavior, to help understand how ethical considerations permeate all job-related activities and to assist ethical decision-making skills.

PA 559 Public Policy and Health Care (4)

An examination of the status and evolution of public policies relating to health and health care, the policy-making processes in health care and the various implications of trends in health care policy.

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 603 Contemporary Public Management Techniques (4)

Application of contemporary public management techniques, such as Total Quality Management (TQM). Managers as change agents and leaders of quality improvement and excellence in the workplace. Strategies for implementing these programs. Counts as credits for all concentrations in the M.P.A. program.

PA 610 Strategic Planning (4)

Theoretical and historical perspectives of strategic planning. The components of a strategic planning model; leadership issues. The planning environment. Planning in nonprofit, health care, and public sector organizations. Internal data assessments. Developing and implementing operating plans. Contingency plans. Practical issues associated with strategic planning. This course counts as credits toward the health care, nonprofit organization and management, or local government concentrations.

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 630 Local Government Management (4)

Fundamentals of local government management. Topics to be covered include: politics and management; the management environment; leadership; staffing and personnel; employee motivation; local budgets; the local economy; and ethics. This course is required for students electing the Local Government Management concentration.

PA 631 Grants: Politics and Administration (2 to 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 M.P.A. director.

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 M.P.A. director.

PA 634 Risk Management (2)

This course will provide a description of the concept of risk management in the public sector. Topics include: risk identification, loss control and safety, insurance and the law, loss prevention and evaluation, placement of insurance and financial responsibility.

PA 638 Public Sector Employee Relations (2 to 4)

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

PA 644 Current Issues in Public Personnel Administration (2, 4)

Selected topics in personnel administration, emphasizing state, county and local experiences. Topics can include: contract maintenance and compliance, merit systems, comparable worth, drug testing, employee assistance programs, affirmative action, mediation, arbitration and others as they emerge over time.

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 M.P.A. director.

PA 658 Internship (4)

Supervised assignment in a public agency for approximately 32 weeks; periodic reports and evaluations. Prerequisite: Permission of M.P.A. director.

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 669 Community Planning and Zoning (4)

A comprehensive study of municipal planning, zoning and general government from the perspective of the public administrator. Topics include: state legislation, state and federal grant programs, making a Master Plan, the impact of court decisions, housing and fiscal impact analysis, impact fee calculation and public works and capital improvements programming.

PA 690 Research Project (4)

Individual research project related to work or program of a public agency.
Prerequisite: Permission of M.P.A. director.

PA 691 Directed Readings (2 to 4)

Special readings designed to supplement or augment the course offerings. Not more than 6 credits of directed readings may be counted towards fulfillment of degree requirements.
Prerequisite: Fully admitted students with at least 20 credits in the M.P.A. program and permission of the M.P.A. director.

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

Special topics in public administration offered by the department.
Prerequisite: Permission of M.P.A. director.

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

Special topics in public policy offered by the department.
Prerequisite: Permission of M.P.A. director.

SPECIAL COURSES

Occasionally, with the approval of the Dean of Graduate Study, 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, COMMUNICATION AND JOURNALISM

RCJ 515 Summer Workshop (2 or 4)

Concentrated two or four week workshops on topics of interest to high school teachers and post-baccalaureate students. May be cross-listed with ENG 515.

SOCIOLOGY

SOC 500 Theories of Society and Culture (4)

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

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 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 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 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.

SCHOOL OF BUSINESS
ADMINISTRATION

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Office of the dean:

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Special instructor:

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Adjunct professors:

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Paul O. Kingstrom, Ph.D., Wayne State University
Diane B. Stricker, Ph.D., Cornell University

Lecturers:

Frank P. Cardimen
David W. Essig
Henry Hastings

Board of Visitors

The Board of Visitors of the School of Business Administration provides a direct link between the industrial community and the School. The board is composed 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:

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Complementing the Board of Visitors of the School of Business Administration are the Accounting Advisory Board and the Council of Information Officers. The Accounting Advisory Board is a group of distinguished individuals in public accounting, industry and government. The board's objective is to enhance the ties between the School of Business Administration's accounting faculty and students and the business and professional accounting community. The Council of Information Officers enhances the education of MIS students at Oakland University and assists in providing well-educated MIS professionals to the business community.

School of Business Administration Mission Statement

The mission of the Oakland University School of Business Administration is to be recognized as among the top business schools in the State of Michigan. To this end the school will pursue excellence in teaching, research, and service and will interact productively with five key constituencies: the students and alumni of Oakland University; the faculty and staff of Oakland University; business, not-for-profit and government organizations; the community of academic and professional peers: local, national and international; and the citizens of the State of Michigan and their representatives in the state legislature and on the Oakland University Board of Trustees.

To achieve this mission, the school continuously engages in five processes: to produce, equip, recognize, promote and uphold.

The School of Business Administration seeks to produce: degree holders with a strong foundation in problem definition, analysis and resolution and in the liberal arts and sciences; and research, performance and service which contribute to knowledge, understanding and the quality of human life.

The School of Business Administration seeks to equip: students with the knowledge and skills to graduate and become effective citizens and professionals; faculty and staff with the resources necessary to carry out their responsibilities; alumni with an appreciation for and access to facilities for continued learning; business, not-for-profit and governmental stakeholders with access to knowledge, concepts and technologies; and peers with emerging insights, considered reflections and thoughtful reviews.

The School of Business Administration seeks to recognize: the achievements of individual students with programs that affirm their academic and personal accomplishments; the achievements of individual school faculty and staff as well as their collaborative efforts; the accomplishments of individual alumni and other people in business, not-for-profit and government organizations and their participation in the life of the university; and the contributions by peers of the school's faculty in the academic community to knowledge, understanding and the quality of human life.

The School of Business Administration seeks to promote: the primacy and continuity of learning, including teaching and research; and collaboration with Oakland University constituencies in advancing learning and public service.

The School of Business Administration seeks to uphold those organizational traditions and activities which contribute to an ambiance characterized by: collegiality, diversity, freedom of inquiry, freedom of expression, and high standards of ethics and scholarship.

The Master of Business Administration

A program leading to the Master of Business Administration (MBA) 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 University MBA 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 MBA 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 MBA 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 understand and effectively interact with the emerging workplace issues of globalization and diversity.
4. Assist students in understanding the effects of, and successively deal with, the changing social, legal, ethical and technological environments upon the organization.
5. 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.
6. Stress the importance of the management of information and information resources in the successful operation of an organization.

MBA concentrations

In addition to the standard MBA program, students may choose to concentrate their elective work in a given discipline or inter-disciplinary area. Currently the MBA program at Oakland University has areas of concentration in Accounting, Business Economics, Finance, Human Resources Management, Management Information Systems, Marketing and Production/Operations Management.

Accreditation

The MBA and undergraduate programs of the School of Business Administration are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

Admission

Admissions to the MBA program are selective and depend on several elements, including scholarship and an ability to communicate effectively. Before an applicant can be admitted to the MBA program he or she must have completed:

1. A bachelor's degree or equivalent from an institution of recognized standing. (Oakland University students admitted to the joint baccalaureate/MBA degree program are exempt from this requirement.)
2. A college course in either the principles of macroeconomics or microeconomics.
3. A recent college algebra course or mathematics courses at a higher level.
4. A college computer programming course or a workstation skills course.
5. The Graduate Management Admission Test (GMAT).

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 recommendations, the admission committee

assesses the potential of applicants for success in the MBA 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, P.O. Box 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 may be required to retake the GMAT.

Part-time status

The MBA program must be completed within six years from the date of entry into the program. The scheduling of MBA classes is based on the assumption that students will be enrolled in a standard part-time program: six courses per year (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 MBA program varies from 36 to 60 credits, depending on the student's prior preparation. The minimum program consists of 36 credits of required courses and electives that must be completed by all candidates.

Students may begin the MBA 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 36 credit MBA 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 accordance with university regulations, all Oakland University MBA course credits used to meet requirements of the MBA program must be earned within six years of the date that the MBA is awarded.

Joint baccalaureate/MBA degree program

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 MBA and a baccalaureate in a non-business field, in the equivalent of five years of full-time study. Students interested in this joint baccalaureate/MBA degree program should apply after they have earned a total of 80 credits and at least one term before they plan to take MBA 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 MBA courses taken before receiving the baccalaureate as "free" undergraduate electives. The Graduate Management Admission Test (GMAT) must be completed before any MBA courses can be taken. This program is available to both full-time and part-time students.

The departments which administer the majors of joint baccalaureate/MBA degree program must certify that the students have a GPA in the top 25% of their class and approve their application for the joint baccalaureate/MBA degree 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. MBA courses used to satisfy undergraduate degree requirements will be reflected on the undergraduate transcript only. Formal admission into the MBA is presumed subject to satisfactory perfor-

mance in the final courses taken to meet the undergraduate degree requirements. Joint baccalaureate/MBA degree program students must satisfy all MBA degree requirements, and must take at least 33 graduate credits in the MBA program after receiving the baccalaureate. Additional information and applications may be obtained from the MBA office.

Graduate assistantships

A limited number of graduate assistantships are awarded each academic year, on a competitive basis, to full-time students. Assistantships include an academic year stipend and an award of 18 credits of tuition and accompanying fees. In return, graduate assistants work 20 hours per week assisting one or more faculty members in their research efforts. Additional information and applications may be obtained from the MBA office.

MBA program of study

The MBA program consists of three parts: the core program, the integrative case course (MGT 535) and a set of at least four electives. Each part of the program will be detailed below.

MBA core program

The core program is designed to develop basic skills in management for the MBA student. These courses do not assume any previous education in business or management. Students entering the MBA program are required to have college courses in economics; algebra; computer programming or personal computer workstation skills, or the equivalent experience. In some cases, MBA 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 or personal computer workstation courses. In such cases, eventual admission to the MBA program will depend upon the successful completion of these courses, along with the usual criteria for admission.

Only students formally admitted into the MBA program, another graduate program at Oakland University or guest students from an MBA program at another university, may register for the MBA core classes.

To be exempted from the core courses the applicant must have passed an equivalent undergraduate course with a grade of 2.0 (C) or better within the previous 10 years. Exemption from a core course reduces the total credit requirement for the MBA. Students exempted from some or all the core courses will be required to take at least a minimum program of 36 MBA credits. As part of his or her program the MBA student must take at least one graduate level course in each of the functional areas (i.e., at least one graduate course in ACC, FIN, MIS, MKT, ORG, & POM) either as one of the four MBA electives or in addition to these electives. Exemptions from core courses are determined by the MBA Office after an evaluation of the student's transcript. A student will be allowed to take a core course from which he/she had been exempted only with prior written approval from the MBA Office.

The core program of 45 credits consists of the following 15 courses:

Core courses		Credits
QMM 501	Quantitative Methods for Management	3
MIS 502	Computer Methods for Management	3
or MIS 503	Computer Orientation	(1)
QMM 510	Statistical Analysis for Managers	3
ECN 520	Managerial Economics	3
ACC 511	Financial Accounting	3
ORG 530	Organizational Behavior	3

MGT 550	Legal Environment of Business	3
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
POM 521	Operations Management	3
		45

Integrative business policy course

The integrative business policy course, MGT 535, draws on all the coursework in the core of the MBA program in the analysis of real world cases in a team setting. MGT 535 is required of all MBA candidates.

MBA electives

MBA candidates complete their program by selecting a minimum of 12 credits of MBA electives. These credits may be drawn from MBA elective courses offered by the School of Business Administration or from approved courses offered by other units of Oakland University. Six of the elective credits may be a master's project. All MBA electives are numbered at the 600 level.

If MBA students want a more structured set of electives, they can take one of the MBA concentrations. A maximum of two concentrations can be noted on their transcripts. The MBA concentrations consist of the core courses and the integrative MGT 535 course noted above and electives structured as noted under each MBA concentration listed below. All courses are 3 credits unless otherwise noted.

Accounting Concentration:

To provide more background in accounting the student would be required to complete three electives from the following list for the concentration in Accounting:

ACC 601	Financial Analysis & Reporting
ACC 615	Federal Income Taxation for Business
ACC 618	Computer-Based Accounting and Systems
ACC 620	Cost Management
ACC 622	Non-Business Accounting & Control
ACC 650	Professional Issues in Accounting
ACC 680	Special Topics in Accounting
ACC 690	Independent Study in Accounting

Business Economics Concentration:

To provide more background in the application of economics in business, the student would be required to complete three electives from the following program for a concentration in Business Economics:

ECN 618	Seminar in Economic Policy
ECN 620	Money, Financial Institutions and Markets

ECN 656	Public Finance
ECN 673	International Trade & Finance
ECN 685	Industrial Organizations
FIN 627	International Financial Management
FIN 633	Advanced Financial Management
QMM 652	Forecasting
ECN 680	Special Topics in Economics
ECN 690	Independent Study in Economics

Finance Concentration:

To provide more background in finance the student would be required to complete the following program for a concentration in Finance:

FIN 618	Investment Analysis
FIN 633	Advanced Financial Management
One elective from the following list:	
FIN 627	International Financial Management
FIN 650	Real Estate Investment, Financing & Taxation
ACC 601	Financial Analysis
ACC 615	Federal Income Taxation for Business
ECN 620	Money, Financial Institutions and Markets
FIN 680	Special Topics in Finance
FIN 690	Independent Study in Finance

Human Resources Management Concentration:

To provide more background in human resources management and personnel the student would be required to complete three courses from the following list for a concentration in Human Resources Management:

MGT 638	Labor-Management Relations
ORG 635	Decision-Making in Organizations
ORG 636	Leadership & Group Performance
ORG 637	Motivation and Work Behavior
ORG/POM 640	Total Quality Management
ORG 680	Special Topics in Organizational Behavior
ORG 690	Independent Study in Organizational Behavior

Management Information Systems Concentration:

To provide more background in MIS and to certify the MIS thrust of the Oakland MBA the student would be required to complete two electives from the following list for a concentration in MIS:

MIS 600	Analysis of Complex Systems
MIS 604	Database Management
MIS 605	Business Data/Telecommunications

MIS 616	Systems Analysis and Design
MIS 636	Decision Support Systems
MIS 644	Simulation in Management
MIS 680	Special Topics in MIS
MIS 690	Independent Study in MIS

Marketing Concentration:

To provide more background in marketing the student would be required to complete the following program for a concentration in Marketing:

MKT 608	Marketing Management
Two electives from the following list:	
MKT 604	Consumer Behavior
MKT 605	Marketing Research
MKT 680	Special Topics in Marketing
MKT 690	Independent Study in Marketing

Production/Operations Management Concentration:

To provide more background in production and operations management the student would be required to complete two electives from the following list for the concentration in Production/Operations Management:

ACC 620	Cost Management
POM/ORG 640	Total Quality Management
POM 641	Manufacturing Planning and Control
POM 645	Cases in Operations Management
POM 648	Project Management Techniques
POM 680	Special Topics in POM
QMM 652	Forecasting
POM 690	Independent Study in POM

Standard schedule for 60-credit part-time program

All of the required MBA classes and most electives are taught on Monday through Thursday evenings from 6:30-9:20 p.m. During the fall and winter semesters additional sections of some required courses and some electives are taught on Saturday morning from 9:00-11:50 a.m. The following program is a standard schedule for an MBA student who takes the complete 60-credit part-time program on two evenings per week. Some terms the student could be taking one evening course and one Saturday morning course instead of two evening courses.

First Year

QMM 501	Quantitative Methods for Management
MIS 502	Computer Methods for Management
ACC 511	Financial Accounting
QMM 510	Statistical Analysis for Managers

MGT 550 Legal Environment of Business

ORG 530 Organizational Behavior

Second Year

ECN 520 Managerial Economics

MKT 560 Marketing

ACC 512 Managerial Accounting Systems

MIS 524 Management Information Systems

FIN 533 Managerial Finance

ORG 531 Human Resources Management

Third Year

POM 521 Operations Management

MBA Elective #1

MIS 525 Management of Information Resources

MBA Elective #2

ECN 522 Macroeconomic Analysis

MBA Elective #3

Fourth Year

MGT 535 Policy, Strategy, and Goals

MBA Elective #4

Some MBA candidates will begin the program at more advanced levels than others (see precore and core course exemptions described previously), and will not require the full 60-credit program. For these students, an individualized program of study will be developed reflecting appropriate course exemptions. In all cases, students' plans-of-work will reflect the nature of the course sequencing indicated above.

Application deadlines

The application deadlines are as follows:

Fall semester	July 15
Winter semester	November 15
Spring session	February 28
Summer session	April 30

A completed application must be on file in the Office of Graduate Study, 520 O'Dowd Hall. The applicant must submit: Application for Graduate Study, an MBA supplemental application, official transcripts from all previous colleges and universities, and GMAT scores. Application materials received after the deadline may be reviewed in time for the applicant to participate in late registration.

Candidates should take the GMAT at least five weeks before the deadline for their applications to allow time for the official scores to be sent to Oakland University.

Transfer credit

In accordance with the regulations of the Graduate Council, up to 9 credits of relevant MBA course work may be transferred from an MBA program at a regionally 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 MBA 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 MBA office and the Dean of Graduate Study.

Student evaluation and grading

In accordance with the university requirements for graduate students, a grade point average of 3.00 is required for graduation with the MBA degree. MBA students, therefore, should maintain at least a 3.00 grade point average. MBA students may be dismissed if they do not maintain a grade point average of 3.00 or appropriate progress toward the degree as determined by the MBA office. Any course resulting in a grade below 2.0 must be repeated. Students who do not complete an MBA course for 12 months must formally apply for readmission to the MBA program.

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. Additional information about the master's project may be obtained from the MBA office.

For more information on the MBA

For more information on the Oakland University MBA program including an application for graduate study, a GMAT application, and answers to common questions please either:

Write to:

Ms. Gloria Schatz, Program Assistant for the MBA Program
School of Business Administration
Oakland University, Rochester, MI 48309-4401

Fax a request to:

Ms. Gloria Schatz, Program Assistant for the MBA Program at (810) 370-4275

Email a request to Ms. Gloria Schatz at the following Internet address:

Schatz@oakland.edu

Or call Ms. Gloria Schatz at: (810) 370-3287.

The Master of Science in Engineering Management

The Master of Science program in engineering management is offered by the School of Engineering and Computer Science in cooperation with the School of Business Administration. Intended for students with a bachelor's degree in engineering or computer science, the program has as its goal the provision of the tools and skills necessary for making sound management decisions in industry and business while retaining one's commitment to a specialized field of endeavor. Please consult page 131 for information on the Master of Science in Engineering Management.

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 MBA 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: MIS 502.

ACC 601 Financial Analysis & Reporting (3)

A study of financial accounting and reporting from the perspective of the user of accounting information. The course will emphasize the interpretation and analysis of specific accounting treatments rather than accounting methodology.
Prerequisite: ACC 512.

ACC 615 Federal Income Taxation for Business (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: ACC 511 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 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: ACC 511, ACC 512 and MIS 524.

ACC 620 Cost Management (3)

An analysis of available procedures and techniques to sharpen accounting analyses for managerial planning and control. Extends subjects introduced in ACC 512 to nonmanufacturing firms, decentralized firms, transfer pricing and segment performance measurement.
Prerequisite: ACC 512.

ACC 622 Non-Business Accounting and Control (3)

The characteristics of not-for-profit entities are analyzed and used to define the basic concepts of accounting for funds. Accounting and reporting principles applicable to governmental units, hospitals, schools and other non-profit entities are discussed.
Prerequisite: ACC 512.

ACC 650 Professional Issues in Accounting (3)

Addresses contemporary issues that affect the accounting profession and the professional accountant, including regulation of accounting and accountants; accounting standard-setting; admission to professional status; professional ethics; professional liability; and the impact of technology.
Prerequisite: ACC 511.

ACC 680 Special Topics in Accounting (3)

An in-depth study of the application of accounting theory to a specialized accounting topic. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.
Prerequisite: ACC 511 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: ACC 511, ACC 512 and prior approval of instructor.

ECONOMICS**ECN 520 Managerial Economics (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 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: ECN 520.

ECN 605 Econometrics (3)

Estimation and testing of economic models using regression techniques. Includes experience with violations of regression assumptions, binary variables, autoregression and distributive lag models and the structure of "large" simultaneous equation models.
Prerequisite: ECN 520.

ECN 618 Seminar in Economic Policy (3)

Analysis of economic policy. Topics vary but may include resource allocation, macroeconomic stability, economic growth, energy, public choice, global economic interdependence and the environment.
Prerequisite: ECN 522.

ECN 620 Money, Financial Institutions and Markets (3)

This course provides an analytical foundation for the understanding of the way money and capital markets serve as a conduit through which economic policies, and internal and external shocks affect the multitude of financial instruments and the overall economy. The role of financial intermediaries within the context of the saving/investment process and the supply of money and credit is discussed. The asset/liability management process of various financial institutions is investigated. Finally, the regulatory environment under which U.S. financial institutions operate is examined.
Prerequisite: ECN 522 and FIN 533.

ECN 656 Public Finance (3)

The role and impact of the public sector in a market economy. Includes expenditure determination; the basis of taxation in terms of equity, efficiency and flexibility; timing of cash flows; revenue source analysis; financing public sector debt; and discussion of current problems.
Prerequisite: ECN 522.

ECN 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: ECN 520.

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: ECN 522.

ECN 680 Special Topics in Economics (3)

An in-depth study of the application of economic theory to a specialized economics topic. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.
Prerequisite: ECN 522.

ECN 685 Industrial Organization (3)

The structure of American industry and the factors affecting it, with emphasis on economies of scale, barriers to entry; structure-behavior relationships, including pricing, product differentiation and technical change; evaluation of performance, antitrust and regulation.
Prerequisite: ECN 522.

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: ECN 522 and prior approval of instructor.

FINANCE

FIN 533 Financial Management (3)

Introduction to the institutions, instruments, theories and analytical tools of financial management. Emphasis is placed on return versus risk valuation tradeoff. Topics include capital budgeting, cost of capital, capital structure, dividend policy, cash management, accounts receivable, short-term debt, financial statement analysis, international financial management and financial forecasting.

Prerequisite: ACC 511, ECN 520 and MGT 550.

FIN 618 Investment Analysis (3)

Application of finance theory to investment in debt and equity securities. Will cover the various types of investment alternatives, the markets in which they trade and analytical procedures for estimating their values. An in-depth look at the theory and practice of portfolio management.

Prerequisite: FIN 533.

FIN 627 International Financial Management (3)

Application of finance theory to international financial decision making. Topics include foreign exchange rates, markets and management, international sources of capital, capital budgeting for foreign projects, international diversification and working capital management for the multinational firm.

Prerequisite: FIN 533.

FIN 633 Advanced Financial Management (3)

Expands on the theories introduced in FIN 533. Topics include capital budgeting under uncertainty, agency theory, financial signalling, leasing, capital restructuring and cash management. Cases may be used to illustrate the application and limitations of finance theory.

Prerequisite: FIN 533.

FIN 650 Real Estate Investment, Financing and Taxation (3)

Application of finance theory to investment in income-producing real estate. Topics include market feasibility, property appraisal, income taxation, construction, permanent and creative financing and investment analysis. Students must prepare and present an investment analysis of an actual property.

Prerequisite: FIN 533.

FIN 680 Special Topics in Finance (3)

An in-depth study of the application of finance theory to a specialized financial management topic. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.

Prerequisite: FIN 533.

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: 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. International and ethical issues related to strategic management are discussed.

Prerequisite: ACC 512, ECN 522, FIN 533, MKT 560, MIS 524, ORG 531 and POM 521.

MGT 550 Legal Environment of Business (3)

Examination of the legal environment as it affects business, emphasizing the U.S. and international legal systems, ethical analysis of public policy and managerial decisions, functions and powers of regulatory agencies, and the laws relating to securities, business organizations, employment practices, antitrust and the environment.

Prerequisite: Admission to the MBA program.

MGT 611 Master's Project (6)

Independent elective project.

Prerequisite: ACC 512, ECN 522, FIN 533, MKT 560, MIS 524, ORG 531 and POM 521.

MGT 626 International Business (3)

Examination of the international business environment, including cultural, economic, social, political, legal and financial dimensions. Topics include: strategic planning, production and distribution logistics, technology, transfer pricing, risk analysis. Accounting, finance, marketing, information systems and human resources in a global setting will be introduced. Multinational corporations, regional agreements and public policy round out the course.

Prerequisite: ACC 512, ECN 522, FIN 533, MKT 560, MIS 524, ORG 530 and POM 521.

MGT 638 Labor-Management Relations (3)

Analysis of management-employee relations in modern organizations and public policy in labor-management areas.

Prerequisite: ORG 531 and MGT 550.

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 project is required.

Prerequisite: ACC 512, ECN 522, FIN 533, MKT 560, MIS 524, ORG 531 and POM 521.

MGT 670 Business Ethics (3)

The examination of business ethics and morality as they shape and influence the business environment. The student will develop an awareness of problem areas in the conduct of business. Some of the issues discussed can include but are not limited to: conflicts of interest, honesty, environmental issues, whistleblowing and ethical theory.

Prerequisite: MKT 560, ORG 531 and MGT 550.

MGT 680 Special Topics in Management (3)

The analysis of topics of current interest in management. See *Schedule of Classes* for current offering. Topics vary. Topics may include: Doing Business in Japan, Doing Business in the Pacific Rim, Competitive Strategy, and the Not-For-Profit Organization. A maximum of two Special Topics courses in one rubric may be taken.

Prerequisite: As specified in the schedule for the term.

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: ACC 512, ECN 522, FIN 533, MKT 560, MIS 524, ORG 531, POM 521 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; operating systems; workstation capabilities including word processing, spreadsheet analysis, data base management/query systems and business graphics. Includes extensive exercises on personal computers, networks and larger computers.

Prerequisite: Admission to the MBA program.

MIS 503 Computer Orientation (1)

Familiarization with the university's networks and computer environment, including word processing, spreadsheet analysis, data base management and business graphics. Intended for experienced students who have mastered the material in MIS 502. (Graded S/U.) Includes extensive exercises on personal computers, networks and larger computers.

Prerequisite: Admission to the MBA program and exemption from MIS 502.

MIS 524 Management Information Systems (3)

Development of information systems from the perspective of the manager as a user. Survey of the behavioral, organizational and systems theory foundations of MIS; the systems development process and alternative system development strategies; and the integration of data processing, decision support systems, office automation, and telecommunications across functional areas.

Prerequisite: MIS 502.

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, multinational issues and the information systems staff.

Prerequisite: 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: MIS 502 and MIS 524.

MIS 604 Database Management (3)

Technology, organization, use and administration of database management systems (DBMS). Includes exercises using microcomputer and mainframe DBMS packages.

Prerequisite: MIS 524.

MIS 605 Business Data/Telecommunications (3)

Technology, design, management and use of data, voice, image and video communication networks. Topics include teleprocessing, micro-mainframe links, local area networks (LANs), wide area networks (WANs), distributed systems, client-server networks, teleconferencing, electronic mail, the voice networks, the resources on the Internet, teleprocessing, micro-mainframe links, transborder data flows and communication protocols. Includes exercises using various network configurations.

Prerequisite: MIS 524.

MIS 616 Systems Analysis and Design (3)

Theory and practice of designing information systems to meet user needs, including problem investigation and the analysis, design and implementation of systems. Topics include systems development cycle, system modeling techniques, interface to database management systems, monitoring and control, review and maintenance, and project management. Includes class projects.

Prerequisite: MIS 524.

MIS 636 Decision Support Systems (3)

This course examines the design and implementation of decision support systems (DSS) from the viewpoint of behavioral and organizational theory. Considers the roles of expert systems and artificial intelligence (AI) in decision making. Includes a critical review of the theory and case studies taken from recent MIS literature.

Prerequisite: MIS 524 and QMM 510.

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 analysis for forecasting, planning and decision making in the management environment are explored.

Prerequisite: MIS 524, QMM 510 and knowledge of a programming language.

MIS 680 Special Topics in Management Information Systems (3)

An advanced course involving study of current research issues and recent developments in MIS. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.

Prerequisite: MIS 524.

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 faculty member prior to registering for this course. Offered every term.

Prerequisite: MIS 524 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 in both domestic and international markets. The approach to these problems considers both the normative or theoretical, and the empirical or marketing research orientations.

Prerequisite: Admission to the MBA program.

MKT 604 Consumer Behavior (3)

Study of basic factors in 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: 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: 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: MKT 560.

MKT 680 Special Topics in Marketing (3)

Applications of recent theoretical and empirical findings in marketing. Students may 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. Topics vary. Recent topics included industrial marketing, promotional strategies, and international marketing. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.

Prerequisite: MKT 560.

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: 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. Where appropriate, cross cultural issues will be discussed.

Prerequisite: Admission to the MBA program.

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: QMM 510 and ORG 530.

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: ORG 530.

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: ORG 530.

ORG 637 Motivation and Work Behavior (3)

Analysis of the individual and 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: ORG 530.

ORG 640 Total Quality Management (3)

Surveys the history and basic concepts of total quality management (TQM). Includes the discussion of approaches to quality of Deming, Crosby, Durand, Bernhard-Walsh and others. Teams of students will apply TQM principles to real world projects.
Prerequisite: QMM 510, ORG 530 and POM 521.

ORG 680 Special Topics in Organizational Management (3)

Analyzes topics related to organizational behavior and/or human resources management. Topics may include: job design, total quality management, compensation, management across cultures, research methods and "the dark side" of the organization. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.
Prerequisite: 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: ORG 531 and prior approval of instructor.

PRODUCTION AND OPERATIONS MANAGEMENT**POM 521 Operations Management (3)**

Study of operations of manufacturing and service organizations. Introduction to operational design and control issues such as forecasting, capacity planning, facility location and layout, production control, material requirements planning, scheduling and quality assurance. Includes international, legal and ethical aspects, as well as computer exercises.
Prerequisite: QMM 510.

POM 640 Total Quality Management (3)

Surveys the history and basic concepts of total quality management (TQM). Includes the discussion of approaches to quality of Deming, Crosby, Durand, Bernhard-Walsh and others. Teams of students will apply TQM principles to real world projects.
Prerequisite: QMM 510, ORG 530 and POM 521.

POM 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: POM 521.

POM 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: POM 521.

POM 648 Project Management Techniques (3)

An examination of the various math-based techniques for managing projects. The topics include Program Evaluation Review Technique (PERT) and Critical Path Method (CPM). Includes computer exercises.
Prerequisite: POM 521.

POM 680 Special Topics in Production and Operations Management (3)

An advanced course involving study of current research issues and recent developments in Production and Operations Management. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.
Prerequisite: POM 521.

POM 690 Independent Study in Production and Operations Management (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a production and operations management faculty member prior to registering for this course. Offered every term.
Prerequisite: POM 521 and prior approval of instructor.

QUANTITATIVE METHODS**QMM 501 Quantitative Methods for Management (3)**

Theory and application of mathematical skills required for courses in the MBA program. Covers basic algebra, functions, graphing functions, matrix algebra, linear programming, basic differential and integral calculus and their application to problem definition and problem-solving in business.
Prerequisite: Admission to the MBA program and college algebra.

QMM 510 Statistical Analysis for Managers (3)

Statistical methods useful in management. Includes describing and exploring data, visual presentation of data, discrete and continuous probability models, estimation, hypothesis testing, quality control, regression, and time-series models and forecasts. Real-world applications and use of computer workstation tools are stressed.
Prerequisite: QMM 501 and either MIS 502 or MIS 503.

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 application of these skills.
Prerequisite: POM 521.

QMM 652 Forecasting (3)

Survey of analytical forecasting methods for financial and operational planning including exponential smoothing, time series decomposition, Box-Jenkins, econometric and distributed lag models, seasonality and autocorrelation, Delphi and other qualitative methods, assessment of commercial forecasting services, and case studies. Extensive use of computer packages to prepare actual forecasts for written and oral presentation.
Prerequisite: POM 521.

QMM 680 Special Topics in Quantitative Methods (3)

An advanced course involving study of current research issues and recent developments in Quantitative Methods. Topics vary. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.
Prerequisite: QMM 510.

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: QMM 510 and prior approval of instructor.

SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

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Kay Keyu Li, Ph.D., Johns Hopkins University

Visiting assistant professor:

Patrick Dessert, Ph.D., Oakland University

Special instructor:

Jerry E. Marsh, M.S., Oakland University

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Ronald R. Beck, Ph.D., University of Iowa
Francis H.K. Chen, Ph.D., University of Illinois
Donald R. Falkenburg, Ph.D., Case Western Reserve University
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Adjunct associate professors:

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Bruce E. Stuckman, Ph.D., Oakland University
Simon C. Y. Tung, Ph.D., Rensselaer Polytechnic Institute

Advisory board

The Advisory Board for the School of Engineering and Computer Science is composed of leaders in industry. They assist the school in developing educational and research programs to meet the rapidly expanding requirements in the technical world. The board is available as a body or individually for consultation on such matters as curriculum, research, facilities, equipment requirements, special subjects and long-range planning. Board members are:

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General information

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. It also offers a Master of Science program in engineering management in cooperation with the School of Business Administration. A Master of Science in software engineering is currently in the program approval process. Initial enrollments are likely to begin during the 1995-96 academic year.

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. Students have access to the various computing facilities of the school and the university's mainframe services consisting of DEC VAX 6320, 6310 and 5820. The school also has a large number of personal computers. 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 center of research excellence. The main goals of the center are to contribute to the demand for high technology and industrial productivity in the United States and to create a partnership among industries, government and academic communities to solve problems of common interest, particularly in intelligent robotics, intelligent machine vision and automated manufacturing.

Graduate assistantships/fellowships

A number of graduate assistantships and a limited number of fellowships are awarded each year on a competitive basis. They carry both stipend and tuition remuneration. Graduate assistants render 20 hours per week of teaching and/or research service to the university. No such service is required of graduate fellows. Graduate assistants or fellows at the master's level, who plan to enter either the area of research and development in industry or a doctoral program, are strongly encouraged to include a master's project or thesis as part of their program. For additional information about financial aid refer to page 30 of this catalog and the Graduate Student Handbook of the School of Engineering and Computer Science.

Graduate student handbook

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 departmental offices in Dodge Hall.

The Doctor of Philosophy in Systems Engineering

The field of 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. The School of Engineering and Computer Science is concentrating its efforts in these areas at the Ph.D. level.

The Ph.D. program in systems engineering is 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.

Ph.D. discipline specializations

In keeping with the programs of study that are currently available through its Computer Science and Engineering Department, Electrical and Systems Engineering Department, and Mechanical Engineering Department, the student can follow any one of the following discipline specializations, depending upon his or her previous background and training.

- **Computer Systems:** The work in this discipline may be focused on hardware and software system design, artificial intelligence and expert systems, computer communication systems including parallel and distributed computing, computer graphic systems and software engineering systems.
- **Control Engineering and Dynamic Systems:** The work in this discipline may be focused on adaptive, intelligent, digital and optimal control systems, modelling and estimation of dynamic systems, robotic systems, fuzzy logic and neural network-based control systems.
- **Electrical Engineering Systems:** The work in this discipline may be focused on digital image and signal processing, microelectronic circuits and systems including VLSI, instrumentation and measurement systems, electromagnetic systems, and analog and digital communication systems.
- **Manufacturing Processes and Systems:** The work in this discipline may be focused on manufacturing processes including machining, metal forming, materials, automated inspection and evaluation systems, integrated manufacturing systems, flexible manufacturing systems, artificial intelligence in manufacturing systems, scheduling and systems integration.
- **Mechanical Engineering Systems:** The work in this discipline may be focused on engineering mechanics systems involving acoustics, vibrations, classical/experimental mechanics and non-destructive testing; fluid and thermal energy systems involving phase change, combustion, and energy transfer and conversion; tribology systems involving friction, lubrication and wear; and general manufacturing processes systems.

Admission

The Ph.D. program 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 they will be required to build up basic engineering knowledge through remedial course work. Normally a master's degree from an accredited institution is required for admission; however, students with outstanding undergraduate records may apply directly for admission to the doctoral program. 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 potential. Applicants must submit scores from the Graduate Record Examination (GRE) if they graduated from an institution not accredited by a regional accrediting agency. The Test of English as a Foreign Language (TOEFL) must be submitted by applicants who are graduates of programs taught in a language other than English.

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. 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 a doctoral degree unless the student subsequently transfers to regular status and the courses are accepted as part of the Ph.D. program.

Post-master's students who have demonstrated outstanding achievement, and who later wish to pursue a Ph.D. degree, may apply for admission to the doctoral program. The applicant must complete a new application form, available from the Office of Graduate Study, and submit

official transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the applicant's performance at Oakland University will receive strong consideration.

Advisory committee

As soon as possible after admission, but prior to earning 16 credits of course work, students must form an advisory committee which will direct and guide the progress of their program. Such a committee is composed of four faculty members, specified as follows:

1. Three faculty members nominated by the student (one designated as chair and one selected from a department outside the School of Engineering and Computer Science).
2. One member appointed by the dean of the School of Engineering and Computer Science.
3. Upon recommendation of the advisory committee, following successful completion of the Ph.D. comprehensive examination, one member from within or outside the university community may either be added to the committee or replace a member for the dissertation 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 dean. 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 field of systems engineering recognizes the interdisciplinary nature of engineering, particularly in the areas of robotics, electronics, communications, mechanics, manufacturing systems, fluid and thermal systems, dynamic systems and control, computer hardware, software systems, software engineering, artificial intelligence and expert systems. The successful analysis and design of complex engineering systems in each of these areas involve two major perspectives. The first perspective, characterized by viewing individual elements of any phenomenon, process or system as being interrelated, with the form of the relationship influencing the behavior of the whole, requires that a systems approach be taken in the analysis, modeling or synthesis of the phenomenon, process or system under consideration. The second perspective is discipline specific and requires a detailed understanding of the fundamental physical principles or concepts associated with the particular system under study.

A direct benefit of the above approach to problem solving is that it ties the contributions made to the fundamental knowledge in the field with the nuances and constraints imposed by the environment on the specific problem under investigation. In other words, it makes the engineering research sensitive and relevant to practical applications. For example, consider the problem of computer vision. Research in this area will involve the fundamental principles of pattern recognition, digital signal processing, image enhancement, data communication, etc. However, a computer vision system that is associated with robotics in a classical or flexible assembly line manufacturing environment would be subjected to very different environmental conditions and constraints than would a computer vision system on an all-terrain ground-based vehicle. Integration of such fundamental research, while recognizing the interaction with the environment, lends itself to a systems approach to problem solving.

It is this broad definition of engineering systems that forms the cornerstone of the Ph.D. program in systems engineering at Oakland University. The program is multidisciplinary, drawing its strength and resources from the entire faculty of the School of Engineering and Computer Science.

Academic program

Because of the importance of the two perspectives outlined above, the Ph.D. program in systems engineering has two major components: systems concepts and discipline specific options. The courses in the first component provide the necessary knowledge to apply a systems approach to problem solving.

The systems concepts required for the analysis and design of continuous systems are different from those required of discrete systems. Therefore, two tracks of courses have been identified to address the systems approach to these two different classes of systems. The two sets of courses are:

Continuous Systems (12 credit hours)

SYS 520 Signal and Systems Analysis or ME 510 Continuum Mechanics
APM 541-542 Mathematical Analysis for Engineers

Discrete Systems (12 credit hours)

SYS 569 Computer Simulation in Engineering
APM 563 Discrete Mathematics I
APM 564 Discrete Mathematics II or APM 581 Theory of Computation

Every student in the systems engineering Ph.D. program is required to elect one of these two tracks.

Once the systems approach to problem solving has been established, a student will study several specific depth areas which relate to his/her research interest. These courses provide the discipline specific component of the Ph.D. program. The student will concentrate on at least two of these areas, the selection of which will be the concerted effort of the student and the advisory committee. Although a student is expected to specialize in either the continuous systems or discrete systems, he/she may select courses from other areas as deemed appropriate.

The current discipline specific options offered by the School of Engineering and Computer Science include:

Continuous Systems*

Optimal Control	Numerical Techniques
Dynamic Systems	Manufacturing Processes
Robotics	Quality and Reliability
Advanced Systems Theory	Tribology
Optimization and Decision Theory	Microelectronics, VLSI
Energy Systems	Analog and Digital Communications
Thermal Energy Transport	Signal and Image Processing
Fluid Transport	Instrumentation and Measurement
Experimental Stress Analysis	Electromagnetics
Solid Mechanics and Materials	Intelligent and Adaptive Control
Dynamics, Vibrations and Noise	Digital Control

Discrete Systems*

Manufacturing Systems	Computer Communications
Computer Integrated Manufacturing	Artificial Intelligence
Flexible Manufacturing Systems	Software Engineering
Graphics and CAD/CAM	Theory of Computing Systems
Computer Hardware Design	Microprocessor Systems
Software Systems	Parallel Processing
Virtual Reality	Object Oriented Software Systems

*A listing of courses within each discipline specific option is given in the *Graduate Student Handbook* of the School of Engineering and Computer Sciences.

For example, a student interested in robotics would be required to take the continuous systems track and may elect the following three discipline specific options: robotics, dynamic systems and microprocessors. These three options not only cross the boundaries of the two classes of systems but also include courses from all three departments within the School of Engineering and Computer Science, yet they form a cohesive and intensive research program. This multidisciplinary approach is one of the unique features of the systems engineering Ph.D. program at Oakland University.

The requirement for the Ph.D. is completion of a unified program of formal course work, as specified above, 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 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 review. 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 (8 credits maximum) for at least two consecutive semesters.

The work of Ph.D. students described in the above paragraph will be documented by term reports, reviewed and accepted by the chair 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 a master's degree may petition to have a maximum of 32 credits applied toward the 56. The advisory committee will evaluate the student's prior master's degree work and allow Ph.D. credits for courses relevant to the proposed Ph.D. course of study. All candidates must complete at least 24 credits of additional course work exclusively 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 numerical grades earned are used in computing a student's GPA.

Comprehensive examination

Each student is required to take a comprehensive examination after the student has completed all of his/her course work, but before completing no more than 8 credits of dissertation research. The examination is designed to assess the student's analytical reasoning, theoretical understanding and preparedness to do independent research. The examination is composed of a written component and an oral component. The written examination covers the systems concepts and at least two discipline specific areas relevant to the student's course work and research interest. The student's advisory committee, based on the student's preparation, selects the areas for the examination. The oral examination follows within a month of the written examination. The written examination is commonly split into no more than three parts to be taken over a reasonable period of time (usually not to exceed one month.) A student may repeat the comprehensive 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. All thesis requirements must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

Dissertation proposal review

As soon as a candidate and the advisory committee chair 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 and acceptance of the dissertation by the Office of Graduate Study.

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 earned prior to entry into the program will be evaluated by the advisory committee for their currency before completion of 24 credits of doctoral course work at Oakland University by the student. Course work that is determined to be outdated will not be applicable toward the degree.

Graduation

Students expecting to graduate in a given semester must file an application for degree at the Academic Records Office 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 remedial course work may be required to overcome deficiencies.

Admission to the Master of Science program in engineering management requires a bachelor's degree in engineering or computer science.

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 (GRE) scores are required for a) graduates from institutions not accredited by a regional accrediting agency, b) graduates of programs not accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology (ABET), and encouraged for c) 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 each engineering program are listed in the appropriate department section.

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 or more semesters; the minimum requirement for continuation in the program is a GPA of 3.00.

Special graduate status: For applicants who merely wish to attend classes and do not intend to pursue a degree. To be admitted to special graduate status, students must provide evidence of technical competence, submit a transcript that provides evidence of a bachelor degree awarded, and obtain approval from the chairperson of the department which offers the classes the student plans to attend. Credits earned as a special graduate student do not apply toward the Master of Science from Oakland University unless the student is admitted 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.

Students desiring to transfer to regular status must complete an application form available from the Office of Graduate Study and submit official transcripts and letters of recommendation 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 University. A 3.00 cumulative average in graduate courses is a minimal requirement.

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.

Master's adviser

The progress of each regular student toward the Master of Science degree is directed by the student's adviser, who is a faculty member of the School of Engineering and Computer Science, and is 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 chair of their department.

Master's project or thesis

Although the master's degree requirements may be satisfied by taking only course work, either a graduate engineering project (690) or a directed master's thesis research (691) may be included as part of the program in place of elective courses. Students choosing the thesis option (691) must select an advisory committee which is composed of at least two faculty members from the School of Engineering and Computer Science. The selection of the committee and the plan of study must be approved by the department chair. The chair (major professor) of the advisory committee will direct and guide the research. The student must propose a research topic to the committee for approval; however, a formal presentation of the proposal is not necessary. The completed thesis must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog). At the completion of the research and its documentation, the content of the thesis must be publicly presented and defended. Successful defense of the thesis is a prerequisite for earning the research credits.

Course credit

Normally, graduate credit is awarded only for courses numbered 500 or higher. However, up to 4 credits of Oakland University senior-level (400-499) courses in the major can be approved for graduate credit by the student'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. Students who have received credit for the 400-level version of a cross-listed senior/graduate course cannot receive credit toward a graduate degree for the 500-level version of that course.

Work load and scheduling

Full-time students must 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 chair 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 except that, if a course has been repeated, the most recent grade is used in the calculation of the

GPA. A graduate student is placed on academic probation if the student's overall GPA drops below 3.00 or if the student receives more than one grade below 3.0 including the original grade(s) of any repeated course(s). A graduate student receiving a grade less than 3.0 while on probation is subject to dismissal. A graduate student receiving more than two grades below 3.0 is subject to dismissal whether or not the student was put on probation previously.

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. The degree requirements may be satisfied by taking only course work. However, a graduate engineering project (690) or master's thesis research (691) provides a unique and valuable learning experience in which an individual student works with a faculty member in an area of mutual interest. Therefore, students are encouraged to include such an experience, as their program permits.

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.

Approval by the master's degree adviser and the department chair is required for independent study, engineering projects, master's thesis or special topics courses that are used toward the degree. In addition, approval of the faculty administering the independent study, advising the thesis or project, or teaching the special topics course must be obtained before registering for these credits. No more than 8 thesis or project credits may be used toward the degree requirements. The completed thesis must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

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)

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.)

Required courses: (16 credits)

Select three from the following:

SYS 520 Signal and Systems Analysis (4)

EE 526 Instrumentation and Measurements (4)

EE 534 Principles of Data Communications (4)

EE 581 Integrated Circuits and Devices (4)

and one of the following:

CSE 564* Computer Organization and Architecture (4)

CSE 570* Microprocessor-based System Design (4)

Electives:

Students with specialized interests should consider choosing 8-12 credits of electives within one of the depth areas listed below:

Communications

EE 533 Random Signals and Processes (4)

EE 545 Electromagnetic Engineering (4)

EE 633 Signal Detection and Estimation Theory (4)

EE 635 Information Theory and Coding in Digital and Computer Communication (4)

EE 637 Digital Signal Processing (4)

EE 638 Digital Image Processing (4)

Computers

EE 570* Microprocessor-based Systems Design (4)

CSE 564* Computer Organization and Architecture (4)

CSE 571* Design of Embedded Software Computer Systems (4)

SYS 569* Computer Simulation in Engineering (4)

Controls

EE 572* Microcomputer-Based Control Systems (4)

SYS 630 Optimal Control Theory (4)

SYS 631 Estimation and Control Theory (4)

SYS 632 Analysis of Nonlinear Control Systems (4)

SYS 674 Digital Control Systems (4)

Electronics

EE 585* MOS VLSI Semicustom Design of Digital ASICs (4)

EE 587* Integrated Electronics (4)

EE 625 Analog Integrated Circuit Design (4)

EE 682 Field-Effect Devices (4)

EE 683 Advanced MOS Very Large Scale Integration (4)

EE 726 High-Frequency Electronics (4)

Energy

EE 526 Instrumentation and Measurements (4)

SYS 557 Energy Conservation Systems (4)

SYS 558* Electrical Energy Systems (4)

SYS 721 Large-Scale Dynamic Systems (4)

Students not interested in any one of the above depth areas are expected to consult with their adviser in selection of 8-12 credits of electives either from those listed under required courses or depth areas above and/or from the following:

EE 567, 620, 725,

SYS 510*, 563*, 623, 664, 722, 731,

CSE 513*, 517*, 518*, 547*, 571*

PHY 562, 574, 583, 632, 673
EE 594, 595, 690, 691, 795

8-12

32

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of EE 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

* These courses are cross-listed as advanced undergraduate and graduate courses. If completed as a 400-level course or equivalent as part of baccalaureate degree, the course may be used to offset graduate program requirements. However, credit will not then be awarded and must be earned by completion of an approved substitute course.

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)

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

Plus select one of the four options described below:

1. Engineering Mechanics Option

Required course: ME 521 Dynamics (4)

4

Depth areas:

Select two courses from each of the following depth areas:

16

Solid Mechanics

ME 563 Applied Elasticity (4)

and one of the following:

ME 524 Vibration Analysis (4)

ME 564 Mechanics of Composite Materials (4)

ME 569 Finite Elements (4)

Experimental Mechanics

ME 565 Experimental Stress Analysis (4)

and one of the following:

ME 665 Optical Methods in Experimental Mechanics (4)

ME 567* Optical Measurement and Quality Inspection Methods (4)

Electives**

Select 4 to 8 credits from:

ME 561*, 572*, 574*, 575* or any other ME courses
with level 500 and above

SYS 422, 510, 520, 630, 684; CSE 517*, 518*

With adviser's approval:

ME 594, 595, 690, 691, 795

4-8

2. Fluid and Thermal Systems Option

Required course: ME 582* Fluid and Thermal Energy Systems (4)

4

Depth areas:

Select two courses each from any two of the following depth areas:

16

Energy Systems

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)

Electives**

Select 4 to 8 credits from:

ME 549*, 639, courses from remaining depth area above, or
any other ME courses with level 500 and above

SYS 422, 510, 520, 630, 684; CSE 517*, 518*

With adviser's approval:

ME 594, 595, 690, 691, 795

4-8

3. Manufacturing Processes Option

Required course: ME 572* Material Properties and Processes (4)

4

Depth areas:

Select two courses from each of the following depth areas:

16

Materials and Manufacturing Processes

ME 564 Mechanics of Composite Materials (4)

ME 574* Manufacturing Processes (4)

ME 575* Lubrication, Friction and Wear (4)

Computer-Aided Engineering/Inspection

ME 567* Optical Measurement and Quality Inspection Methods (4)

ME 569 Finite Elements (4)

ME 587* Mechanical Engineering
CAD/CAM Systems (4)

32

Electives**

Select 4 to 8 credits from:
 ME 521, 524, 561*, 563, 565, 569, 610, 665, or
 any other ME courses with level 500 and above
 SYS 422, 510, 517, 520, 583*, 585*, 630, 684; CSE 517*, 518*
 With adviser's approval:
 ME 594, 595, 690, 691, 795

4-8

32

4. General Mechanical Engineering Option

Required course: Select one of:

4

ME 521 Dynamics (4)
 ME 572* Material Properties and Processes (4)
 ME 582* Fluid and Thermal Energy Systems (4)

Depth areas:

Select two courses each from any two of the depth areas listed under
 options 1, 2 or 3, above.

16

Electives:**

Remaining 4-8 credits from the following:
 All ME courses with level 500 and above
 SYS 422, 510, 520, 630, 684; CSE 517*, 518*
 With adviser's approval:
 ME 594, 595, 690, 691, 795

4-8

32

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of ME 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits. Four of the thesis credits may be used to fulfill one of the courses in a depth area requirement. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

*These courses are cross-listed as advanced undergraduate and graduate courses. If completed as a 400-level course or equivalent as part of baccalaureate degree, the course may be used to offset graduate program requirements. However, credit will not then be awarded and must be earned by completion of an approved substitute course.

**Other electives in engineering, mathematics, physics or chemistry that are appropriate to the student's plan of study require prior approval of the faculty adviser and the department chair.

Systems engineering requirements

Three options are available for the Master of Science in systems engineering:

1. Dynamic systems and control
2. Robotics and intelligent systems
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.

1. Dynamic Systems and Control Engineering Option**Mathematics: (4-8 credits)**

APM 541-542 Mathematical Analysis for Engineers (4 each)
 APM 553 Advanced Ordinary Differential Equations (4)
 MTH 555 Complex Analysis (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.)

4-8

Required courses: (20 credits)

SYS 520 Signal and System Analysis (4)
 SYS 630 Optimal Control Theory (4)
 SYS 631 Estimation and Control Theory (4)
 SYS 632 Analysis of Nonlinear Control Systems (4)
 SYS 674 Digital Control Systems (4)

20

Electives: Students are encouraged to consult with their adviser in the selection of 4-8 credits of electives from:

SYS 510*, 623, 632, 721, 722, 731,
 CSE 517*, 518*, 571*, 578*
 EE 526, 570*, 572*, 625, 637
 ME 521
 PHY 562
 SYS 594, 595, 690, 691, 795

4-8

32

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of SYS 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

2. Robotics and Intelligent Systems Option**Mathematics: (4-8 credits)**

APM 541-542 Mathematical Analysis for Engineers (4 each)
 APM 553 Advanced Ordinary Differential Equations (4)
 APM 565 Differential Geometry (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.)

4-8

Required courses (16 credits)

SYS 520 Signal and System Analysis (4)
 SYS 623 Dynamics and Control of Robot Manipulators (4)
 SYS 632 Analysis of Non-Linear Control System (4)
 EE 570* Microprocessor-based Systems Design (4)

16

Electives: (8-12 credits)

For non-thesis option, at least 8 credits chosen from group A and the remainder from group B

Group A

ME 521	Dynamics (4)
SYS 674	Digital Control Systems (4)
CSE 513	Soft Computing (4)
CSE 515*	Expert Systems and Decision Support Systems (4)
CSE 516*	Artificial Intelligence (4)
EE 572*	Microcomputer-based Control Systems (4)

Group B

Any graduate level courses with SYS designation
 CSE 517*, 518*, 542, 545*, 550*, 565*, 571*, 578*
 EE 526, 533; PHY 562; SYS 594, 595, 690, 795

8-12

32

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of SYS 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits. Four additional credits may be chosen from Group 'A' courses above. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

3. Manufacturing Systems Engineering Option**Mathematics: (4-8 credits)**

APM 541	Mathematical Analysis for Engineers (4)
APM 563	Applied Mathematics: Discrete Methods I (4)
MOR 554	Mathematical Programming (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.)

4-8

Required courses: (20 credits)

CSE 512*	Artificial Intelligence in Manufacturing (4)
SYS 563*	Foundations of Computer-Aided Design (4)
SYS 569*	Computer Simulation in Engineering (4)
SYS 583*	Production Systems (4)
SYS 684	Computer-Integrated Manufacturing Systems (4)

20

Electives: (4-8 credits)

Students are encouraged to consult with their adviser in the course selection:

SYS 422, 510*, 517, 520, 585*, 623, 630, 632, 664, 674, 788
 CSE 513*, 516*, 545*, 571*,
 EE 526, 567, 570*
 ME 569, 572*
 SYS 594, 595, 690, 691, 795

4-8

32

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of SYS 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

*These courses are cross-listed as advanced undergraduate and graduate courses. If completed as a 400-level course or equivalent as part of baccalaureate degree, the course may be used to offset graduate program requirements. However, credit will not then be awarded and must be earned by completion of an approved substitute course.

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.

Admission requirements

To be accepted into the Master of Science degree program in computer science and engineering, a 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.
2. Have received credit for at least two years of college computer science or engineering courses, including computer organization and assembly language programming, data structures and one of the following: digital system design, programming languages, software engineering or operating systems.
3. Have received credit for at least two years of college mathematics, including differential and integral calculus, linear algebra and discrete mathematics. Course work in statistics is desirable.
4. Have at least 10 credits of science (physics, chemistry, biology or equivalent).

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 (no course equivalent to a course studied at the undergraduate level may be selected) and earn a cumulative grade point average of 3.0.

2. Successfully complete at least 24 credits in Computer Science and Engineering (CSE) courses including:

- a. one course from the following theory group:

APM 563	Applied Mathematics Discrete Methods 1 (4)
APM 581	Theory of Computation (4)
APM 577	Computer Algebra (4)
CSE 510	Logic in Computer Science (4)
CSE 511	Design and Analysis of Algorithm (4)

- b. at least two courses from the following group:

CSE 521	Computer Program Construction (4) or CSE 537 Systematic Software Development (4)
CSE 535	Programming Languages (4)
CSE 538*	Verification of Computer Programs (4)
CSE 546	Database Systems II (4)
CSE 547*	Computer Communications (4)
CSE 556*	Computer Graphics II (4)
CSE 571*	Design of Embedded Software Computer Systems (4)
CSE 578*	Switching Theory (4)
CSE 647	Advanced Computer Communications (4)
CSE 650	Advanced Operating Systems (4)
CSE 664	Parallel and Distributed Processing (4)
CSE 665	Advanced Compiler Design (4)

- c. 12 additional credits may be chosen from the remaining courses listed in (b) above and/or the following: CSE 512, 513*, 514*, 515*, 516*, 517*, 518*, 537*, 539*, 540*, 541, 545*, 550*, 555*, 564*, 565*, 570*, 580

3. Successfully complete 8 additional credits from courses listed under 2(a), (b), (c) above or 8 credits from the following group:

CSE 594	Independent Study (4)
CSE 595	Special Topics (4)
CSE 690	Graduate Computer Science and Engineering Project (4 to 8)
CSE 691	Masters Thesis Research (8)

Alternatively, students with sufficient breadth in computer science or computer engineering in their combined undergraduate and graduate programs may petition to take up to 8 credits of graduate level course work outside of the CSE rubric, such as from APM, EE, ME or SYS courses. However, this would require prior permission of the CSE Department.

Thesis Option

Students electing this option must accumulate a minimum of 8 credits of CSE 691. Successful completion and defense of a thesis is a prerequisite for earning these credits. All theses must conform to university standards (see "master's thesis/doctoral dissertation" section in the *Policies and Procedures* section of this catalog).

*These courses are cross-listed as advanced undergraduate and graduate courses. If completed as a 400-level course or equivalent as part of baccalaureate degree, the course may be used to offset graduate program requirements. However, credit will not then be awarded and must be earned by completion of an approved substitute course.

The Master of Science in Engineering Management

The Master of Science program in engineering management is offered by the School of Engineering and Computer Science in cooperation with the School of Business Administration. Intended for students with a bachelor's degree in engineering or computer science, the program has as its goal the provision of the tools and skills necessary for making sound management decisions in industry and business while retaining one's commitment to a specialized field of endeavor.

To be awarded the Master of Science degree in engineering management the student must:

1. Successfully complete a minimum of 42-43 credits of graduate level work as specified below.
2. Earn a grade point average of at least 3.00 in courses applied toward the degree.

Mathematics: (select 4 credits)

MOR 554	Mathematical Programming (4)
STA 501	Statistical Methods in Research and Production (4)
STA 503	Design and Analysis of Industrial Experiments (4)
	4

Required core: (select 12 credits)

SYS 510*	Systems Optimization and Design (4)
SYS 569*	Computer Simulation in Engineering (4)
SYS 585*	Statistical Quality Control (4)
SYS 680	Engineering Decision Analysis (4)
SYS 684	Computer-Integrated Manufacturing Systems (4)
	12

Group A: (select 8 credits)

Choose two 500 and/or 600 level courses, in one discipline only, from SYS, EE, ME or CSE (excluding CSE 501, 502 and 504)

8

Group B: (select 15 credits)

ACC 512	Managerial Accounting Systems (3)
ECN 520	Microeconomic Decision Analysis (3)
FIN 533	Financial Management (3)
MIS 524	Management Information Systems (3)
MKT 560	Marketing (3)
ORG 531	Human Resources Management (3)
POM 521	Operations Management (3)
	15

Group C: (select 3-4 credits**)

ACC 511	Financial Accounting (3)
ECN 522	Macroeconomic Analysis (3)
MGT 550	Legal Environment of Business (3)
MIS 525	Management of Information Resources (3)
ORG 530	Organizational Behavior (3)
CSE 545*	Database Systems (4)
SYS 583*	Production Systems (4)
	3-4

* These courses are cross-listed as advanced undergraduate and graduate courses. If completed as a 400-level course or equivalent as part of baccalaureate degree, the course may be used to offset graduation program requirements. However, credit will not then be awarded and must be earned by completion of an approved substitute course.

** Some of the courses in this group may serve as prerequisites for above courses.

Course Offerings

Courses offered through the School of Engineering and Computer Science carry the following designations: computer science and engineering courses, CSE; electrical engineering courses, EE; systems engineering courses, SYS; mechanical engineering courses, ME. Courses offered under the general title of engineering are listed under EGR. For some of the courses, the semester(s) in which they are usually offered is indicated at the end of the course description. However, this is subject to change.

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 790 Doctoral Dissertation Research (2 to 12)
Directed research toward the doctoral dissertation.

COMPUTER SCIENCE AND ENGINEERING

For additional related courses students should refer to the course offerings in electrical engineering (EE) and systems engineering (SYS).

CSE 501 Programming and Data Structures (4)
Introduction to the C++ programming language, iteration and recursion, functions, strings, structures, pointers, concepts of abstract data type and object-oriented programming. Data structures including lists, stacks, queues, binary trees and their traversal, and searching and sorting. Applications including stack-based algorithms, binary search trees, expression trees, and heaps. An accelerated course intended to provide working knowledge in programming using data structures. Credit not applicable toward an M.S. degree in the CSE department. Offered fall, winter.
Prerequisites: Math 155 and knowledge of at least one high-level programming language.

CSE 502 Microprocessors, Computer Organization and Assembly Language Programming (4)
An accelerated course in computer organization, hardware design, and low-level programming. Assembly level machine organization, representation of data, memory organization and mapping, instruction set and programming, concepts of RISC and CISC machines, Boolean functions and circuits, minimization and design, flip-flops, excitation tables, design of synchronous sequential circuits, shift registers, study of single processor architectures, interfacing and communication. Credit not applicable toward an M.S. degree in the CSE department. Offered fall.
Prerequisite: CSE 501 or equivalent.

CSE 504 Discrete Structures and Foundations of Computer Science (4)
An accelerated course presenting fundamental mathematical background for computer science. Propositions, truth tables, implication, equivalence, logical proofs, quantifiers, mathematical induction. Sets, relations, functions, orderings, equivalences. Cardinality, counting, combinations, permutations, binomial coefficients, inclusion and exclusion principles. Digraphs, isomorphism, paths, cycles, adjacency matrices. Time orders of algorithms, NP-completeness, iteration versus recursion. Finite automaton acceptors and regular sets, context-free grammars and languages, pushdown automata, Turing machines, unsolvable problems. Credit not applicable toward an M.S. degree in the CSE department. Offered fall, winter.
Prerequisite: CSE 501 or equivalent.

CSE 510 Logic and Discrete Mathematics (4)
A graduate-level presentation of basic mathematical background for the study of computer science, computer engineering, and software engineering. Boolean expressions; propositional calculus; proofs; formal logic; quantification; predicate calculus; predicates and programming; sets, relations, functions, orderings, and equivalence relations; mathematical induction; integers and sequences; graph theory. Offered fall.
Prerequisite: CSE 504 or equivalent.

CSE 511 Design and Analysis of Algorithms (4)
This course covers computer algorithms, their design, and their analysis. Different strategies for constructing algorithmic solutions including Divide-and-Conquer, Dynamic Programming, and Greedy Algorithms are discussed and illustrated using graph and artificial intelligence problems. The development of algorithms for parallel and distributed architectures is also discussed. Computational complexity, as it pertains to time and space, is used to evaluate algorithms. Amortized analysis (aggregate and accounting methods) is introduced and used to evaluate data structures implementations. A general overview of complexity classes is given. The course emphasizes algorithm design rather than implementation. Offered fall.
Prerequisites: CSE 501 and 504 or equivalent.

CSE 512 Artificial Intelligence in Manufacturing (4)
This course focuses on the integration of the techniques and methodologies from artificial intelligence and manufacturing engineering. On the manufacturing side, issues of design, manufacturability, process planning, and cost analysis are cast around feature-based CAD/CAM technologies. The artificial intelligence techniques include standard transparent representation schemes of rule bases and semantic networks as well as the most up-to-date opaque representations of neural networks and genetic algorithms, both areas integrated with issues of fuzzy logic and control. Involves a large class project in the Artificial Intelligence in Manufacturing (AIM) laboratory. Offered winter.
Prerequisite: Background in artificial intelligence, manufacturing, or business.

CSE 513 Soft Computing (4)
This course studies algorithms that can be used to add humanlike intelligence to computer systems. Topics covered include fuzzy logic, artificial neural networks, genetic algorithms, and classification and regression trees. Applications to machine learning, pattern recognition, and intelligent automation. Offered fall.
Prerequisite: CSE 501 and 504 or equivalent.

CSE 514 Introduction to Logic Programming (4)
Principles and applications of declarative programming, using PROLOG as an example language. Emphasis is on the second-order logic as the foundation for a programming language. Various applications of logic programming are covered as the laboratory component of the course. Topics include theoretical foundations (propositional calculus, predicate calculus, inference rules, canonical forms, and proof systems), PROLOG (syntax, semantics, search tree, unification, backtracking, variable-binding, and recursion), and applications (symbolic processing, formula manipulation, program verification, rapid prototyping, language processing, expert systems, and theorem proving). Offered fall.
Prerequisites: CSE 501 and 504 or equivalent.

CSE 515 Expert Systems and Decision Support Systems (4)
Covers foundations, state-of-the-art, theory, and practice of both expert systems and decision support systems. Topics in expert systems include knowledge representation, reasoning under uncertainty, weak methods and role-limited methods, and knowledge acquisition reuse in the context of knowledge acquisition tools and meta-tools. Topics in decision support systems include decision theory and decision models, decision support systems architecture, and organizational and group support systems. Offered winter.
Prerequisite: CSE 516 is recommended but not required.

CSE 516 Artificial Intelligence (4)
Introduction to artificial intelligence techniques including knowledge representation using semantic networks, scripts, frames, predicate calculus, production and expert systems, and procedures; learning via symbolic and adaptive algorithms; natural language understanding; and game playing and other searching problems. Offered fall.
Prerequisite: CSE 335 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. Credit cannot be received for both CSE 517 and APM 533. Prerequisite: Knowledge of a scientific programming language.

CSE 518 Applied Numerical Methods: Matrix Methods (4)

Systems of linear and nonlinear equations, eigenvalue problems, optimization methods, statistical methods. Credit cannot be received for both CSE 518 and APM 534. Prerequisite: Knowledge of linear algebra and a scientific language.

CSE 521 Computer Program Construction (4)

This course studies the mechanisms underlying programming decisions and presents systematic procedures for making these decisions. The procedures studied cover the design of iterative loops, and sequence statements, along with general heuristics that represent problem solving strategies. The course uses the formalism of relational algebra. The relational algebra is covered in class. Offered fall. Prerequisites: CSE 501 and 504 or equivalent.

CSE 535 Programming Languages II (4)

Modern topics in programming languages such as: object-oriented languages, functional programming logic programming, parallel programming, concurrent programming in a distributed environment, formal syntax and semantics, exception handling, client-server programming. Offered winter. Prerequisites: CSE 231, 335 and 343.

CSE 537 Systematic Software Development (4)

A project-driven, language-independent, top-down software development method based on specifications and refinement of every step of design. It involves user-defined Abstract Operations and Abstract Data types. A variant of the Vienna Development Method (VDM) is used. Specification techniques are introduced gradually, instep with a nontrivial term project. An emphasis is placed on practical applications of the method. Offered winter. Prerequisites: Fluency in programming and a good command of data structures; APM 563 a plus.

CSE 538 Verification of Computer Programs (4)

Systematic methods of software verification, testing and analysis and the supporting CASE tools. Topics: principles of formal verification, static program analysis and dynamic program analysis (testing and debugging). A significant part of the course is its lab component. Offered fall. Prerequisite: CSE 501 or equivalent.

CSE 539 Software Engineering (4)

An overview of software development processes, tools, and techniques from the perspective of learning what they can and cannot do; deciding when, how and why to apply them; and selecting among the available alternatives. Requirements analysis and specification techniques; life-cycle models; process modeling; software design methods; project planning and management; quality assurance; configuration management; program and system testing. Offered fall. Prerequisite: CSE 231 or equivalent.

CSE 540 Software Quality (4)

Intended for students who have mastered fundamental design and programming skills. The impact of software design and construction techniques on structural quality for both object-oriented and traditional decomposition. The relationship between software structure and software maintainability (modifiability and readability) and reusability is emphasized. Topics include software design, object-oriented design and its impact on reuse and modifiability, information hiding, layers of abstraction, coupling and cohesion, polymorphism and inheritance hierarchies for reuse, designing reusable components and libraries, structuring code for maintenance, coding for readability, modularity, abstraction mechanisms in design, software complexity. Offered winter. Prerequisite: CSE 231 or equivalent.

CSE 541 Software Project Planning and Management (4)

Quantitative models of the software lifecycle; cost-effectiveness analysis; multiple-goal decision analysis; uncertainty and risk analysis; planning a software project; project modeling, scheduling, and milestones; resource allocation; software cost estimation; software engineering metrics; mechanisms for monitoring and controlling schedule, budget, quality, and productivity; staffing, leadership, motivation, and team building; communication management and project documentation. Offered fall. Prerequisite: CSE 539 or equivalent.

CSE 545 Database Systems I (4)

Study of the design and implementation of relational, hierarchical, and network database systems. Query/update languages; conceptual data models; physical storage methods; database system architecture; database security and integrity. Includes the study of existing systems. Offered fall. Prerequisite: CSE 501 and CSE 504 or equivalent.

CSE 546 Database Systems II (4)

Continuation of CSE 545. Concurrency control, recovery, and query optimization for database systems; distributed database systems; object-oriented database systems; knowledge-base systems; optimization of conjunctive queries and linear recursions; experimental knowledge-base systems; the universal relation as a user interface. Students will create and conduct studies of standard relational databases as a laboratory component of this course. Offered winter. Prerequisite: CSE 545 or equivalent.

CSE 547 Computer Communications (4)

A study of data communications and computer networks with emphasis on the functional characteristics of communications hardware and the design of communications control software. Standard protocols and interfaces. Case studies of local area networks and wide area networks. Communications software is designed and implemented as student projects. Offered fall. Prerequisite: CSE 550 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. Offered fall, winter. Prerequisites: CSE 501 and 502 or equivalent.

CSE 555 Computer Graphics I (4)

Introduction to the concepts underlying two- and three-dimensional computer graphics. Topics include an overview of graphics hardware and software; capabilities and algorithms of a two-dimensional raster graphics package; basics of three-dimensional raster graphics; algorithms for simple three-dimensional raster graphics; introduction to computer animation. Prerequisites: MTH 256 and CSE 231 or permission of instructor.

CSE 556 Computer Graphics II (4)

Continuation of CSE 555. Topics covered include realistic rendering techniques (hidden line/surface, lighting, shading, texture mapping); mathematics and data structures for curve, surface, and solid representation (including B-spline and Bezier techniques), advanced animation techniques (key-frame animation, morphing). Prerequisites: CSE 555 or permission of instructor.

CSE 564 Computer Organization and Architecture (4)

Stored program computers, theory and design of arithmetic-logic and control units, hardwired design and microprogrammed design, performance metrics and scalability, pipelined computer design, interfacing input/output units with processors, parallel processing. Emphasis of this course is on hardware design and organization. Offered winter. Prerequisite: CSE 502 or equivalent.

CSE 565 Compiler Design (4)

This is a project-oriented course in which the student develops a compiler for a simple language. Formal language and regular grammars; finite-state machines and lexical analysis; context-free grammars and parsing; syntax-directed translation and decorated parse-trees; symbol-table design; quadruples and other intermediate-forms; simple optimizations. Offered winter. Prerequisites: CSE 335 and 343.

CSE 570 Microprocessor-based Systems Design (4)

Application of microprocessors and microcomputers to the solution of typical problems; interfacing microprocessors with external systems; programming considerations. This is a laboratory, design-oriented course. Several short design projects and one large design project will be given. Credit cannot be earned for both CSE 570 and EE 570. Offered fall, winter.
Prerequisite: CSE 502 or equivalent.

CSE 571 Design of Embedded Software Computer Systems (4)

Design of real-time systems with microcontrollers such as the 68HC11 and 68332. Object-oriented software development using both assembly language and high-level languages. Use of interrupts. Project-oriented course. Offered winter.
Prerequisite: CSE 570 or equivalent.

CSE 578 Switching Theory (4)

Combinational switching functions, duality, NAND/NOR realization, functional decomposition of combinational circuits, symmetric functions, unate functions, threshold logic and design with threshold elements, iterative circuits, completely- and incompletely-specified sequential circuits and their minimization, Moore and Mealy models, asynchronous circuits, races, sequential machine decomposition. Emphasis is on the theoretical properties of switching functions and their design. Offered fall.
Prerequisites: CSE 502 and CSE 504 or equivalent.

CSE 580 Software Engineering Project (4)

Application of the methodologies, tools, and theory of software engineering to produce a specific, validated software product. Projects can be faculty-generated, self-generated, and/or work-related. All projects must be undertaken in concert with one or more CSE 580 students under the supervision of the instructor. Prior to enrollment, a project proposal must be prepared and approved by the instructor and one other SECS faculty member. Standard software engineering documents must be prepared and approved at each phase of the project and an oral presentation of the project to the CSE department is normally expected during the course. Course includes lectures on CASE tools and case studies in software engineering. Offered winter.
Prerequisites: Successful completion of at least six courses applicable to the M.S. degree in software engineering including CSE 541.

CSE 594 Independent Study (2 to 4)

Independent study in a special area of computer science and engineering. Topic must be approved prior to registration.

CSE 595 Special Topics (2 to 4)

Study of special topics in computer science and engineering. May be taken more than once.

CSE 647 Advanced Computer Communications (4)

Data communications networking technology; protocols and architecture; protocol specification and verification; network performance measurement and predication-analysis, simulation, and modeling. Offered winter.
Prerequisite: CSE 547 or equivalent.

CSE 650 Advanced Operating Systems (4)

This course focuses on distributed operating systems. Communication protocols such as message systems and RPC; synchronization of distributed systems; processes and processors; distributed file systems; distributed shared memory. Offered fall.
Prerequisite: CSE 550 or equivalent.

CSE 664 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 systems; parallel computers such as Illiac IV, PEPE, and STARAN; pipelined computers; multiprocessing by tight and loose coupling; distributed systems; data flow machines; architecture and software considerations. Offered winter.
Prerequisite: CSE 564.

CSE 665 Advanced Compiler Design (4)

Advanced topics in compiler design. Topics include language extensions, parsing algorithms, error correction, data flow analysis, code optimization strategies, and code generation strategies. Offered fall.
Prerequisite: CSE 565 or equivalent.

CSE 690 Graduate Computer Science and Engineering Project (2 to 12)

Independent work on an advanced computer science and engineering project. Topic must be approved prior to registration.

CSE 691 Master's Thesis Research (2 to 8)

Directed research leading to a master's thesis. Topic must be approved prior to registration.

CSE 794 Independent Study (2 to 4)

Advanced independent study in a special area of computer science and engineering. Topic must be approved prior to registration.

CSE 795 Special Topics (2 to 4)

Advanced study of special topics in computer science and 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 526 Instrumentation and Measurements (4)

Errors in measurements, error corrections and minimization; transducers and their applications; signal conditioning and interfacing; electromagnetic compatibility and interference problems in instrumentation; measurement instruments and their characteristics. Measurement systems, signal analyzers and data acquisition systems; signal conversion; computer and microprocessor based instrumentation. With laboratory. Offered fall.
Prerequisite: Permission of instructor.

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. Offered winter.
Prerequisite: Basic knowledge of linear systems.

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. Offered fall.
Prerequisite: A course in probability.

EE 545 Electromagnetic Engineering (4)

Electromagnetic theory with applications. Diffraction, radiation, propagation, guided waves, optical transmission and resonant cavities. Offered fall.
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 Microprocessor-based Systems Design (4)

Application of microprocessors and microcomputers to the solution of typical problems; interfacing microprocessors with external system; programming considerations. This is a laboratory, design oriented course. Several short design projects and one large design project will be given. Credit cannot be earned for both CSE 570 and EE 570. Offered fall, winter.

EE 572 Microcomputer-based Control Systems (4)

Microcomputer-aided control system design and implementation techniques; board-level microcomputer and digital signal processor technology; design and realization of digital controllers, estimators and filters; hardware development of stand-alone on-line microcomputer/processor-based control systems; real-time applications and multi-processor systems. A laboratory and project oriented course. Offered fall, winter.
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. Integrated circuits functional blocks, fabrication techniques, processing steps and equivalent circuits. Device modeling and simulation techniques used. Offered fall, winter.

EE 585 MOS VLSI Semicustom Design of Digital ASICs (4)

MOS integrated circuit fundamentals. NMOS, PMOS and CMOS processes. Inverters, logic and transmission gates, propagation delays. Design techniques, performance evaluation, speed/area/power trade off. PLAs, finite state machines, memory and registers. VLSI system design projects for semicustom integrated circuits using standard cell libraries and/or PLAs within the OCT TOOLS. Offered fall.

Prerequisite: Permission of instructor.

EE 587 Integrated Electronics (4)

Modern microelectronics processes and fabrication of integrated circuits. Crystal growth and wafer preparation, photolithography, dielectric and polysilicon film deposition, epitaxial growth, oxidation, diffusion, ion implantation, etching, metallization and integrated circuits layout principles. Introduction to MOS-based and bipolar junction transistor-based microcircuits design and fabrication. Fabrication processing simulation using SUPREM. With projects.

EE 594 Independent Study (2 to 4)

Independent study in a special area of electrical engineering. Topic must be approved prior to registration.

EE 595 Special Topics (2 to 4)

Study of special topics in electrical engineering. May be taken more than once.

EE 620 Multi-dimensional Signal Theory (4)

Random vector analysis. Generalized harmonic analysis. Correlation and spectrum analysis of stochastic fields. Multi-dimensional linear systems. Transformations of random fields in multidimensional systems. Elements of generalized functions and Hilbert spaces. Applications to signal field processing, image processing and antenna and sensor array design.

Prerequisite: SYS 520.

EE 625 Analog Integrated Circuit Design (4)

Building blocks of analog integrated circuits and their limitations; characteristics, analysis and applications of analog integrated circuits; principles of circuit and system design with analog integrated circuits. Offered winter.

Prerequisites: Permission of instructor.

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 635 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 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. Offered winter.

Prerequisite: Basic knowledge of linear systems.

EE 638 Digital Image Processing (4)

Fundamentals of digital image processing; review of one-dimensional signal processing techniques; introduction to two-dimensional signals and systems; two-dimensional digital filtering; image enhancement techniques; statistical model based methods and algebraic techniques for image restoration; image data compression; image analysis and computer vision. Selected applications.

Prerequisites: Knowledge of linear systems, and probability and statistics.

EE 682 Field-Effect Devices (4)

Electronic structure of semiconductor surfaces. Concepts of surface states and surface charge. Metal-Semiconductor (MS) contacts: ohmic and rectifying. Conductivity modulation and the theory of JFET and MESFET transistors. Integrated device technology, including Silicon on Sapphire (SOS) and Silicon on Insulator (SOI) structures and their application.

Prerequisite: EE 581.

EE 683 Advanced MOS Very Large Scale Integration (4)

Full custom design, analysis and techniques of ASICs. 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. Advanced analog/digital systems design. Offered winter.

Prerequisite: Permission of instructor.

EE 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project in electrical engineering. Topic must be approved prior to registration.

EE 691 Master's Thesis Research (2 to 8)

Directed research leading to a master's thesis. Topic must be approved prior to registration.

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)

Transmission lines with sinusoidal and pulse excitation. Passive and active circuit components at high frequency. High frequency amplifiers, communication circuits, waveform generators and digital circuits. Introduction to high frequency measurements.

Prerequisite: SYS 520 or EE 625.

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 794 Independent Study (2 to 4)

Advanced independent study in a special area in electrical engineering. Topic must be approved prior to registration.

EE 795 Special Topics (2 to 4)

Advanced study of special topics in electrical engineering. May be taken more than once.

MECHANICAL ENGINEERING**ME 510 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. Offered winter, odd years.

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. Offered winter.

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. Offered winter.

ME 538 Fluid Transport (4)

Continued study of the fundamentals of fluid mechanics and their applications; angular momentum principle, generalized study of various turbomachines, potential flow of inviscid fluids; laminar and turbulent boundary layer theory; dimensional analysis and similitude; compressible flow. With laboratory emphasizing engineering design. Offered fall.

ME 548 Thermal Energy Transport (4)

Continued study of properties and descriptions of conduction, convection and thermal radiation heat transfer; thermal boundary layer theory; forced and natural convection, heat transfer correlations. Thermodynamics of thermal radiation, radiation intensity, surface properties and energy exchange. Laboratory emphasizes experimental design and development of empirical relationships. Offered winter.

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 engineering and design problems. Offered winter, odd years.

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. Includes design project(s). With laboratory. Offered winter.

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. Offered winter. 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, beams on elastic foundation, curved and composite beams, rotating disks, thick-walled cylinders, and energy methods. Offered fall.

ME 563 Applied Elasticity (4)

Fundamentals of solid mechanics, stress-strain and equilibrium and compatibility equations, generalized Hook's law, boundary conditions. Plane strain and generalized plane stress, plane elasticity. Airy stress function, torsion and bending, St. Venant principle, introduction to thermoelasticity, and numerical methods. Offered winter.

ME 564 Mechanics of Composite Materials (4)

Introduction to composite materials. Forming procedures and manufacturing. Basic principles of fiber-reinforced composite materials. Introduction to micromechanics of a lamina. Macromechanical behavior of a laminate. Bending of laminated plates. Stress analysis of viscoelastic composite materials. Characterization and design of composite materials. Structural synthesis. Offered winter, odd years.

ME 565 Experimental Stress Analysis (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. Offered fall, winter.

ME 567 Optical Measurement and Quality Inspection (4)

Topics include the state-of-the-art optical methods such as holography, shearography, moire, three-dimensional computer vision, electronic speckle pattern interferometry and laser triangulation; with applications to measurement of displacement, vibrational mode shapes, material properties, residual stresses, three-dimensional shapes, quality inspection and nondestructive testing. Offered fall.

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. Offered fall.

ME 572 Material Properties and Processes (4)

Study of mechanical behavior of real engineering materials and how they influence mechanical design. True stress/strain properties of materials, plastic deformation and fracture of materials, failure theories, fatigue damage under cyclic loading, creep and high temperature applications. Material properties of engineering metals, ceramics and composites. Behavior of materials during and after manufacturing processes such as stamping, drawing, extrusion, etc. Offered winter.

ME 574 Manufacturing Processes (4)

Fundamentals and technology of machining, forming, casting and welding. Mechanics of cutting. Molding of polymers. Tolerancing and surface topography. Manufacturing considerations in design. Economics of manufacturing. With laboratory. Offered fall.

ME 575 Lubrication, Friction and Wear (4)

Study of fundamental wear mechanisms including: adhesive, abrasive, corrosive and surface fatigue. Boundary and hydrodynamic lubrication. Friction theories. Surface topography characterization. Applications: journal and ball bearings, gears and engine components. Offered spring.

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 with design-oriented laboratory projects. Offered fall.

ME 587 Mechanical Engineering CAD/CAM Systems (4)

Introduction to the use of CAD/CAM systems in mechanical engineering design. Fundamentals of computer graphics, finite element modeling and interactive design. Analysis and evaluation of the static, dynamic and thermal mechanical systems designed on the CAD/CAM system. Includes design project(s) in various topics. Offered fall.

ME 594 Independent Study (2 to 4)

Independent study in a special area in mechanical engineering. Topic must be approved prior to registration.

ME 595 Special Topics (2 to 4)

Study of special topics in mechanical engineering. May be taken more than once.

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. Offered winter, even years.

ME 639 Gas Dynamics (4)

Fundamental theories and applications of high-speed aerodynamics are the major subjects of the course. One-dimensional gas dynamics and wave motion. Shock waves in supersonic flow. Flow in ducts and wind tunnels. The equations of three-dimensional frictionless flow. Small-perturbation theory. Slender body theory. The similarity rules of high-speed flow and methods of measurement. Transonic flow. The method of characteristics. Offered fall, odd years.

Prerequisite: ME 538

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. Offered fall.

ME 665 Optical Methods in Experimental Mechanics (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. Offered winter.

ME 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project in mechanical engineering. Topic must be approved prior to registration.

ME 691 Master's Thesis Research (2 to 8)

Directed research leading to a master's thesis. Topic must be approved prior to registration.

ME 794 Independent Study (2 to 4)

Advanced independent study in a special area in mechanical engineering. Topic must be approved prior to registration.

ME 795 Special Topics (2 to 4)

Advanced study of special topics in mechanical engineering. May be taken more than once.

SYSTEMS ENGINEERING

For related courses students should refer to course offerings in electrical engineering (EE) and computer science and engineering (CSE).

SYS 422 Robotic Systems (4)

Overview of industrial robots, their components and typical applications. Kinematics of robots and solution of kinematic equations. Path planning. Vision and pattern recognition. Robots and solution of kinematic equations. Path planning. Vision and pattern recognition. Robot and vision programming languages. Laboratory experience in the development and implementation of a robot language environment using minirobots. Offered fall.

SYS 510 Systems Optimization and Design (4)

Classical optimization techniques including Lagrange multipliers and Kuhn-Tucker conditions. Computer techniques for system optimization including linear programming, constrained and unconstrained nonlinear programming. System design-case studies. The course emphasizes a capstone design experience involving system modeling, simulation and optimal design. Offered winter.

SYS 517 Probability and Its Engineering Applications (4)

Techniques and topics from probability of use to engineers, particularly those interested in manufacturing. Includes topics from statistics, control charts, propagation of error and tolerancing, analysis of queuing systems using birth and death processes and Markov chains, reliability, decision trees, etc. Offered winter, even years.

Prerequisite: Course in probability.

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. Offered fall.

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, transmission and distribution of electrical energy. Analysis and design of three-phase circuits, per unit normalization, system design evaluation and load-flow, symmetrical components and stability. Offered winter.

SYS 563 Foundation of Computer-aided Design (4)

Computer-aided design as the keystone in computer integrated manufacturing. Designs of mathematical representations for applications and databases. Hermite, Bezier, splines, B-splines and Liming curves. Hermite, Bezier, Coon's tensor product and Gordon surfaces. Approximation versus design of curves and surfaces. Communication among computer-aided design systems. Offered fall.

SYS 569 Computer Simulation in Engineering (4)

Basic modeling and simulation methods for discrete, lumped and continuous systems, discrete-event systems; software verification and interactive graphical output interpretation; fundamentals of system identification; model validation and credibility considerations. Emphasis on modern simulation theory, software and design demonstration of practical engineering applications including manufacturing systems. Offered winter.

Prerequisite: Permission of instructor.

SYS 583 Production Systems (4)

Design of computer systems to control the flow of material in manufacturing systems from forecast to finished product. Topics include parts explosion, bill-of material, inventory control, Pareto distribution, lead time MRP, shop floor control, line balancing, etc. Offered fall.

Prerequisite: Course in probability.

SYS 585 Statistical Quality Control (4)

Fundamentals of statistical quality control and their use in design of systems. Control charts for mean and range for variables, 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. Offered winter.

Prerequisite: Course in probability.

SYS 594 Independent Study (2 to 4)

Independent study in a special area in systems engineering. Topic must be approved prior to registration.

SYS 595 Special Topics (2 to 4)

Study of special topics in systems engineering. May be taken more than once.

SYS 623 Dynamics and Control of Robot Manipulators (4)

Representatives and transformations in Cartesian and joint space. Denavit-Hartenberg link modeling, robot kinematics and path planning. Newton-Euler and Lagrangian dynamic formulation, analysis of robotic systems and linearizations. Position control, force control and compliant motion. Stimulation and realization. Offered winter.

Prerequisite: SYS 520.

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. Offered winter.

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. Offered fall.

Prerequisite: SYS 630.

SYS 632 Analysis of Nonlinear Control Systems (4)

Nonlinear dynamic systems modeling and analysis by differential geometry and Lie algebra representation methods. Controllability, observability, system invertibility and system decomposition. Global linearization theory, control strategies and engineering applications. Theory of nonlinear control system stability and stabilization. Approximation analysis methods and computer simulation studies. Offered fall.
Prerequisite: SYS 520.

SYS 634 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 533.

SYS 635 Adaptive Control Systems (4)

Classifications of self-tuning and adaptive systems; parameter estimation techniques, self-tuning regulators and state estimators, stability and convergence analyses; model reference adaptive systems using Lyapunov and hyperstability methods; applications of adaptive control systems; computer simulation and laboratory experiments.
Prerequisites: SYS 520.

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. Project demonstrates the application of 3-D graphics to the analysis and design of engineering applications.
Prerequisite: SYS 563.

SYS 674 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. Pole-placement and observer/estimator techniques. Actual construction of a microcomputer-based controller culminates the course. Offered fall.
Prerequisite: SYS 520.

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.

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. Offered fall.

SYS 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project in systems engineering. Topic must be approved prior to registration.

SYS 691 Master's Thesis Research (2 to 8)

Directed research leading to a master's thesis. Topic must be approved prior to registration.

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 520.

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 735 Intelligent Control Systems (4)

Definition and paradigm for intelligent control; self-learning and supervised learning; hierarchical decision architecture; fuzzy logic, neural network, heuristics, genetic algorithm, optimum strategy and related topics; examples of intelligent and autonomous systems; computer simulation and visualization of applications.
Prerequisite: Permission of instructor.

SYS 788 Propagation of Error (4)

The response of a system with many components differs from the desired response when there are random deviations from the nominals in the component values (as in statistical tolerancing in manufacturing). The course addresses the central problem which is to quantify the relationship between these errors, analytically, experimentally, graphically or by means of engineering calculations, etc. Both analytical and numerical methods are developed: the n-dimensional Taylor series expansion is the basic tool for the analytical case while n-dimensional numerical integration is used for the other cases. Computer methods are developed to make these techniques practical. Offered winter.
Prerequisite: Course in probability.

SYS 794 Independent Study (2 to 4)

Advanced independent study in a special area in systems engineering. Topic must be approved prior to registration.

SYS 795 Special Topics (2 to 4)

Advanced study of special topics in systems engineering. May be taken more than once.

ENGINEERING MANAGEMENT

For engineering component of this program see courses listed under computer science and engineering (CSE), electrical engineering (EE), mechanical engineering (ME) and systems engineering (SYS). For business component of the program, relevant course descriptions are as follows:

ACC 511 Financial Accounting (3)

Focus is on financial accounting for external reporting: communications addressed to shareholders, government agencies, potential investors and the public.

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.

ECN 520 Managerial Economics (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.

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.

FIN 533 Financial Management (3)

Introduction to the institutions, instruments, theories and analytical tools of financial management. Emphasis is placed on return versus risk valuation tradeoff. Topics include capital budgeting, cost of capital, capital structure, dividend policy, cash management, accounts receivable, short-term debt, financial statement analysis, international financial management and financial forecasting.

MGT 550 Legal Environment of Business (3)

Examination of the legal environment as it affects business, emphasizing the U.S. and international legal systems, ethical analysis of public policy and managerial decisions, functions and powers of regulatory agencies, and the laws relating to securities, business organizations, employment practices, antitrust and the environment.

MIS 524 Management Information Systems (3)

Development of information systems from the perspective of the manager as a user. Survey of the behavioral, organizational and systems theory foundations of MIS; the systems development process and alternative system development strategies; and the integration of data processing, decision support systems, office automation, and telecommunications across functional areas.

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, multinational issues and the information systems staff.

MKT 560 Marketing (3)

Focuses on problems of product planning, market segmentation, demand analysis, consumer behavior, product distribution, pricing and promotion in both domestic and international markets. The approach to these problems considers both the normative or theoretical, and the empirical or marketing research orientations.

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. Where appropriate, cross cultural issues will be discussed.

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.

POM 521 Operations Management (3)

Study of operations of manufacturing and service organizations. Introduction to operational design and control issues such as forecasting, capacity planning, facility location and layout, production control, material requirements planning, scheduling and quality assurance. Includes international, legal and ethical aspects, as well as computer exercises.

SCHOOL OF HEALTH SCIENCES

Dean: Ronald E. Olson

General Information

The School of Health Sciences offers degree and non-degree programs in health and medically related fields. A program leading to the Master of Science degree is offered in exercise science. A program leading to the Master of Physical Therapy degree is offered to students initially completing a required undergraduate pre-physical therapy curriculum and a bachelor of sciences in health sciences as described in the *Oakland University Undergraduate Catalog*. A non-degree graduate certificate in orthopedic manual physical therapy program is offered to physical therapists who have acquired clinical experience following an entry level physical therapy education. Finally, a number of graduate level courses are offered through the school's program in industrial health and safety for students who wish to enroll on a non-degree basis or who may be able to apply these courses as electives to a graduate degree in a related field.

A Master of Science in physical therapy is anticipated to be approved in 1995. This would be an advanced degree option for individuals already holding an entry level physical therapy degree.

The Meadow Brook Health Enhancement Institute is a university facility of the School of Health Sciences. The institute offers programs addressing health promotion and disease prevention, including programs for health maintenance, cardiac rehabilitation, diabetic health, women's health, nutrition, weight control, stress management, smoking cessation, movement re-education and others. The full-time staff of the institute provides these programs to the university community as well as to the public at large through individual or corporate associations.

The School of Health Sciences' Clinical Research Laboratory provides facilities and expertise to university and subscribing hospital investigators involved with biomedical research.

Admission to any program offered by the School of Health Sciences may be considered on a competitive basis if the balance between applicants and available instructional resources requires such action to maintain the academic integrity of the program.

Exercise Science Program

Director:

Brian R. Goslin

Associate professors:

Brian R. Goslin, Ph.D., Rhodes University

Robert W. Jarski, Ph.D., University of Iowa

Charles R.C. Marks, Ph.D., University of Michigan

Alfred W. Stransky, Ph.D., Florida State University

Clinical professors:

Barry A. Franklin, Ph.D., Pennsylvania State University

Murray B. Levin, M.D., Wayne State University

Clinical associate professors:

John J. Karazin, M.D., Wayne State University

John F. Kazmierski, D.O., College of Osteopathic Medicine and Surgery, Des Moines, Iowa

Steven J. Keteyian, Ph.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:

Albert A. DePolo, Jr., D.O., *Philadelphia College of Osteopathic Medicine*
 Robert C. Nestor, D.O., *Kansas City College of Osteopathic Medicine*
 Chandra S. Reddy, M.D., *Osmania Medical College (India)*
 Thomas E. Schomaker, D.O., *Chicago College of Osteopathic Medicine*
 Robert L. Segula, M.D., *University of Michigan*

Adjunct assistant professor:

Jack T. Wilson, Ph.D., *University of Northern Colorado*

Clinical instructor:

Henry R. DeLorme, M.S., *Oakland University*

The Master of Science in Exercise Science

This interdisciplinary program emphasizes the role of exercise in health improvement and in the primary and secondary prevention of chronic degenerative disease. The curriculum addresses the interrelationships among life-style, health and physical activity and optimization of human performance. Clinical experience is gained through the University's Meadow Brook Health Enhancement Institute and other cooperating internship sites. 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 is 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. 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 is removed.

Admission to this program is competitive. All required application materials should be sent to the Office of Graduate Study at least three months prior to the start of the desired term of entry (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 chair, and two committee members agreed upon by the student and chair. 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. *All thesis requirements must conform to university standards (see "master's thesis and doctoral dissertation" section in the Policies and Procedures section of this catalog).*

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. At least one internship shall be taken at a health promotion/disease prevention facility. Students are expected to satisfy this requirement by completing one internship at the Meadow Brook Health Enhancement Institute. 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.

Code of Ethics

Along with scholarly preparation in the appropriate academic disciplines, high levels of ethical conduct are considered essential for those who are involved in health care. Students are expected to comply with the principles of the Code of Ethics and Professional Conduct of the American College of Sports Medicine. Violations will be brought before the faculty and could result in dismissal from the program.

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 (400 level or above) 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.

See *Course Offerings* section.

Physical Therapy Program

Interim Director: *Christine Stiller Sermo*

Associate professors:

Osa Jackson, Ph.D., University of Michigan

Kornelia Kulig, Ph.D., Academy of Physical Education (Wroclaw, Poland)

Special instructors:

Christine Stiller Sermo, M.A., Wayne State University

Kristine Thompson, M.P.H., University of Michigan

Visiting assistant professors:

Faye Cobb, M.A., Wayne State University

Gretchen D. Reeves, Ph.D., University of Michigan

Clinical professor:

A. Charles Dorando, B.S., Adelphi College

Consulting professor:

Olaf Evjenth, Orthopedic Institute, Oslo, Norway

Clinical assistant professors:

Frank C. Kava, M.S., University of Kentucky

Kristie S. Kava, M.S., University of Kentucky

Bjorn W. Svendsen, D.H.Sc., Loma Linda University

Consulting assistant professor:

Lasse Thue, School of Physical Therapy of Berlin

Senior clinical instructor:

Cathy A. Larson, M.S., University of Alabama (Birmingham)

Clinical instructors:

Michael R. Beauvais, B.S., Wayne State University

Reyna T. Blumentritt, M.A., Central Michigan University

Henry D. Boutros, M.Ed., Wayne State University

Mary L. Drumheller, M.S., Mercy College of Detroit

David K. Gilboe, B.S., Wayne State University

Dorothy J. Indish, B.S., Wayne State University

Kathleen Jakubiak Kovacek, B.S., Wayne State University

Peter R. Kovacek, M.S., Central Michigan University

Rick Orlandoni, B.S., Wayne State University

Jeffrey Placzek, B.S., Oakland University

Marilyn J. Raymond, M.A., Wayne State University

Helene M. Rosen, B.S., University of Michigan

Daniel A. Selahowski, B.S., New York University

Jody Tomasic, B.S., Oakland University

Kenneth M. Woodward, C.P.O.

The Master of Physical Therapy

The Master of Physical Therapy degree is an entry-level graduate program which prepares individuals for licensure in the physical therapy profession. As a graduate program, it includes advanced theoretical, clinical practice and research courses and experiences to prepare graduates to function at the forefront of the profession.

Physical therapists are concerned with the prevention and treatment of acute and chronic conditions which cause disorders of movement. In order to provide appropriate treatment, physical therapists evaluate the musculoskeletal, neuromuscular, cardiopulmonary and associated systems calling on the basic sciences and the behavioral sciences in the interpretation of this evaluation. Patient programs are then developed to resolve movement dysfunctions. Physical therapists work in concert with all members of the health care team through a variety of referral relationships.

The program is accredited by the Commission on Accreditation of Physical Therapy Education.

Admission

The Master of Physical Therapy degree program represents the second half of a three-year professional program which begins at the undergraduate level at Oakland University. As such, admission to this program is restricted to those students admitted into and successfully completing the undergraduate portion of the program as described in the *Oakland University Undergraduate Catalog*. Students completing the undergraduate portion of the program will have earned a minimum of 63 semester hours of course work (excluding transfer credits, electives and general education requirements) at Oakland University by completing the following courses: BIO 381, 460; EXS 304; HS 324, 391, 401; PHY 325; PT 300, 301, 311, 330, 331, 332, 333, 334, 351, 360, 370, 420, 442, 452, 460. Students completing the undergraduate portion of the program will have earned a Bachelor of Science in Health Science degree or an equivalent degree.

Requirements for the degree

Students admitted to the MPT program are required to attend a full-time program of prescribed course work. A new class of students begins this program each winter semester and ends four semesters later, following completion of the winter semester of the second year. A minimum of 49 semester hours of credit are required for the degree, consisting of the following courses: HS 331, 534; PT 512, 513, 521, 522, 533, 553, 554, 555, 561, 571, 572, 577, 592, 599.

Grade point policy

The grading policy of the Office of Graduate Study (see the *Policies and Procedures* section of this catalog) will be followed for students in the MPT program. That is, a 3.00 grade point average for all course work taken in the graduate phase of the program is required for graduation and no grade below 2.0 may be applied toward this degree. Student progress throughout the program will be monitored by the Physical Therapy Promotion and Graduation Committee. Students whose GPA falls below 3.00 shall be subject to probation and will be informed of their probationary status, including the grounds for the decision. Students receiving a GPA of less than 3.00 more than once are subject to suspension or dismissal from the program. Dismissal by the Dean of Graduate Study is based on a recommendation from the Physical Therapy Promotion and Graduation Committee. Students should consult page 24 of this catalog for appeal procedures concerning academic dismissals.

Code of ethics

Ethical conduct is critical to a profession. Students are required to abide by the *Physical Therapy Code of Ethics and Guide of Professional Conduct*, published by the American Physical Therapy Association. Violations will be reviewed by the Physical Therapy Promotion and Graduation Committee and could result in dismissal from the program.

Graduate Certificate in Orthopedic Manual Physical Therapy

The graduate certificate in orthopedic manual physical therapy is designed to offer advanced, graduate level courses in orthopedics to physical therapists interested in developing clinical specialty skills. This educational program provides advanced theoretical and clinical training, emphasizing differential diagnosis and manual therapy procedures.

The certificate program is offered as a part-time course of study accommodating the needs of working professionals. Students enrolled in the program will participate in 17 credits of course work including orthopedic theory, techniques and clinical internship training. The length of study for this part-time program is three years, with courses being offered primarily on a weekend and evening basis. The clinical internship training entails 440 hours of supervised clinical training at an approved clinical site. All of the required courses that comprise this certificate can be applied to the Master of Science in Physical Therapy degree which is anticipated to be approved in 1995.

Admission

To be eligible for admission to this program, individuals must hold an entry level physical therapy degree (i.e., Bachelor of Science or Master of Physical Therapy) from an APTA accredited program, or its equivalency, and be licensed as a physical therapist in the state of Michigan. Two years of clinical experience is highly recommended. Class size is limited due to the nature and sequencing of the manual therapy technique courses. A new group of students is accepted every even-numbered year.

Fees

Special course fees are associated with several of the courses required for the certificate.

Requirements for the certificate

To fulfill the certificate requirements the student must complete, with at least a 2.0 grade in each course and an overall grade point average of 3.00, a program consisting of PT 510, 511, 520, 601, 602, 611 and 677.

Course Offerings

EXERCISE SCIENCE

(Scheduling of classes subject to change.)

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. Offered in the fall semester.

Prerequisite: STA 225, graduate status.

EXS 505 Health and Disease (2)

This course familiarizes the student with the pathogenesis of representative diseases and the physical changes associated with varying states of health and disease. Information from the health and medical history focus upon factors that are life-style related. Offered spring semester in odd-numbered years.

Prerequisite: BIO 111 and 207, or instructor's permission.

EXS 510 Stress Management (2)

This course examines the causes of stress and the changes that occur as a result. The physiological and psychological results of stress are investigated. Practical solutions to improving stress management that include recognition of the most common symptoms are discussed. Offered spring semester in even-numbered years.

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. Offered in the fall semester.

Prerequisite: BIO 325 or CHM 201, EXS 304 or instructor's permission.

EXS 521 Basic Athletic Training (2)

Course directed to competitive sports and the recognition and immediate care of athletic injuries.

EXS 525 Biomechanics (4)

This course emphasizes the principles of mechanics applied to human movement. Students learn the principles of applied kinesiology for the analysis of exercise, gait and physical activity in recreational and occupational settings. Qualitative and quantitative techniques for human motion analysis are presented. Offered winter semester.

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. Offered in the winter semester.

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. Offered in the fall semester.

Prerequisite: BIO 325 or CHM 201, EXS 304 or instructor's permission.

EXS 545 Physical Activity and Aging (2)

This course explores concepts underlying corporate and worksite health promotion programs. It examines administration of these programs including: health and exercise program planning; facility planning and design; program management; staffing; equipment selection; safety and legal issues; and marketing. Offered spring semester in odd-numbered years.

Prerequisite: EXS 304, permission of instructor.

EXS 550 Corporate and Worksite Wellness Programs (2)

This course explores concepts underlying corporate and worksite health promotion programs. It examines administration of these programs including: health and exercise program planning; facility planning and design; program management; staffing; equipment selection; safety and legal issues; and marketing. Offered spring semester in odd-numbered years.

Prerequisite: EXS 304, permission of instructor.

EXS 580 Preventative Nutrition Through the Life Span (2)

This course emphasizes the preventative benefits of life-style changes in physical activity and nutrition through the life span as they apply to the chronic degenerative diseases including diabetes, cancer and cardiovascular diseases. Offered spring semester in even-numbered years.

Prerequisite: EXS 540

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. Offered every semester.

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. Offered winter and summer semesters.

Prerequisite: EXS 510, 520 and 530 or instructor's permission.

EXS 610 Clinical Biomechanics (2)

This course focuses on the pathomechanics of the human musculoskeletal system. The use of exercise in rehabilitation, sports medicine and clinical settings is explored. Topics include static and dynamic properties of human tissue, mechanisms of injury, pathokinesiology in various anatomical regions, and principles of musculoskeletal exercise prescription. Offered fall semester in even-numbered years. Prerequisite: EXS 350 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. Offered winter semester. 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 630 Seminar in Exercise Science (2)

In-depth study of often cited, controversial, or recent research articles on a topic in exercise science. Students will give oral critiques of articles and write one review paper. Offered every other year. Prerequisite: EXS 500 and 520.

EXS 635 Environment and Human Performance (2)

A multi-perspective consideration of human adaptation to major factors which can significantly influence human movement in diverse micro- and macro-environments. Factors to be considered include temperature, altitude, precipitation, light, noise and sociocultural. Health/safety in locomotion, rehabilitation, sport/recreation, and occupational contexts are emphasized. Offered fall semester in odd-numbered years. Prerequisite: EXS 304, EXS 520 or instructor's permission.

EXS 650 Independent Study (2-6)

In-depth study of exercise science topics approved by the student's faculty adviser and comprehensive examination committee. Written and oral comprehensive examinations are given to determine if the student has acquired knowledge of exercise science expected of a master's degree candidate. Offered every semester. Prerequisite: 20 credits of graduate study, including EXS 500.

EXS 690 Thesis Research (2-6)

Independent research approved by the student's faculty adviser and thesis committee. The student will present the methodology and findings of his/her work in the form of a written master's thesis. In addition, an oral defense of the thesis will be scheduled following acceptance of the written thesis. Offered every semester. Prerequisite: 20 credits of graduate study, including EXS 500.

HEALTH SCIENCES**HS 534 Administration and Health Care Delivery (3)**

Discussion and group experiences dealing with various aspects of health care administration including: management theories, employee motivation, billing, patient-care audit, policies and procedures, problem-oriented medical record, quality assurance, code of ethics and public relations. A joint lecture for physical therapy and medical laboratory sciences students and separate discussion/seminar sessions will be held for each discipline to focus on issues unique to that profession.

INDUSTRIAL HEALTH AND SAFETY

(The Industrial Health and Safety Program does not offer a graduate degree program. However, it has been authorized to offer the following graduate courses.)

IHS 503 Industrial Toxicology (3)

Concepts and techniques of toxicology with special attention to industrial work environments. Evaluation of the effects of toxic substances on the human body. Focus on responses of various systems within the body to selected toxic agents. Prerequisite: BIO 207, CHM 204, IHS 302.

IHS 504 Ergonomics (2)

Ergonomics and related change management concepts; anthropometry, biomechanics, metabolic energy expenditure, capabilities and limitations of workers; design and analysis of the work place, hand tools, controls and products; application of the NIOSH Lifting Guidelines and other standards. Graduate students will be required to do a research project involving ergonomics.

IHS 510 Health Care Facility Safety (2)

Critical health care associated risks such as blood borne diseases, radiation, medical waste handling and back injuries as well as the general topics of ergonomics, construction, hazardous waste and fire safety as they relate to diverse health care facilities.

PHYSICAL THERAPY**PT 503 Diagnostic Imaging (2)**

Diagnostic imaging techniques (roentgenography, MRI, CT, etc.) as they apply to evaluation of the neuromusculoskeletal system are presented and discussed. Radiographic interpretation and imaging interpretation of various traumatic lesions and arthropathies that affect the musculoskeletal and associated systems will be conducted. Selected correlations with physical and laboratory findings will be discussed. Prerequisite: PT 513 or equivalent or physical therapy license.

PT 510 Advanced Orthopedics I (4)

This course introduces the practical foundation for clinical practice as a specialist in orthopedic rehabilitation. Lectures, laboratories and case presentations build on basic skills in refining evaluation, preventive care and treatment skills for orthopedic disorders. Prerequisite: Two years of clinical experience recommended.

PT 511 Advanced Orthopedics II (2)

A lecture and laboratory course on differential diagnosis of musculoskeletal dysfunction and application of manual therapy treatment techniques in varying soft tissue restrictions. Prerequisite: PT 510.

PT 512 Arthrology (2)

The in-depth study of human articulations based on current research publications and cadaver studies. Lecture, seminar and laboratory sessions.

PT 513 Musculoskeletal System (4)

Lectures, demonstrations and case presentation of orthopedic disorders from the standpoints of etiology, clinical signs and symptoms, treatment and prognosis. Joint mobilization techniques are emphasized.

PT 520 Advanced Orthopedics III (2)

A lecture and laboratory course on differential diagnosis of musculoskeletal dysfunction and application of manual therapy treatment techniques in varying soft tissue lesions.

PT 521 Neuromuscular System (4)

Development of evaluation and treatment approaches for patients with neuromuscular problems. Neuroanatomy/neurophysiology of treatment approaches mentioned with emphasis on development of clinical skills through lecture, laboratory and problem-solving sessions.

PT 522 Prosthetics and Orthotics (2)

Principles and techniques in the evaluation and management of clients requiring prosthetic and/or orthotic devices.

PT 553 Electrotherapy (3)

Principles and techniques of evaluation and treatment of pathological conditions using electrotesting and electrotherapy procedures. Descriptive medical electronics and instrumentation, lecture, laboratory and problem-solving sessions.

PT 550 Clinical Anatomy and Neuroanatomy (3)

This course includes cadaver dissection with emphasis on the spine. There will be a review of functional anatomy relative to surface palpation of bone, ligament/tendon and muscles. A detailed description of joints, their surfaces, the ligamentous relationships including functional relationships between the noncontractile and contractile structures and the peripheral nervous system is analyzed. Vascular and neural supplies to the musculoskeletal system are described.

Prerequisite: Human gross anatomy.

PT 553 Clinical Education III (2)

Clinical education including integration of patient evaluation and treatment planning and implementation with an emphasis on the patient with neuromuscular abnormalities.

PT 554 Clinical Education IV (8)

A full-time supervised clinical experience in a specialty area. The length of the experience will vary according to the site and area. Each student will work with the Academic Coordinator of Clinical Education to develop a clinical experience to meet their personal interests. Student initiative to develop clinical experience is an integral part of the course.

PT 555 Community Health (2)

Concepts of community health education, public health and health behavior will be presented. Strategies for assessing health education needs and changing health behaviors in the practice of physical therapy will be discussed. Methods of identifying and assessing community resources will be addressed. Students are graded on a project, journal and final exam.

PT 561 Physical Therapy and the Human Life Cycle II (2)

This course describes the normal age related changes from adulthood into old age in terms of physiology, psychology, sociology and environmental resources. The focus of this course is to highlight how patient assessment and treatment need to be adapted in light of normal age related changes.

PT 570 Musculoskeletal Biomechanics (3)

Current biomechanical literature on peripheral and spinal joint arthrokinematics is extensively analyzed. Musculoskeletal measurement techniques and methodology are studied and applied in a developed research study (patient case). Selected aspects of ergonomics are addressed including work and leisure seating design, night rest furniture and accessories.

Prerequisite: EXS 350 or PT 311 or equivalent. Licensure in physical therapy.

PT 571 Cardiopulmonary System (3)

Physiology, pathophysiology, evaluation and treatment of disorders of the pulmonary and cardiac systems. Therapeutic principles are relevant to all patients, not only those with a primary diagnosis of cardiopulmonary abnormalities. Module on EKG interpretation included. Clinical application and problem-solving skills are the emphasis of the laboratory sessions.

PT 572 Rehabilitation Procedures (4)

Principles and techniques in the evaluation and management of neuromuscular and musculoskeletal involved clients with focus on the spinal cord injury (SCI), traumatic brain injury (TBI), cerebral vascular accident (CVA), and cerebral palsy (CP) patient populations.

PT 577 Diagnostic and Referral Systems (3)

A course designed to facilitate the student to synthesize evaluation skills in physical therapy with differential diagnostic skills; to refine the student's knowledge of other professionals to whom the PT refers and from whom the PT receives referrals; to develop prognostic skills using algorithms and clinical decision trees.

PT 590 Advanced Clinical Research Design (4)

Research study designs and methodologies most relevant to clinical practice are presented. Topics include: scientific method, ethics, conceptualization of research problems and interpretation of existing research. Emphasis given to: single case design, meta analysis case study design, historical case design, qualitative designs and the taxonomy of building designs.

Prerequisite: Licensure in physical therapy.

PT 592 Research II (2)

Course focusing on development of proposal, methodology, data collection and development of outline of student research project. HS 391 is a required foundation course.

PT 593 Neurorehabilitation Seminar (2)

Detailed analysis of patient case presentations, including treatment, goal setting, follow-up care, team interaction and family orientation. Video presentations of patients from student clinical education experiences will be included.

PT 594 Orthopedic Seminar (2)

Same as PT 593 with emphasis on patients with orthopedic/musculoskeletal problems.

PT 595 Cardiopulmonary Seminar (2)

Same as PT 593 with emphasis on patients with cardiopulmonary problems.

PT 596 Pediatric Seminar (2)

Same as PT 593 with emphasis on evaluation/treatment modification for the pediatric patient population.

PT 597 Geriatric Seminar (2)

Same as PT 593 with special emphasis on evaluation/treatment modifications for the elderly patient.

PT 598 Independent Study (1-4)

Student develops and carries out with permission of program director an independent study to meet clinical interest not covered by PT 593-597.

PT 599 Research III (3)

Continuation of PT 592. Upon completion of individual student research reports, students will present their findings. Group discussion and small group analysis of written/oral reports will examine impact and implications for physical therapy practice.

PT 601 Clinical Orthopedic Internship I (2)

A four month part-time supervised clinical experience in an outpatient orthopedic clinic. Prerequisite: PT 510.

PT 602 Clinical Orthopedic Internship II (2)

A four month part-time supervised clinical experience in an outpatient orthopedic clinic. Prerequisite: PT 510, 511, 601.

PT 610 Clinical Neurophysiology (2)

This course describes theories related to pain; the physiology, neuroanatomy, chemical anatomy and emotional influence on the pain experience, and structural/functional pathology interfering with neuromuscular control.

Prerequisite: BIO 460 Neuroanatomy or equivalent.

PT 611 Applied Movement Sciences (3)

This course presents the physiology related to exercise and exertion. The metabolic activity level of bone, muscle, tendon, ligament, cartilage and discs are described, compared and contrasted. Sources of fuel for exercise and energy production are described as it relates to the specificity of exercise training, tissue remodeling and regeneration. There is a description of mechanisms governing peripheral energy production and utilization, and peripheral versus central events during the adaptation to repeated exercise bouts and training.

Prerequisite: Anatomy, physiology, kinesiology, biomechanics, pathology, exercise physiology.

PT 631 Clinical Pharmacology of the Musculoskeletal System (1)

Principles of pharmacology including drug nomenclature, classification, pharmacokinetics, approval, and regulation are reviewed. Typical agents, their pharmacokinetics, adverse effects and specific physical therapy concerns are covered for the following: analgesic and anti-inflammatory drugs, skeletal muscle relaxants, cardiovascular drugs, anti-infectious agents, cancer treatments, anti-epileptic drugs, anesthetics, psychopharmacology and endocrine pharmacology.

Prerequisite: Basic pharmacology or permission of instructor.

PT 677 Advanced Differential Diagnosis (2)

This course is designed to facilitate the student to synthesize evaluation skills in physical therapy with differential diagnostic skills; to refine the student's knowledge of other professionals to whom the physical therapist refers and from whom the physical therapist receives referrals; to develop prognostic skills using algorithms and clinical decision trees.

Prerequisite: Entry level physical therapy degree.

SCHOOL OF EDUCATION AND HUMAN SERVICES

Acting dean: Mary L. Otto

Associate dean: F. James Clatworthy

Distinguished professor emeritus:

Laszlo J. Hetenyi, Ed.D., Michigan State University

Professors emeriti:

Edward A. Bantel, Ed.D., Columbia University
Harold C. Cafone, Ed.D., University of Arizona
George E. Coon, Ed.D., Wayne State University
Sidney W. Graber, Ed.D., Wayne State University
Harry T. Hahn, Ed.D., Temple 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
William F. Moorhouse, Ed.D., University of Wyoming

Professors:

Jane M. Bingham, Ph.D., Michigan State University
Ronald L. Cramer, Ph.D., University of Delaware
Gerald G. Freeman, Ph.D., University of Michigan
W. Dorsey Hammond, Ph.D., University of Delaware
James W. Hughes, Ed.D., University of New Mexico
Jacqueline I. Lougheed, Ed.D., Wayne State University
Donald M. Miller, Ph.D., University of Wisconsin
Sharon P. Muir, Ph.D., University of Nebraska-Lincoln
Mary L. Otto, Ed.D., Indiana University
Sandra Packard, Ed.D., Indiana University
Roderic E. Richter, Ed.D., Wayne State University
Howard Splete, Ph.D., Michigan State University
Ronald M. Swartz, Ph.D., New York 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
Joyce A. Eckart, Ed.D., University of Rochester
William C. Fish, Ed.D., Columbia University
Eric J. Follo, Ed.D., Wayne State University
Andrew Gunsberg, Ph.D., University of Illinois
William G. Keane, D.Ed., Columbia University
Billy Joe Minor, Ph.D., Indiana University
Robert G. Payne, Ph.D., University of Michigan
Richard Pipan, Ed.D., University of North Carolina
Anne E. Porter, Ph.D., Wayne State University

Luellen Ramey, Ph.D., University of Florida
Renate Rohde, Ph.D., Indiana University
Robert M. Schwartz, Ph.D., University of Illinois
Carol A. Swift, Ph.D., University of Arizona
Dyanne M. Tracy, Ph.D., Indiana University
Toni S. Walters, Ph.D., Oakland University
Elinor B. Waters, Ed.D., Wayne State University

Visiting associate professor:

Lee Skandalaris, Ph.D., Wayne State University

Assistant professors:

Sandra M. Alber, Ed.D., Wayne State University
James F. Cipielewski, Ph.D., Oakland University
Sarah L. Gibson, Ph.D., Wayne State University
William A. Hoerr, Ph.D., University of Illinois
Shannan McNair, Ed.D., University of Michigan
Dawn M. Pickard, Ph.D., Purdue University
Robert A. Wiggins, Ph.D., University of Illinois

Visiting assistant professor:

Joyce Wienczek, M.Ed., George Mason University

Adjunct professor:

Asa G. Hilliard, III, Ed.D., University of Denver

Special instructor:

Carrie Owens-Petty, M.A., Michigan State University

The School of Education and Human Services offers programs leading to:

- Doctor of Philosophy in reading
- Education Specialist in school administration
- Master of Arts in Teaching in reading and language arts
- Master of Education in three areas:
 - early childhood
 - curriculum, instruction and leadership
 - special education
- Master of Arts in counseling
- Professional Certification
- School administration certification

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 certification requirements

General information

To meet the professional (formerly 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 course work in methods of teaching reading. (Course work taken in the undergraduate degree 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 course work 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)

For those students enrolled in the MAT in reading and language arts only, RDG 632 and RDG 633 may be used. This reading requirement applies to students seeking a professional certificate after July 1, 1983.

Candidates for the professional 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. Oakland University will accept 6 to 9 credits 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 10 semester hours of course work within their planned program. For more information about planned programs, consult the following pages in this catalog:

- Curriculum, Instruction and Leadership, page 170
Early Childhood, page 178
Counseling, page 163
Microcomputer Applications in Education, page 197
Reading and Language Arts, page 190

Upon successful completion of course work (3.00 for graduate courses, 2.00 for undergraduate), students must apply for certificate renewal or professional certification through the Office of Academic Records, 102 O'Dowd Hall. As of spring 1989, the Michigan Department of Education will charge for all certifications and renewals. A copy of the fee structure is available through the Office of Academic Records.

Those teachers who wish to renew a lapsed continuing or permanent certificate and do not possess a master's degree must complete six credits at the graduate or undergraduate level. These credits do not have to be in a planned program. On completion, the student must apply for validation directly to the Michigan Department of Education, Teacher Certification, Box 30008, Lansing, MI, 48909.

Professional teacher certification renewal

As of July 1, 1992, persons receiving a professional (formerly continuing) certificate are required to renew that certificate every five years on the basis of six semester hours of academic credit earned from an approved teacher preparation institution or the equivalent in State Board approved teacher development programs or activities that will award credits obtained as State Board Continuing Education Units (SB-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.

Initial certification in elementary education

Students who hold a bachelor's degree and wish to obtain an initial teaching certificate must complete a second undergraduate degree in elementary education. Contact the SEHS Advising Office (370-4182) for an information brochure and admissions information.

Initial certification in secondary education

Initial certification in secondary education is available for students who already hold a bachelor's degree. Please contact the SEHS Advising office (370-4182) for more information. Please note; secondary certificates are given in the following subjects only: mathematics, biology, chemistry, physics, French, German, Spanish and Music.

Endorsements

Endorsements refer to any subject areas, specializations or changes of grade level which are added to a certificate. No undergraduate grade below 2.0 or graduate grade below 3.0 can be applied to an endorsement program.

1. These endorsements require the completion of a master's degree at Oakland University:
Reading
Counseling

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:

Major/minor subject area endorsements

Endorsements may be added in any of the areas approved by the state of Michigan for Oakland University. They are as follows: mathematics, science (elementary only), biology, chemistry, physics, language arts, history, political science, psychology, sociology, speech, social studies (elementary only), English, Spanish, French, German and fine arts.

Early childhood endorsement

Course work follows the planned program listed under the Department of Human Development and Child Studies (Early Childhood).

Special education endorsement

Endorsements may be earned in Autistically Impaired (K-8 or 7-12), Learning Disabilities (K-8) and Emotionally Impaired (K-8). These endorsement programs may also be used as planned programs for professional certification. After successful completion of course work (3.00 for graduate courses, 2.00 for undergraduate), students must apply for endorsement and professional certification through the Office of Academic Records, 102 O'Dowd Hall. An examination may be required by the Michigan Department of Education before adding the endorsement. Prior to completion of the endorsement program, students must contact the SEHS Advising Center (810) 370-4182 to determine the status of the testing requirements.

Administrator certification

The Department of Curriculum, Instruction and Leadership offers administrator certification in the areas of elementary/middle school principal, secondary/middle school principal and central office administration. Contact that department for more information (810) 370-3070.

Admission

Initial certification

Apply for admission through the Office of Admissions and Scholarship for the second undergraduate status (U2).

Major/minor subject area endorsement

Apply through the Office of Admissions and Scholarship for post baccalaureate status (PB).

Departmental planned program

Students who wish to complete requirements for professional certification in a non-degree departmental planned program apply through the Office of Graduate Study as a Professional Certification student (PC).

Master's program

Students completing their professional certification requirements while obtaining a master's degree apply through the Office of Graduate Study as a master's student (M1).

For admission to U2 or PB status

Contact the Office of Admissions and Scholarship for undergraduates at 101 North Foundation Hall.

For admission to PC or M1 status

All students must submit an application for admission, a \$30 application fee and official transcripts from all schools previously attended (additional documentation required for master's degree candidates) to the Office of Graduate Study, 520 O'Dowd Hall.

Advising

All students must schedule a program planning appointment with an adviser *after being notified of acceptance to a program*, as follows:

Students accepted into master's programs should call the faculty advisers identified in their letters of acceptance.

Students accepted for special education endorsement should call the Department of Human Development and Child Studies (810) 370-3077.

All other students must contact the SEHS Advising Office (810) 370-4182 for an appointment to complete a required plan of work.

No advising is available for Special Graduate students.

DEPARTMENT OF COUNSELING

Chair: Robert W. Brown

Professors: Mary L. Otto, Howard Splete

Associate professors: Robert W. Brown, Luellen Ramey, Renate Rohde

Visiting assistant professor: Elyce Cron

Visiting instructor: Victoria Junior

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 is made.

All applicants must submit a formal, written statement of purpose that explains reasons for entering the counseling program and employment goals. Applicants should describe 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.

Application deadlines

The application deadlines are as follows:

Fall semester	June 15	(full-time enrollment)
	July 1	(part-time enrollment)
Winter semester	November 1	
Spring semester	March 1	

Academic standing

In order to remain in good standing a student must maintain an overall GPA of at least 3.00 and make satisfactory progress toward the degree. Satisfactory progress toward the degree is evaluated by the student's adviser in consultation with the department chair and program faculty. No grade below 2.0 can be applied toward a degree and two grades below 3.0 or one below 2.0 will automatically lead to an evaluation of progress and possible dismissal.

Graduation requirements

At least 48 graduate level credits are required for 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.

Graduates of the program are eligible to apply for a professional counselor license issued by the state of Michigan. Graduates may also qualify for other credentials; consult your adviser for further information.

Required core courses

All candidates for the M.A. in counseling must take five core courses:

CNS 500*	Introduction to the Counseling Profession (2)
CNS 510*	Multicultural Counseling (2)
CNS 520	Theories of Counseling (4)
CNS 530	Developmental Counseling (4)
CNS 540	Testing and Assessment in Counseling (4)

*CNS 500 and CNS 510 are prerequisite or corequisite to all other counseling courses. 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. A plan of work must be on file by the time all core courses are completed.

Counseling emphasis in school settings

The following courses are for persons with a valid teaching certificate preparing for a position as a school counselor and who are seeking school counselor endorsement. In addition to the five core courses, students must take CNS 561, 571, 640, 660, 661, 663, 664, 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 five core courses, students must take CNS 564, 574, 640, 660, 661, 663, 664, 666 and 4 credits of electives.

Program Options

Two-year planned program

The two-year planned 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 two-year planned 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 two-year program, which begins only in the fall semester, is highly selective. A completed application for fall admission should be received by the June 15.

A typical two-year program plan

	Year 1	Year 2
Fall	CNS 500	CNS 664
	CNS 510	CNS 660
	CNS 520	CNS 663
	CNS 530	
Winter	CNS 661	CNS 666
	CNS 540	Elective
	CNS 640	
Spring	CNS 564/574	
Summer	or	
	CNS 561/571	

Macomb University Center cohort program

The Macomb University Center Program is an off-campus master's program in counseling for students residing or working in the Macomb County area. The program is cohort based and allows completion of the degree in two full years and one semester. Students are admitted to the program as a cohort in fall only and must take all courses (except laboratory classes and electives) at the Macomb University Center and in the prescribed sequence. Admission to the program is selective and applicants must meet all regular admission requirements. A completed application for fall admission must be received by July 1.

Macomb University Center cohort program plan

	Year 1	Year 2	Year 3
Fall	CNS 500	CNS 640	CNS 666
	CNS 510	CNS 660	
	CNS 520		
Winter	CNS 530	CNS 663	
	CNS 540	Elective	
Spring	CNS 661	CNS 664	
	CNS 564		
	CNS 574		
Summer	CNS 661	CNS 664	

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 163.

A typical part-time program plan

	Year 1	Year 2	Year 3	Year 4
Fall	CNS 500/CNS 510	CNS 540	CNS 660	CNS 663
Winter	CNS 520	Elective	CNS 661	CNS 664
Spring	CNS 530	CNS 564/574	CNS 640	CNS 666
Summer		or		
		CNS 561/571		

Advanced specializations

The department offers five advanced specializations of 12 credits each for current students who desire to specialize at the master's level and for post-master's students who wish to add advanced skills. Admission to specializations is limited and competitive; request admission information from the specialization coordinator. Students who are admitted are expected to complete the specializations in sequence and within one calendar year. Each specialization consists of advanced theoretical course work, advanced techniques and an advanced clinical internship.

Specialization in mental health counseling - 12 credits

R. Brown, Coordinator

CNS 684	Intelligence and Personality Assessment (4)
CNS 685	Psychopathology (4)
CNS 686	Internship: Mental Health Counseling (4)

Specialization in marriage and family counseling - 12 credits

E. Cron, Coordinator

CNS 687	Advanced Couple and Family Theory (4)
CNS 688	Couple and Family Counseling Practicum (4)
CNS 689	Internship: Marriage and Family Counseling (4)

Specialization in substance abuse counseling - 12 credits

L. Ramey, Coordinator

CNS 578	Introduction to Chemical Dependency (4)
CNS 678	Counseling the Chemically Dependent (4)
CNS 679	Internship: Substance Abuse Counseling (4)

Specialization in advanced career counseling - 12 credits

H. Splete, Coordinator

CNS 675	Advanced Career Counseling (4)
CNS 676	Leadership in Career Counseling and Career Development (4)
CNS 677	Internship: Career Counseling (4)

Specialization in child and adolescent counseling - 12 credits

R. Brown, Coordinator

CNS 680	Theories and Techniques of Child and Adolescent Counseling (4)
CNS 681	Practicum in Child and Adolescent Assessment and Treatment (4)
CNS 682	Internship: Child and Adolescent Counseling (4)

Professional certification planned program in counseling

Candidates for the professional certification planned program in counseling must meet all program admission requirements as listed for the M.A. program.

Core courses (all required): CNS 500, 510, 520, 530, 540
Elective: CNS 561, 574 or 640

Course Offerings

CNS 500 Introduction to the Counseling Profession (2)

A study of the counseling profession. Topics include: Professional identity, legal and ethical issues, historical and social/cultural foundations. Required for core program.

Corequisite: CNS 510.

CNS 510 Multicultural Counseling (2)

A study of methods and techniques of counseling in a pluralistic and multicultural society. Includes a focus on cultural awareness and sensitivity, gender issues and individuals with special needs.

Corequisite: CNS 500.

CNS 520 Theories of Counseling (4)

Study of the major theories of personality and counseling including historical development, philosophical tenets and current applications. Required for core program.

Prerequisite or corequisite: CNS 500 and CNS 510.

CNS 530 Developmental Counseling (4)

An overview of life-span developmental theories for counseling children, adolescents and adults. Includes the use of case studies to assess developmental needs of clients in a variety of settings.

Prerequisite or corequisite: CNS 500 and CNS 510.

CNS 540 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.

Prerequisite or corequisite: CNS 500 and CNS 510.

CNS 560 Special Problems in Counseling and Personnel Work (2, 4, 6 or 8)

Study of specialized problems in various areas of 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.

Prerequisites: Core courses and 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 and guidance programs, provides an overview of issues facing school counselors and examines procedures for organizing and administering such programs.

Prerequisites: Core courses. Corequisite CNS 571.

CNS 564 Introduction to Community/Agency Counseling (2)

Surveys key issues in providing mental health consultation and human services. 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.

Prerequisites: Core courses. Corequisite: CNS 574.

CNS 567 Workshop in Counseling and Guidance (2, 4, 6 or 8)

Evaluation and development of counseling 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.

Prerequisites: Core courses. Corequisite CNS 561.

CNS 573 Introduction to Family and Couple Counseling (4)

A study of 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.

Prerequisite: Core courses or instructor permission.

CNS 574 Diagnosis and Treatment Planning in Counseling (2)

Introduction to the criteria and procedures used in current DSM manual and other systems for client diagnosis. The case study method is used to develop treatment plans based upon diagnostic information. Prerequisites: Core courses. Corequisite CNS 564.

CNS 577 Reaction to Significant Loss (4)

Covers the concept of significant loss, behavioral and psychosocial reactions to loss and effective counseling strategies. Among losses covered are those resulting from death, divorce and loss of self-esteem and mobility.

Prerequisite: Core courses or instructor permission.

CNS 578 Introduction to Chemical Dependency (4)

Covers information about drugs and alcohol, including history, categories, definitions, misuse, abuse, attitudes and reasons for use. Studies the modes of prevention and treatment programs for substance abuse. Prerequisite: Core courses.

CNS 640 Career Development Theory and Practice (4)

Covers theories of career development and techniques of career assessment with individuals from early childhood to adulthood. Emphasizes the processes for providing career guidance and counseling for self-understanding, decision making and employability.

Prerequisites: Core courses.

CNS 660 Research in Counseling (2, 4, 6 or 8)

Study of research techniques and procedures in counseling designed to prepare students to critically evaluate the counseling research literature and to conduct independent research projects. Topics include sampling, data collection techniques, research design, statistical analysis and professional report writing. May be elected for independent study.

Prerequisites: Core courses.

CNS 661 Techniques of Counseling (4)

Laboratory training in counseling skills and application of theory to practice. Development of a personal theory of counseling is expected. Includes audio and videotaping of counseling interviews with clinical supervision.

Prerequisites: Core courses and full admission to the counseling program.

CNS 663 Group Counseling (4)

Theory, practice and ethics of group counseling. Provides opportunities to develop group counseling skills under supervision.

Prerequisites: Core courses, CNS 661. CNS 661 may be taken as a corequisite.

CNS 664 Counseling Practicum (4)

Application of counseling and consultation theories and techniques to practice with clients in a supervised lab environment. Includes individual and group clinical supervision of audio and video taped counseling sessions. May be elected a second time with instructor's permission for a total of not more than 8 credits.

Prerequisites: Full admission to program in counseling and completion of CNS 564/574 or CNS 561/571, 640, 661, and 663. CNS 640, 661 and 663 must be completed with a grade of 3.0 or better.

CNS 666 Internship in Counseling (2, 4, 6 or 8)

A field counseling experience supervised by a qualified counseling professional. 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 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 counseling education students enrolled in CNS 661 and 664.

Prerequisite: Permission of instructor.

CNS 673 Advanced Group Counseling (4)

Study of theory and research pertaining to group leadership, composition, selection, intervention, termination, evaluation and follow-up. Students develop a written description of their group counseling approach and have concurrent supervised group counseling experiences.

Prerequisites: CNS 661 and 663.

CNS 674 Advanced Consultation Techniques (4)

Study of theories of consultation will be reviewed and related consultant roles will be presented. The course will include demonstrations of consulting techniques, development of a consultation model and concurrent supervised consultation experiences.

Prerequisites: Core courses, CNS 571.

CNS 675 Advanced Career Counseling (4)

An advanced study of career development theories, career assessment, and career counseling techniques. Supervised career counseling experiences are required.

Prerequisite: CNS 640 and instructor permission.

CNS 678 Counseling the Chemically Dependent (4)

A study of the approaches to chemical dependency treatment. Covers research, assessment, inpatient and outpatient treatment, follow-up treatment and relapse prevention for alcohol and other drugs.

Prerequisite: CNS 578 or instructor permission.

DEPARTMENT OF CURRICULUM, INSTRUCTION AND LEADERSHIP

Chair: Joyce A. Eckart

Professors: James W. Hughes, Jacqueline I. Loughed, Sharon P. Muir, Sandra P. Packard, Roderic E. Richter

Associate professors: Joyce A. Eckart, Eric J. Follo, William G. Keane, Dyanne M. Tracy

Assistant professors: Sarah L. Gibson, William A. Hoerr, Dawn M. Pickard, Robert A. Wiggins

Graduate Program Coordinators: Eric J. Follo, William G. Keane

The Department of Curriculum, Instruction and Leadership offers a program leading to an Education Specialist degree in school administration, and a program for a Master of Education (M.Ed.) degree with concentration in either leadership or in curriculum and instruction for both elementary and secondary educators. The department also offers programs which provide Michigan teacher certification, the administrator certificate with endorsements for principals and central office personnel, and professional development opportunities for practicing teachers and administrators.

The Education Specialist program in school administration is designed for teachers interested in school administrative positions, administrators and other school personnel who desire professional development beyond a master's degree, and school personnel who seek the necessary professional preparation to change positions or to gain administrator certification at the building or district level.

The M.Ed. 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 as well as for school district central office positions. The curriculum and instruction concentration assists teachers in understanding the process of learning and in improving the art of teaching.

Education Specialist

Coordinator: William G. Keane

Faculty council: William G. Keane (coordinator), Lindson Feun, Eric J. Follo, Thomas Goulding, Rosetta Mullen, John Schultz, Kenson J. Siver, Robert A. Wiggins

Admission

The faculty council for the Education Specialist program will screen candidates in five areas after the following have been received by the Office of Graduate Study: 1) application for admission plus application fee; 2) official transcripts from all undergraduate and graduate work; 3) evidence of a master's degree from an accredited institution; 4) two letters of recommendation from professional colleagues or supervisors familiar with the candidate's current position; 5) a personal goals and evaluation statement indicating willingness to make a two-year

commitment to the program, a statement of personal goals after completing the school administration program, and an assessment of personal strengths and weaknesses for roles in educational leadership.

Candidates may be interviewed by members of the faculty council, who 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 Study no later than July 1.

Degree requirements

Forty credits beyond the master's degree are required for the Education Specialist degree in school administration. One required course will be offered during the evening or late afternoon of each term (fall, winter and spring) and two required courses will be offered during the first summer. The program action research project will be started during the first semester and will be scheduled for completion by the end of the last semester of the program.

Program Courses

EA 740	School as a Formal Organization
EA 741	School Business Management
EA 742	Educational Law
EA 743	Administrative Leadership Skills
EA 744	Long-Range Planning
EA 746	Conceptual Curriculum Perspectives for Educational Leadership
EA 747	Program Evaluation
EA 748	Seminar on School-Community Development
EA 750	Action Research Project
EA 754	Educational Personnel and School Labor Relations
EA 756	Supervision and Staff Development

Field experiences and mentoring

All program participants will be paired with an individual mentor who is currently a practicing administrator. The purpose of the mentorship is: to provide opportunities for field experiences in schools; and to provide specific activities with mentors, including reflective interviewing, shadowing, obtaining feedback and assistance, accessing professional craft knowledge and career planning. Additional field experiences will relate class discussions and assignments to actual practice in school and district settings.

Michigan certification

Candidates successfully completing the Education Specialist program in school administration and possessing a valid Michigan teaching certificate with three years of successful teaching experience will be eligible to receive administrator certificate endorsements by the Michigan Department of Education as an elementary or secondary administrator (in accordance with teacher certification level), central office administrator and superintendent.

Course Offerings

Prerequisite to all courses: admission to Ed.S. program.

EA 740 School as a Formal Organization (4)
An introduction to organizational theory and analysis and its application to educational organizations. Students will be expected to complete written case studies. Program action research project will be started.

EA 741 School Business Management (4)
In-depth analysis of financial and business operations of schools, including external and local funding sources, resource allocation issues, school budget accounting and auditing systems.

EA 742 Education Law (4)

Analysis of school law through examination of landmark legal cases and legislative statutes. Emphasis on investigation of rights and responsibilities of students, teachers, administrators and parents; school liability issues; current court and legislative trends.

EA 743 Administrative Leadership Skills (4)

Examination of critical components of effective educational leadership with emphasis on instruction leadership, development of a collaborative learning community, site-based management and strategies for school improvement.

EA 744 Long-Range Planning (2)

Analysis of components of long-range planning including environmental scanning, identification of key stakeholders, development of district mission plan, goals and objectives, design and implementation of action plan.

EA 746 Conceptual Curriculum Perspectives for Education Leadership (4)

Examination of the philosophical and social forces shaping development and delivery of curriculum; knowledge bases of curriculum design including human development and cognitive psychology theory; analysis of contemporary design issues including cooperative learning and outcome-based education.

EA 747 Program Evaluation (2)

Presentation of the basic theories, techniques and issues involved in the design and management of program evaluation. Application by specific case study and analysis of data for administrative decision making.

EA 748 School/Community Relations (2)

Topics will be selected from a range of school/community relations issues. Major stakeholders will be identified and their roles and potential impact on the school analyzed.

EA 750 Action Research Project (2, 4, or 6)

The culminating experience for the program is a total team action research project related to school improvement. Students will submit a comprehensive project report and conduct presentations to appropriate school or community representatives.

EA 754 Educational Personnel and School Labor Relations (4)

Analysis of successful human resource management and labor relations practices for school improvement.

EA 756 Supervision and Staff Development (4)

Examination of administrative roles and responsibilities for supervision of staff, in-class simulations of clinical supervision, and issues of effective staff development for school improvement.

The Master of Education in Curriculum, Instruction and Leadership

Coordinator: Eric J. Follo

Admission

Applicants to the M.Ed. program apply to Oakland University and the Department of Curriculum, Instruction and Leadership through the Office of Graduate Study. Application forms for the university and for the department are available from that office. Admission is a selective process; meeting minimum criteria does not guarantee acceptance into the program. Students are notified of their admission status by the Dean of Graduate Study.

Admission requirements

1) an undergraduate GPA of at least 3.00; 2) two letters of recommendation from individuals in a supervisory relationship to the applicant; and 3) a goals statement. Students who are conditionally admitted to the program must complete a minimum of 12 credit hours with a grade of at least 3.2 in each course.

Students seeking up to 12 hours of non-degree course work for personal or professional development may be assigned special graduate or post-master's status; applications for special graduate and post-master's status are available from and processed through the Office of Graduate Study.

Program requirements

Upon admission, a plan of study is prepared jointly by the student and the faculty adviser. No grade below 2.8 may be applied to the degree. Students concentrating in either leadership or in curriculum and instruction complete a program of 36-40 credits, depending on the exit plan selected. The program consists of a 12 credit core, a 4 credit concentration core, 16 credits selected from the concentration and a 4-8 credit exit option. Four Oakland University credits may be applied from outside the department; exceptions to this policy require approval of a Petition of Exception by department faculty and the Dean of Graduate Study.

CORE — 12 credits

- | | |
|---------|---|
| CIL 510 | Introduction to Curriculum, Instruction and Leadership (must be taken as first course in M.Ed. program) |
| CIL 509 | Schools, Students and Educational Equity |
| CIL 554 | Interaction Laboratory for Teacher Development |

CONCENTRATION — Complete the 4 credit concentration core and 16 credits of electives from one of the concentrations, either Leadership or Curriculum and Instruction. Course selection is approved by a faculty adviser.

Leadership Core — 4 credits: one of the following:

- | | |
|---------|---------------------------------------|
| CIL 580 | Theories and Techniques of Leadership |
| CIL 677 | Women and Men in Leadership |

Leadership Electives — 16 credits from the following:

- | | |
|----------|---|
| CIL 513 | Organization of the Schools |
| CIL 585 | Law for Teachers and Administrators |
| CIL 588 | Supervisory Skills for Teachers and Administrators |
| CIL 590 | Special Studies in Curriculum, Instruction and Leadership |
| CIL 611 | Issues in Education |
| CIL 612 | Applied Curriculum Studies |
| CIL 658 | The Educational Administrator |
| CIL 658a | The Educational Administrator: Elementary |
| CIL 658b | The Educational Administrator: Secondary |
| CIL 659 | Advanced Seminar in Law for Teachers and Administrators |
| CIL 661 | Topics in Educational Leadership |
| CIL 685 | Staff and Curriculum Development for School Improvement |
| CIL 689 | Multicultural Education in the Schools |

Curriculum and Instruction Core — 4 credits

- | | |
|---------|--------------------------------------|
| CIL 512 | Principles of Curriculum Development |
|---------|--------------------------------------|

Curriculum and Instruction Electives — 16 credits from the following:

- | | |
|---------|--|
| CIL 505 | Science and Children |
| CIL 506 | Outdoor Education |
| CIL 507 | Aerospace Education |
| CIL 561 | Gender Socialization in the Schools |
| CIL 577 | Art for the Elementary Teacher |
| CIL 585 | Law for Teachers and Administrators |
| CIL 587 | Special Studies in the Elementary School |
| CIL 588 | Supervisory Skills for Teachers and Administrators |
| CIL 589 | Integrating Disciplines in the Curriculum |

- CIL 590 Special Studies in Curriculum, Instruction and Leadership
- CIL 612 Applied Curriculum Studies
- CIL 614 The Elementary Mathematics Curriculum
- CIL 615 Diagnosis and Remediation in Mathematics
- CIL 687 Global Education in the Schools
- CIL 689 Multicultural Education in the Schools

EXIT PLAN — 4-8 credits (choose one):

- CIL 695 Practicum in Curriculum, Instruction and Leadership plus 4 additional elective credits selected with prior approval by the adviser
- CIL 699 Terminal Research Project in Curriculum, Instruction and Leadership

The exit plan is to be completed within the last calendar year of the program with the M.Ed. adviser's and supervising instructor's approval. The terminal research project is completed under the direction of the faculty adviser, or in the case of a thesis, with a committee of three faculty members.

Michigan certification

Professional teacher certification

Teachers may be recommended for professional teacher certification upon completion of a planned program in curriculum, instruction and leadership consisting of CIL 510; CIL 554; either CIL 509 or 585; and 8 elective credits. See page 159 for general information on Michigan Professional Certificate requirements.

Administrator certification

A minimum of three years teaching experience and a master's degree are required by the Michigan Department of Education before granting administrative certification. The department offers planned programs leading to administrator certification. Admission requirements to the programs are: 1) a master's degree or admission to a master's degree program at Oakland University; 2) a current teaching certificate; 3) an undergraduate GPA of at least 3.00, or a GPA of at least 3.00 in a minimum of 12 graduate credits; and 4) compliance with regulations established by the Michigan Department of Education regarding criminal convictions.

A Michigan Administrator Certificate Endorsement in elementary or secondary administration is available for students enrolled in the MAT in the reading and language arts. Applicants must first be admitted to the MAT in reading and language arts and must subsequently be approved and meet all criteria for admission to this program by the CIL Department.

Program requirements

Elementary/Middle School Principal (20 credits)
CIL 580 or 677; CIL 585, 658, 658a, 661, 685.

Secondary/Middle School Principal (20 credits)
CIL 580 or 677; CIL 585, 658, 658b, 661, 685.

Central Office (30 credits)

- 1) CIL 509 or 689; CIL 580 or 677; CIL 585, 588 (2 credits), 612, 661, 685, and 2) a choice of a) CIL 658 and either CIL 658a or 658b, or b) CIL 689.

A minimum of 12 credits must be completed at Oakland University and course work must be completed within 10 years of applying for each endorsement.

Course Offerings

CIL 505 Science and Children (4)

Surveys new science curricula for grades K-8. Topics include teaching toward conceptual change; 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 and planning outdoor education programs. Field trips are included.

CIL 507 Aerospace Education (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 Introduction to Curriculum, Instruction and Leadership (4)

Investigates current education research, technology and instructional techniques and methods of implementing them in effective teaching and leadership practices. *Must be taken as first course in M.Ed. program.*

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 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 Advanced Interaction Laboratory for Teacher Development (4)

Strengthens and refines teachers' communication skills, instructional strategies, models of teaching and delivery systems to improve the learning climate for all students. Newly acquired skills are implemented, practiced and assessed in authentic settings. Teachers participate in peer coaching, group problem solving and qualitative research.

CIL 561 Gender Socialization in the Schools (4)

Provides an understanding of the role that gender plays in teaching and learning, with emphasis on the gender socialization of students in learning environments from pre-school to graduate school. Assists prospective teachers, parents and others in designing programs that reduce gender bias in the educational system.

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 (4)

Allows participants, through a workshop practicum, to implement artistic activities within school subject areas. Provides for integration and enrichment of the curriculum via the arts.

CIL 580 Theories and Techniques of Leadership (4)

Examines leadership theories and techniques. Specific techniques include team building, decision making and supervision.

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.

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 Teachers and Administrators (2 or 4)

Strengthens and develops the supervisory skills of teachers and administrators. Emphasizes assessment using observation, feedback and evaluative techniques.

CIL 589 Integrating Disciplines in Curriculum (2 or 4)

Explores methods and materials for integrating the curriculum. Emphasis is on thematic unit planning.

CIL 590 Special Studies in Curriculum, Instruction and Leadership (2 or 4)

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 4 credits.
Prerequisite: Adviser and supervising instructor permission.

CIL 611 Issues in Education (2, 4 or 6)

Studies current issues impacting on the organization, administration and environment of schools.

CIL 612 Applied Curriculum Studies (4)

Examines practices and research in curriculum in modern public school settings. Investigates the total experiences of young people in school and challenges existing practices on the basis of recent curriculum developments.
Prerequisite: CIL 512.

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 in Mathematics (4)

Guides teachers in acquiring skills for determining learners' basic mathematics instructional levels, diagnosing learning difficulties and designing appropriate remedial follow-up procedures. Emphasizes K-8 mathematics curriculum.

CIL 658 The Educational Administrator (2)

Emphasizes processes and procedures in the management of educational systems, including personnel development.
Corequisite: CIL 658a or 658b.

CIL 658a The Educational Administrator: Elementary (2)

Explores the roles of federal, state and local government in elementary and middle school instruction.

CIL 658b The Educational Administrator: Secondary (2)

Explores the roles of federal, state and local government in secondary and middle school instruction.

CIL 661 Topics in Educational Leadership (4)

Focuses on significant leadership issues including community relationships and adult community education, as well as financing of the schools.

CIL 677 Women and Men in Leadership (2 or 4)

Examines organization and leadership theories, personal and professional skills and networking strategies. Students participate in researching leadership styles of women and men as well as attitudes of women and men toward women leaders.

CIL 685 Staff and Curriculum Development for School Improvement (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 for school improvement.

CIL 687 Global Education in the Schools (4)

Examines the role of global education in grades K-12. Identifies ways that 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 689 Multicultural Education in the Schools (4)

Explores multicultural components of culture, race, gender, ethnicity, religion, socioeconomic status and exceptionalities in the American educational process. Examines ways that teachers in grades K-12 can meet objectives of multicultural education within the existing curriculum.

CIL 695 Culminating Masters Seminar (4)

Synthesizes and applies knowledge and skills gained in M.Ed. studies to professional activities in the field. Students prepare professional development workshops and activities and work with other professionals in the field on skill or curriculum development.
Prerequisite: Admission to M.Ed. program, adviser and supervising instructor permission.

CIL 699 Terminal Research Project in Curriculum, Instruction and Leadership (4)

Plans and executes a significant project designed 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.Ed. program, adviser and supervising instructor permission.

PROFESSIONAL DEVELOPMENT (does not apply to M.Ed. or a certificate program)**EDL 599 Workshop in Education (1 to 8)**

Provides an opportunity to develop competency in new practices or to adapt teaching skills to different subjects, situations or age groups. (Graded S/U.) Does not apply to M.Ed. program or initial administrative certification.

DEPARTMENT OF HUMAN DEVELOPMENT AND CHILD STUDIES

Chair: Ronald M. Swartz

Professors: Gerald G. Freeman, Donald M. Miller, Ronald M. Swartz

Associate professors: Marc E. Briod, Andrew Gunsberg, Carol A. Swift

Assistant professors: Richard C. Pipan, Sandra Alber, Shannan McNair

Special instructor: Carrie Owens-Petty

The Department of Human Development and Child Studies offers programs leading to teaching endorsements, continuing certification and degrees of Master of Education (M.Ed.) in early childhood and in special education. The M.Ed. in early childhood education can include the professional certification and/or ZA endorsement. Endorsements in learning disabilities (L.D.) and emotionally impaired (E.I.) are offered at the elementary level (K-8). An endorsement in autistically impaired (A.I.) is offered at both the elementary (K-8) and secondary (7-12) levels. The M.Ed. in special education is non-categorical and does not lead to an endorsement in any given handicapping category; however, electives may be chosen which lead to partial fulfillment of endorsement requirements. Both endorsement and M.Ed. programs fulfill professional certification requirements. 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 official 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 Study. Completed applications (including letters of recommendation, all official transcripts, and goal statements) are reviewed according to the following schedules: **For Early Childhood Education:** June 1 for fall admission, October 1 for winter admission, April 1 for summer admission. **For Special Education:** June 1 for fall admission, October 1 for winter admission, February 1 for spring admission.

Minimum criteria for acceptance into the department are: 1) an undergraduate degree with a GPA of 3.00 (applicants who do not meet this standard may be considered for conditional admit, but will be required to achieve 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 committees); 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.

Early Childhood Education

Admission decisions will be based on the above criteria and preference will be given to applicant(s) for the master's degree, and those with varied and sustained experiences with young children.

Special Education

Admission for the M.Ed. in special education requires 1) an undergraduate GPA of 3.00 or above, or a graduate GPA of 3.50 or above; 2) an endorsement in at least one area of special education; and 3) a minimum of one year teaching experience, or the equivalent, in special education.

Criteria for admission to the endorsement programs in special education are: the applicant must 1) hold or be eligible for, a valid Michigan elementary teacher's certificate (note: applicants for the A.I. endorsement may hold either elementary or secondary certification regardless of level of endorsement program); 2) have completed a minimum of one year teaching experience or the equivalent; 3) have an undergraduate GPA of 3.0 or above or a graduate GPA of 3.00 or above; 4) have completed SE 501 or the equivalent. The prerequisite course may be taken as a Special Graduate (SG) and admission to an endorsement program will be delayed until it is completed.

Applicants who hold a K-12 certificate in Physical Education, Art or Music, or a secondary certificate in a content area (and no elementary certificate), but wish to pursue an endorsement at the elementary level may apply. Extra course work will be determined on an individual basis, based on transcript review and documented experience.

Courses taken before official admission to a program 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 are not eligible to enroll in special education core endorsement or degree courses prior to full admission to the program unless they obtain written permission from the program coordinator. Students who do register for core courses prior to eligibility may be administratively withdrawn from courses and their program status reviewed. Students with special graduate status or post-master's status are not eligible for early registration until the last day. Applications for special graduate, post-master's and instructor permission forms are available from and processed through the Office of Graduate Study. Special education applicants must obtain written permission from the program coordinator. Contact the department secretary for information.

The Master of Education in Early Childhood Education

The graduate program in early childhood education leads to the Master of Education (M.Ed.) degree. The program prepares professionals to work with children from birth through age eight 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 program emphasizes a broad interdisciplinary view of early childhood education and child development. Also emphasized are multicultural issues concerning young children and their families, and the need for educational programs to respect and respond to children's developmental variabilities and exceptionalities. Practica are available in a variety of settings including hospitals, early childhood centers, infant and toddler programs and other situations. A final project is required for the M.Ed.: this is a field-based project and includes preparation of a project report.

Requirements for the M.Ed. in early childhood education

Degree requirements are 36 credits, distributed as follows:

Level I (20 credits)

- FE 509 Family, Child and Learning in Cultural Context (4)
- EC 540 Theories of Child Development and Education (4)
- EC 542a Applied Developmental Principles (4)
Prerequisites: FE 509 and EC 540
- EC 543 Teacher as Child Advocate and Adult Educator (4)
Prerequisite: FE 509 or EC 540
- EC 544 Play as a Learning Medium (4)
Prerequisite: FE 509 or EC 540

Level II (12 credits) Prerequisite is completion of all courses in Level I

- EC 645 Assessment of the Young Exceptional Child (4)
- FE 593 Action Research Techniques in Education (4)
This course focuses on planning for the required project and its reporting in EC 650.

Elective

Elect one of the following course options:

- EC 545 Administration and Direction of Early Childhood Programs (4)
- EC 547 Infants: Normal and Exceptional Development and Programming (4)
- EC 548 Toddlers: Normal and Exceptional Child Development and Programming (4)
- EC 549 Development of the Young Exceptional Child (4)
- EC 644 Play and Development of the Hospitalized Child (4)
- EC 651 Gifted and Talented Young Children (4)

Level III (4 credits) Prerequisite is completion of all courses in Level II

- EC 650 Practicum in Early Childhood (4)
This is the final requirement of the program and consists of class meetings, seminars and the completion of an action project and a project report.

Professional certification and endorsement programs

Persons seeking provisional or professional elementary teaching certificates may do so in early childhood through a planned program (20 credits) and/or by combining the planned program with course work for the endorsement in early childhood.

Planned program in early childhood for professional certification and/or the early childhood endorsement (ZA)

This program of study consists of the five courses in Level I of the M.Ed. listed above.

Advising assistance for non-M.Ed. students can be obtained in the SEHS Advising Center, 472 O'Dowd Hall (370-4182).

See page 160 for general information on Michigan Professional Certificate Renewal requirements.

Admission

Criteria and procedures for admission are the same as those stated for the department.

The Master of Education in Special Education

The master's program in special education is a degree focusing on the broader concepts of exceptionality: learning, instruction and development, rather than specific categories. Exploration of theory and research and advanced application in instruction and assessment are intended to prepare educators to go beyond the classroom and to lay the foundation for leadership roles in the field.

Degree requirements

A total of 44 credits is required for the M.Ed. in special education. 24 credits from endorsement-level courses may be applied toward the degree. The degree, as described below, does not meet the requirements for a categorical endorsement. Students who wish to pursue an endorsement in conjunction with a degree should apply for that program as well. Individual program plans must be completed with faculty approval. This may be done during the admission process or shortly afterward. Courses taken prior to adviser approval (not on program plan) may not count toward the degree.

Requirements for the M.Ed. in special education

Core (20 credits)

- SE 601 Issues and Trends in Special Education (4)
- SE 619 Theoretical Foundations of Exceptionality (4)
- SE 624 Advanced Diagnostics (4)
- FE 593 Action Research Techniques in Education (4)
- SE 699 Project in Special Education (4)

Electives (24 credits)

Electives may include a concentration of courses in a selected area, such as Reading or Early Childhood; they may also comprise a selection intended to enhance certain skills such as consultation; or they may be used to partially fulfill the requirements for an endorsement in a categorical area.

Endorsements

Endorsements generally refer to any content areas, specializations or changes of grade level which are added to a certificate. Endorsement programs can be used as planned programs for professional certification. No undergraduate grade below 2.0 or graduate grade below 3.0 can be applied to this program.

Endorsement requirements

Prerequisite courses

- SE 501 Introduction to the Student with Special Needs (4)
- or
- SE 355 Identifying Learning and Behavior Problems in Students (4)

Corequisite course (all endorsement programs)

- FE 506 Child Development, Variability and Learning (may be taken after admission to the program)

Learning disabilities: K-8 (32-36 credits)

- SE 502 Legal Issues in Special Education (4)
- SE 517 Language and Learning Disabilities (4)
- SE 523 Educational Procedures for Students with Learning Disabilities (4)
- SE 524a Introduction to Special Education Assessment (4)
- SE 524b Practicum in Special Education Assessment (4)

- RDG 536 Teaching Reading to the Special Child (4)
 CIL 615 Diagnosis and Remediation in Mathematics (4)
 SE 580 Student Teaching in Elementary Special Education:
 Learning Disabilities (4 or 8)

Emotionally impaired: K-8 (28-32 credits)

- SE 502 Legal Issues in Special Education (4)
 SE 510 Students with Behavioral and Emotional Disorders (4)
 SE 518 Behavior Management (4)
 SE 520 Educational Procedures for Students with Emotional Impairments (4)
 SE 524a Introduction to Special Education Assessment (4)
 SE 524b Practicum in Special Education Assessment (4)
 SE 582 Student Teaching in Elementary Special Education:
 Emotionally Impaired (4 or 8)

Autistically impaired: K-8 (18 credits)*

- SE 559 Characteristics of Children and Youth with Autism (4)
 SE 527a Educational Procedures for Elementary Students with Autism (2)
 SE 578a Language Problems in the Young Child with Autism (2)
 SE 579a Classroom and Behavior Management for the Elementary Student with
 Autism (2)
 SE 596 Consultation Skills for Teachers of Students with Autism (4)
 SE 584 Student Teaching in Elementary Special Education:
 Autistically Impaired (4)

Autistically impaired: 7-12 (18 credits)*

- SE 559 Characteristics of Children and Youth with Autism (4)
 SE 527b Educational Procedures for Secondary Students with Autism (2)
 SE 578b Language Problems in the Secondary Student with Autism (2)
 SE 579b Classroom and Behavior Management for the Secondary Student with
 Autism (2)
 SE 596 Consultation Skills for Teachers of Students with Autism (4)
 SE 585 Student Teaching in Secondary Education:
 Autistically Impaired (4)

NOTE: Each endorsement must contain a minimum of 15 unduplicated credits

* Admission to these programs is on a cohort basis.

MAT in Reading and Language Arts with Endorsement in Learning Disabilities (K-8)

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 elementary learning disabilities (K-8). The dual program consists of a block of 24-30 credits from Reading/Language Arts and 28-32 credits from Special Education, not including pre- or co-requisites.

Courses are:

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: SE 502, 523, 524a, 524b, 517, 580 and CIL 615.

This program involves a dual admissions/advising process. Following admission to the reading program, an interview should be scheduled with an adviser in the reading and language arts department. Students should then file an application (available from the Office of Graduate Study) to add the L.D. endorsement if they have not already done so. Admission requirements are the same as for the regular L.D. endorsement program.

Course Offerings

EARLY CHILDHOOD

EC 540 Theories of Child Development and Education (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 educators 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 kindergarteners 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 for at least 32 hours at a program site approved by the course instructor.

Prerequisite: EC 542a or PSY 510 or equivalent.

EC 548 Toddlers: Normal and Exceptional Development and Programming (4)
Studied are developmental/intellectual aspects unique to toddlers (15 to 36 months), including attention to variabilities and exceptionalities. 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. Seminars and class sessions 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 Observation and Assessment of the Young Child (4)
Assessment of young exceptional children, with training in interpreting formal and informal assessments and 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)
A culminating seminar and workshop involving the completion of an action project and the project report preparation. Attention is given to issues, concepts and knowledge which underlie the projects in the perspective of contemporary knowledge and research. Project reviews and discussions address the significance and implications of project experience and outcomes for professional practice.

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 506 Child Development, Variability and Learning (4)
Development and stage theories of cognition and learning behavior, examined through research accounts of physical and mental variability, cultural background, social circumstances, lived experience, learning style and mode of educational interactivity.

FE 509 Family, Child and Learning in Cultural Context (4)
An interdisciplinary examination of selected social issues about children and early education in culturally diverse America: changing family patterns, socioeconomic and language issues, home-school transitions, media influence, child-parent-teacher relations, developing awareness of self and world.

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 Action Research Techniques in Education (4)
Study of research techniques in the social sciences and education, methods of gathering evidence, elementary statistical concepts in education, research design and reporting. Especially useful for students preparing to start their terminal projects.
Prerequisite: EC 645.

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 program only with permission of adviser. (Graded S/U).
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.

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; nature of the child.

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 the developing person throughout the life cycle. Topics include self, mind, intelligence, cognition, meaning awareness, feeling, competence and creativity. The person is studied in the context of social and cultural processes.

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 implications 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, social, 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 various strategic learning environments and educational programs.

Prerequisite: FE 606 or permission of the instructor.

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 Student with Special Needs (4)**

Introduction to special education that presents the characteristics, etiologies 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 along with an overview of issues and current research.

Prerequisite: Graduate standing or permission of the instructor.

SE 502 Legal Issues in Special Education (4)

Intensive study of PL-94-142 and the Michigan Special Education Rules and their implications for educating handicapped children. Evaluation, IEPC's, related services, free and appropriate education, placement options, adequate referral and evaluation, investigation and due process hearings highlighted. Prerequisite: Admission to program.

SE 510 Students with Behavioral and Emotional Disorders (4)

Addresses the characteristics of students with emotional impairments, related etiologies, current research issues and educational implications.

Prerequisite: Admission to program.

SE 517 Language and Learning Disabilities (4)

Research in the area of language and learning disabilities is covered, with emphasis on assessment and intervention strategies. Both oral and written languages are considered, preschool through adult, with emphasis on the elementary-aged student.

Prerequisite: Admission to program.

SE 518 Behavior Management (4)

Students are exposed to a variety of behavior and classroom management techniques along with philosophical approaches to behavioral change. Emphasis is on classroom application.

Prerequisite: Admission to program.

SE 520 Educational Procedures for Students with Emotional Impairments (4)

Focuses on the implementation of effective strategies for academic instruction and classroom management for emotionally impaired elementary students. Various service delivery models, parent-home interaction, and the IEP are emphasized, with prevocational needs of the student and communication skills for the teacher addressed.

Prerequisite: Admission to program.

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 within the context of cooperative teaching, regular education initiative and inclusion.

Prerequisite: Permission of instructor.

SE 523 Educational Procedures for Students with Learning Disabilities (4)

Addresses the seven legally defined areas of learning disability in terms of informal assessment, appropriate instructional materials and curricular modification for the K-8 student. Remedial techniques and their application are reviewed.

Prerequisite: Admission to program.

SE 524a Introduction to Special Education Assessment (4)

Introduces assessment terminology. Standardized tests typically used to identify students with exceptionalities are reviewed, along with relevant research related to selected tests and the identification process.

Prerequisite: Admission to program.

SE 524b Practicum in Special Education Assessment (4)

Students learn how to administer, score and interpret selected educational tests used in the identification of students with exceptionalities.

Prerequisites: SE 524a, admission to program and permission of instructor.

SE 527a Educational Procedures for Elementary Students with Autism (2)

Emphasizes evaluation and instruction of young autistic students. Relates informal assessment to instructional planning in the cognitive, motor and affective domains. Special attention is paid to communicative skills and pre-vocational needs.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 527b Educational Procedures for Secondary Students with Autism (2)

Emphasizes evaluation and instruction of the autistic adolescent and young adult. Relates informal assessment to instructional planning in cognitive, affective and motor domains. Vocational, recreational and life skills needs are stressed.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 559 Characteristics of Children and Youth with Autism (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 throughout the life.

Prerequisite: Admission into the A.I. endorsement program or permission of the S.E. coordinator.

SE 578a Language Problems in the Young Child with Autism (2)

Provides an overview of normal language acquisition as the foundation for understanding language problems of the young child with autism. Differential diagnosis and techniques for facilitating language and communication are emphasized.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 578b Language Problems in the Secondary Student with Autism (2)

Provides an overview of normal language development as the foundation for understanding the communicative difficulties of adolescents and young adults with autism. Specialized techniques, with attention to vocational and life skills implications, are included.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 579a Classroom and Behavior Management for the Elementary Student with Autism (2)

Focuses on constructive management plans with young children with autism. Individual plans, as well as group and environmental management are covered.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 579b Classroom and Behavior Management for the Secondary Student with Autism (2)

Focuses on constructive management plans for the secondary student with autism. Legal, ethical and theoretical issues are addressed. Vocational planning included.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

SE 580 Student Teaching in Elementary Special Education: Learning Disabilities (1-8)

Final experience required for endorsement in the area of learning disabilities. Students will complete one of four plans. Eligibility for each is based on previous credentials and experience. Students should consult with adviser regarding individual requirements, application procedures and deadlines.

Prerequisite: Completion of course work and permission of SE coordinator.

SE 582 Student Teaching in Elementary Special Education: Emotionally Impaired (1-8)

This is the final experience required for endorsement in the area of emotional impairment. Students will complete one of three plans. Eligibility for each is based on previous credentials and experience. Students should consult with adviser regarding individual requirements, application procedures and deadlines.

Prerequisite: Completion of course work and permission of SE coordinator.

SE 584 Student Teaching in Elementary Special Education: Autistically Impaired (4)

Specialized experience with elementary level autistic students.

Prerequisite: Completion of course work and permission of SE coordinator.

SE 585 Student Teaching in Secondary Special Education: Autistically Impaired (4)

Specialized experience with secondary level autistic students.

Prerequisite: Completion of course work and permission of SE coordinator.

SE 590 Selected Topics in Special Education (1-4)

Special issues related to contemporary practice in special education. May be elected as an independent study.

Prerequisite: Permission of instructor

SE 596 Consultation Skills for Teachers of Students with Autism (4)

Designed to develop consultation skills of teachers who work with autistic students. Includes home-school interactions, family and community support services.

Prerequisite: Admission to the A.I. endorsement program or permission of the S.E. coordinator.

SE 601 Issues and Trends in Special Education (4)

Study of current major issues in special education. Emphasis is placed on the historical perspective of each issue and its current implications for teacher preparation, school program development, school administration, parental acceptance and other dimensions of the special education process.

Prerequisite: Admission to M.Ed. or permission of instructor.

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 concerning evaluation, remediation and program planning for exceptional students to translate consultations into educational programs.

Prerequisite: Admission to M.Ed. or permission of instructor.

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).

Prerequisite: Admission to M.Ed. or permission of instructor.

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.

Prerequisite: Admission to M.Ed. or permission of instructor.

SE 624 Advanced Diagnostics (4)

Focus is on the assessment process in the applied setting: the use and interpretation of standardized tests, informal assessment procedures, differential diagnosis, and implications for instruction and placement.

Prerequisite: Admission to M.Ed., SE 524a and SE 524b, and instructor permission.

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: Permission of instructor.

SE 699 Final Project in Special Education (1-8)

Planning and execution of significant research or project. The result should be suitable for conference presentation and/or journal submission.

Prerequisite: FE 593 and permission of instructor.

DEPARTMENT OF READING AND LANGUAGE ARTS

Chair: Ronald L. Cramer

Professors Emeriti: Harold C. Cafone, George E. Coon, Harry T. Hahn

Professors: Jane M. Bingham, Ronald L. Cramer, W. Dorsey Hammond, Robert M. Schwartz

Associate professors: Richard F. Barron, Gloria T. Blatt, Robert J. Christina, Anne E. Porter, Toni S. Walters

Assistant professor: James F. Cipielewski

Visiting associate professor: Lee J. Skandalaris

Visiting assistant professor: Joyce Wiencek

The Department of Reading and Language Arts offers:

- Ph.D. Doctor of Philosophy in reading and language arts
- M.A.T. Master of Arts in Teaching in reading and language arts
- M.A.T. with endorsement in learning disabilities (LD)
- M.A.T. with endorsement in early childhood (ZA)
- M.A.T. with Michigan administrator certificate endorsement
- Michigan Certification Planned Program in reading and language arts
- Microcomputer Applications Certificate Program
- Advanced Microcomputer Applications Certificate Program
- Post-Master's Certificate in reading and language arts
- Post-Master's Advanced Certificate in reading and language arts

The Doctor of Philosophy in Reading and Language Arts

Coordinators: Richard F. Barron and W. Dorsey Hammond

Reading and language arts education is predicated upon an understanding of such diverse domains of knowledge as linguistics, psychology, psychometrics and educational psychology, to mention just a few. A well prepared reading and language arts teacher must have a solid foundation in literature, composition, language development, comprehension, word recognition, learning theory, diagnosis and correction of reading difficulties, theoretical models of reading, and a historical perspective on reading and language arts as it has developed over the past few centuries. Well versed reading and language arts experts must possess a solid theoretical background as well as the practical knowledge required to teach reading and the related language arts in classrooms and clinical settings.

The Reading and Language Arts Department is committed to offering a program of study that prepares students to conduct and evaluate research, to master the art of teaching children and adults to read and write, and to understand and appreciate the wealth of knowledge that related disciplines can contribute to literacy instruction.

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 a personal essay and scores on the Miller Analogies Test. Second, applicants who score highest on the screening steps are interviewed by the faculty. Final admission recommendations are then made by the reading and language arts faculty working as a committee of the whole.

Residence

Students must complete two semesters during which they earn at least 8 credits each semester. The combined spring/summer sessions may constitute one semester toward residency. During residency, students may be assigned experiences not ordinarily available through course work. Examples of such experiences may include tutoring children and adults in the reading clinic, assisting faculty in the conduct of research, and teaching undergraduate or graduate courses under departmental supervision. Graduate assistantships, which include a stipend, tuition, and fees, are available on a competitive basis to students pursuing full-time study. Assistantships can not be granted to students who are employed full time.

Academic advising

Upon acceptance into the program, students are advised by the Ph.D. program coordinators. During the first semester of study, students are assigned a permanent academic adviser. The permanent academic adviser provides academic counseling throughout the course of study and assists the student in developing a plan of study. The plan of study specifies major and minor course work.

Course of study

The Ph.D. program consists of three parts: the reading and language arts core and research component, the minor specialization component, and the dissertation component. The reading and language arts core consists of experiences and course work in developmental reading instruction, children's literature, composition, theoretical models and historical perspectives, instructional systems technology, advanced diagnosis and correction of reading disabilities, and seminars on selected current trends and issues in the field.

Required course credits include 44 credits in the reading and language arts core and research components, 24 credits in the minor specialization and 24 dissertation credits. When appropriate, up to 36 graduate credits earned in a master's degree at Oakland University or other accredited universities may be applied toward the Ph.D. degree upon approval of the faculty and the Dean of Graduate Study. In practice, however, transfer credit is seldom granted.

The reading and language arts core and research component consists of 11 advanced courses conducted in seminar fashion. These seminars cover such topics as statistics, research design, cognitive psychology, comprehension, theoretical models of reading, historical perspectives on reading, children's literature, the composing process, instructional systems technology, advanced diagnosis and correction, dissertation preparation, applied research and other selected topics. There are 44 credits in the reading and language arts core and research components combined. The following courses make up the reading core and the research component:

RDG 700A&B	Introduction to Educational Statistics and Research Design in Reading and Language Arts
RDG 701	Introduction to Research in Reading
RDG 702	Applied Research in Reading and Language Arts
RDG 703	Advanced Diagnostic and Corrective Reading
RDG 704	Perspectives in Literature
RDG 705	Perspectives in Writing
IST 706	Perspectives in Instructional Systems Technology
RDG 707	Theoretical Models and Historical Perspective
PSY 590*	The Psychology of Reading
RDG 708*	The Psychology of Reading
RDG 709	Doctoral Seminar in Reading

*Students take either PSY 590 or RDG 708, not both.

The minor specialization component consists of 24 semester hours of study in a related discipline such as linguistics, psychology, English, learning disabilities, early childhood, instructional systems technology, children's literature, composition, school administration, counseling or business.

The dissertation component consists of course work in statistics, research design, applied research and culminates in a dissertation. The dissertation requirement consists of 24 credits. Dissertations may investigate any faculty approved theoretical or practical issue in reading and language arts.

Qualifying examination

Before admission to candidacy, each student must pass a written and oral qualifying examination. The examination is taken after the bulk of course work is completed. The examination is prepared by the faculty under the supervision of the Ph.D. coordinator. The coordinator appoints a faculty committee to evaluate each candidate's qualifying examination. This committee consists of at least two faculty members from the Reading and Language Arts Department and one faculty member from the candidate's area of minor concentration.

The qualifying examination is administered twice each academic year, in the fall and spring semesters. Normally, students will have passed their qualifying examinations before final approval of the dissertation proposal is given. However, the dissertation adviser can make an exception to this norm, when appropriate.

The qualifying examination consists of two written examinations and a qualifying paper presented at the time the examination is scheduled. The examination is administered over two days and covers reading and language arts content on the first day and minor concentration content on the second day. The paper covers a special interest area selected by the student and approved by the Ph.D. coordinator and the student's academic adviser. The Ph.D. coordinator, in consultation with the faculty, assembles the examination questions. The oral examination, administered by the evaluation committee, can be taken only after successfully completing the written examination.

The committee may permit a student to repeat the qualifying examination. An unacceptable performance on the qualifying examination may result in educational requirements and experiences in addition to those specified in the regular course of study. Passing evaluations on either the written or oral portions of the examination do not preclude the faculty from requiring additional courses or learning experiences if the evaluating committee deems such action warranted.

Dissertation

Each candidate must complete a dissertation that makes a worthwhile contribution to the major field of study. When a student is ready to initiate a dissertation proposal, he or she should nominate a dissertation committee chairperson. The dissertation committee is then formed in consultation with the student's dissertation chairperson. The dissertation committee consists 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 concentration and one member-at-large. The student's nominees are subject to availability and other constraints. The coordinators of the doctoral program must approve the selection of the dissertation committee.

The dissertation committee chairperson advises the candidate through the stages of dissertation preparation. When the dissertation committee chairperson and the student have agreed on a dissertation topic, the student must prepare a written dissertation proposal. Content of the dissertation proposal shall be specified by the dissertation chairperson in consultation with the dissertation committee. The student shall present and orally defend the proposal before the dissertation committee, interested faculty and invited guests, insuring that all relevant issues pertaining to the dissertation are considered. Once the dissertation committee approves the proposal, the student may initiate the study.

A penultimate 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. Eleven bound copies of the dissertation are required and are distributed as follows: 1 to the Office of Graduate Study, 2 to Kresge Library, 3 to the chair of the Reading and Language Arts Department, and 1 for each member of the dissertation committee.

Twenty-four credits in RDG 799 are required of all doctoral students and no more than 12 credits should be taken prior to the approval of the proposal. Merely amassing dissertation credits does not indicate satisfactory progress toward, or completion of, the dissertation. The dissertation is deemed completed only after a successful oral defense and after final approval of the completed dissertation by the dissertation committee.

Oral final 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 make comments and ask questions, only the dissertation committee certifies approval of the dissertation. The dissertation committee may permit reexamination if the initial dissertation defense is deemed inadequate.

Time limits

All requirements, including the dissertation, must be completed within eight years after admission to the program. An extension may be granted with the approval of the Ph.D. coordinator and the Dean of Graduate Study.

If six consecutive semesters elapse where no credits are accumulated toward the degree, the student will be considered inactive and may be dropped from the program. Students who are deemed inactive or dropped from the program may be reinstated upon approval of the Ph.D. coordinator and the Dean of Graduate Study.

Graduation

Students expecting to graduate in a given semester must file an Application for Degree form at the Academic Records Office and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

The Master of Arts in Teaching in Reading and Language Arts

Most MAT students are classroom teachers whose daily work requires them to deal with the literacy needs of young children, adolescents or adults. Consequently, the thrust of instruction in the MAT program is to prepare classroom teachers to work effectively and efficiently in settings where class sizes may range from 5 to 40 or more learners. While the emphasis is on classroom instruction, the MAT program does provide a K-12 state of Michigan reading endorsement and qualifies certified teachers to serve as reading consultants, reading specialists or remedial and corrective reading teachers. Endorsement candidates must also pass a state of Michigan certification test before a reading endorsement can be issued.

Admission

Applicants to the MAT degree in reading and language arts apply to the department through the Office of Graduate Study. Applications are accepted at any time. Applicants are notified of their status after submitting all required documents.

The department considers only those applicants who hold baccalaureate degrees from accredited institutions. While an undergraduate grade point average of at least 3.0 is the minimum standard for admission, other factors bearing on potential academic success are given due consideration. An application for admission, an application fee, two letters of recommen-

dation and official transcripts of previous academic work must be submitted to the Office of Graduate Study before the application can be reviewed by the department.

Requirements

The requirement for the MAT in reading and language arts is 36 credits; if the two-course option, in lieu of RDG 699: Terminal Project is selected, the program requires 40 credits.

Required courses (24 or 28 credits)

RDG 500	Foundations of Reading Instruction
RDG 571	Foundations of Literature for Children and Adults
RDG 575	Teaching Writing in the Elementary and Secondary Schools
RDC 632	Diagnosis of Reading Disabilities
RDC 633	Correction of Reading Disabilities
RDG 699*	Terminal Project

*Students may elect a two-course option in lieu of RDG 699. This option necessitates 40 credits for graduation. Recommended substitute courses in lieu of RDG 699 are: RDG 534, 570 and 594. Other courses may be substituted for these three but only with adviser permission.

Elective courses (12 credits)

Twelve credits may be elected from the reading and language arts course offerings. Any 500 or 600 level course with a RDG or IST designation preceding the course number constitutes an acceptable elective. In addition, RDG or IST 700 level courses may serve as electives, but only with adviser and course instructor permission.

Candidates for the Michigan Elementary Professional Certificate (formerly Continuing Certificate) must elect RDG 534 if they have not previously met this requirement.

Candidates for the Michigan Secondary Professional Certificate must elect RDG 538 if they have not previously completed an equivalent course. It is the student's responsibility to confirm with the School of Education and Human Services' advising office whether or not prior course work fulfills state requirements for the professional certificate.

MAT in Reading and Language Arts with Endorsement in Learning Disabilities (LD)

Coordinator: Richard F. Barron

The Department of Reading and Language Arts and the Department of Human Development and Child Studies offer a combined program leading to the MAT in reading and language arts and a Michigan Teaching Certificate Endorsement in Elementary Learning Disabilities (K-8). The dual program consists of 12 to 15 courses (46-62 credits). Courses requirements are as follows:

Block 1: Reading and Language Arts

RDG 500	4 credits
RDG 571 or 574	4 credits
RDG 575	4 credits
RDG 632	4 credits
RDG 633	4 credits
RDG 699 or an adviser approved two course substitute	4 or 8 credits

Block 2: Learning Disabilities

SE 501, SE 377, FE 506	Prerequisite courses
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SE 502	4 credits
SE 517	4 credits
SE 523	4 credits
SE 524a	2 credits
SE 524b	2 credits
SE 580	4 credits
CIL 615	4 credits

This program requires a dual advising process. Following admission to the MAT program in reading and language arts, students should immediately schedule an advising interview with the program coordinator, who will assist in planning the reading portion of the program. Advising forms and records will then be transmitted to a special education adviser who will assess prior course work and determine the student's eligibility for admission into the endorsement program. Admitted students will receive a completed advising form, specifying all course work needed from both reading/language arts and special education. Failure to arrange the initial advising interview during the semester of admission may result in a loss of completed credits.

MAT in Reading and Language Arts with Endorsement in Early Childhood Education (ZA)

Coordinator: W. Dorsey Hammond

A limited number of reading and language arts students will be admitted to the early childhood endorsement sequence. Candidates for admission to the certificate endorsement sequence in early childhood must first be admitted to the MAT in reading and language arts program and then apply to the early childhood program by the June 1st deadline for fall admission (see graduate catalog for the early childhood area). Students admitted to this sequence must schedule an advising appointment with the program coordinator before taking courses. Course requirements are as follows:

Block 1: Reading and Language Arts

RDG 500	4 credits
RDG 571 or 574	4 credits
RDG 575	4 credits
RDG 632	4 credits
RDG 633	4 credits
RDG 560	4 credits
RDG 699 or an adviser approved two course substitute	4 or 8 credits

Block 2: Early Childhood

EC 450	4 credits
EC 544	4 credits
EC 542	4 credits
EC 509	4 credits
EC 543	4 credits

MAT in Reading and Language Arts with Michigan Administrator Certificate Endorsement in Elementary or Secondary Administration

Coordinator: Richard Barron

The Department of Reading and Language Arts and the Department of Curriculum, Instruction and Leadership offer a combined program leading to the MAT in reading and language arts with a Michigan Administrator Certificate Endorsement. Candidates for this program must first be admitted to the MAT reading and language arts degree program and must meet all CIL requirements for admission to the Michigan Administrator Certificate Endorsement program (see catalog section for the CIL Department). Students admitted to this program must schedule an advising appointment with the program coordinator before scheduling courses. Course requirements are as follows:

Block 1: Reading and Language Arts

RDG 500 or 538	4 credits
RDG 571	4 credits
RDG 575	4 credits
RDG 632	4 credits
RDG 633	4 credits
Reading Elective	4 credits
RDG 699 or an adviser approved two course substitute	4 or 8 credits

Block 2: Curriculum, Instruction and Leadership Elementary/Middle School Principal Certification

CIL 580 or 677	4 credits
CIL 585	4 credits
CIL 658	2 credits
CIL 658a	2 credits
CIL 661	4 credits
CIL 685	4 credits

Or: Block 2: Curriculum, Instruction and Leadership Secondary/Middle School Principal Certification

CIL 580 or 677	4 credits
CIL 585	4 credits
CIL 658	2 credits
CIL 658b	2 credits
CIL 661	4 credits
CIL 685	4 credits

Microcomputer Applications Certificate Program

Coordinator: Anne Porter

The Reading and Language Arts Department offers a 16-credit certificate indicating focused training in educational applications of microcomputers and related technologies. This program is intended for teachers, administrators and professional staff representing a variety of educational and training levels. The certificate program meets the needs of educators in the challenging and rapidly changing field of technology in education as it relates to literacy, learning and the school curriculum.

Students enrolled in the MAT program in reading and language arts may earn the certificate as part of the master's degree program. Under this option, students will complete the elective portion of the MAT by enrolling in IST 594, 595 and 679. IST 699 will be substituted for RDG 699.

Students who do not wish to be enrolled in the MAT program will be admitted in Professional Certification (PC) status. They will receive the certificate upon the successful completion of the four courses listed above.

Advanced Microcomputer Applications Certificate Program

Coordinator: Anne Porter

For holders of the Certificate of Microcomputer Applications in Education (or the equivalent), the Department of Reading and Language Arts offers a 16-credit certificate of advanced study in the theory and application of instructional systems technology in the enhancement of learning environments. This program provides an opportunity for focused inquiry in specific areas of interest relating to the impact of advanced technologies on teaching, learning and literacy in a variety of settings.

Doctoral students may pursue this certificate as part of their minor concentration. Students enrolled in the MAT in reading and language arts program may use these courses as part of their elective sequence with permission from their adviser. Students may also enroll in the certificate program without pursuing a graduate degree. Students will receive the certificate upon the successful completion of IST 630, 703, 706 and 780.

Certificate Endorsement in Reading

The Department of Reading and Language Arts offers a 24 credit, K-12 Michigan Certificate Endorsement in Reading for students who have successfully completed a master's degree in an allied or related field of study. Required courses are RDG 500, 571, 575, 632, 633 and one elective. Endorsement seekers must also pass a State of Michigan reading endorsement certification examination. Students considering pursuing this endorsement must schedule an advising interview prior to making application to the program. Failure to do so may result in loss of completed credits and/or dismissal from the program.

Post Master's Certificate Programs in Reading, Language Arts, and Literature: 16 credits and 32 credits

Coordinator: James Cipielewski

The 16 and 32 credit certificate programs in reading, language arts, and literature are intended for two different groups of students: 1) students with little background in reading and, 2) students who have completed a MAT in reading and language arts. If you have little or no reading, language arts or children's literature background, the options available will enable you to gain a basic understanding of literacy instruction and provide invaluable information on current trends and issues in the field.

Since some school districts now require planned 15 and 30 hour programs, the Post Master's Certificate Programs in reading, language arts, and literature will meet the need for a planned program. Students wishing to pursue this program option should schedule an advising appointment with the program coordinator.

16 credits

The 16 credit certificate consists of three courses from among the courses listed below plus an adviser approved elective. A concentration in children's literature, writing or secondary reading can be arranged with an adviser.

- RDG 530 Workshop in Reading
- RDG 560 Emerging Literacy: Early Reading and Writing
- RDG 561 Phonics in Proper Perspective
- RDG 562 Whole Language: From Premise to Practice
- RDG 563 The Reading-Writing Connection
- RDG 566 ESL: Literacy for Second Language Learners
- RDG 573 Adolescent Literature
- RDG 574 Literature for the Young Child
- RDG 576 Poetry: Reading and Writing
- RDG 577 Narrative: Reading and Writing
- RDG 578 Non-fiction: Reading and Writing
- RDG 631 Problems in Reading Instruction

32 credits

The 32 credit certificate requires that the 16 hour certificate first be completed. Thereafter, the following requirements apply:

- RDG 565 Teaching Apprenticeship: Reading and Language Arts
- RDG 780 Independent Investigations in Reading and Language Arts
- Elective: Two adviser approved electives totaling 8 credits

Course Offerings

READING AND LANGUAGE ARTS

- 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 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 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 and emphasizes the developmental literacy skills of children, starting with kindergarten.

- 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 536 Teaching Reading to the Special Child (4)
Focuses on the diagnostic teaching of reading with special education students, particularly: learning disabled, educable mentally impaired, emotionally impaired and autistic children. Students appraise reading competency and plan instruction using a variety of formal and informal assessment processes. Prerequisite: Admission to the learning disabilities certificate endorsement program or instructor permission.

- 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 539 Clinical Issues in Early Literacy Instruction: Reading Recovery™ Teacher Training (2, 4)
A three semester sequence to prepare teachers to implement specialized reading methods with young children most at risk for reading difficulty in the classroom context. Teachers observe, record, analyze, and modify the reading and writing behavior of children and develop understandings of reading acquisition. May be repeated for a maximum of 10 credits. Prerequisites: Students must be nominated by a participating school district and accepted into the Reading Recovery™ program or receive permission from program director.

- RDG 560 Emerging Literacy: Early Reading and Writing (2, 4)
Examines principles, strategies, and research related to early literacy development among children from preschool through primary grades. Emphasizes the developmental nature of early learning and literacy.

- RDG 561 Phonics in Proper Perspective (2, 4)
Addresses the role of phonics in the reading process of emergent and mature readers. Different theoretical views of phonics are examined and compared. Explores phonemic awareness and related concepts. Strategies for teaching phonics are presented. Special emphasis placed on the appropriate uses of phonics in a whole language curriculum.

- RDG 562 Whole Language: From Premise to Practice (2, 4)
A course designed to explore modern integrated approaches to teaching language arts. Included are the study of language development, literature, oral and written language instruction, spelling and grammar. Whole language philosophy, premises, and practices are stressed.

- RDG 563 The Reading-Writing Connection (2, 4)
Develops understanding of the nature of the writing and reading processes, the influence of reading on writing, the influence of writing on reading, the uses of literature in the reading-writing connection and the nature of the learner in the reading-writing process.

- RDG 565 Teaching Apprenticeship: Reading/Language Arts (4)
Students work in a mentoring relationship with a faculty member. Specific experiences determined by each student's interests and needs. Apprentice teachers participate through observation, supervising group activities, counseling and guiding individual students, organizing and presenting lectures and demonstrations.

RDG 566 ESL: Literacy for Second Language Learners (2, 4)

Examines significant issues involved in teaching literacy to children and adults who are second language learners of English (ESL: English as a Second Language). Provides background for ESL teachers and suggests methods, practices, and procedures for working with ESL learners.

RDG 570 The Author's and Illustrator's Art and Craft (4)

Selected authors' and illustrators' works are read and criticized in light of psychological, sociological, historical, literary and curricular factors. Examines ways to encourage young people in elementary and secondary schools to read critically and appreciatively a variety of literacy works representing multicultural perspectives and works in translation.

RDG 571 Foundations of Literature for Children and Young Adults (4)

Presents criteria for selecting and evaluating literature for children and young adults from a historical perspective. Examines important research in the field and ways to incorporate literature, specifically multicultural and international literature, into the curriculum via books, tapes, and films.

RDG 572 Storytelling and Creative Dramatics (4)

Focuses on methods of encouraging children to use imaginative and dramatic skills to interpret literature. Helps teachers use creative drama techniques. Provides opportunities to select, learn and tell stories, lead drama activities, storytelling, and creative drama programs.

RDG 573 Adolescent Literature in Middle Schools, Junior and Senior High Schools (4)

Introduces literature written for and of interest to adolescents. Topics include trends in literature and publishing, methods of presenting books, how to stimulate reluctant readers and the use of trade books, tapes, and films in content areas.

RDG 574 Literature for the Young Child (4)

Emphasizes the careful selection and sensitive use of developmentally appropriate and enriching literature, including multicultural literature with preschool and early elementary school children.

RDG 575 Teaching Writing in the Elementary and Secondary Schools (4)

Emphasizes writing and teaching the writing process. Topics include prewriting, drafting, revising, publishing, conferencing, writing workshops, poetry, evaluation, writing across the curriculum, invented spelling, reading-writing connection, and issues related to learning to write.

RDG 576 Poetry: Reading and Writing (2, 4)

Examines children's response to poetry, the writing of poetry, approaches writers use in poems and the strategies teachers can use when teaching poetry writing. Emphasis will be on learning how to read and write poetry, professional teaching and assessment.

RDG 577 Narrative: Reading and Writing (2, 4)

Examines children's responses to narrative writing, how they write fiction and the relationship between fiction writing and reading comprehension. Also examines how writers write fiction, how reading fiction improves writing, and methods of assessing responses to narrative writing.

RDG 578 Non-Fiction: Reading and Writing (2, 4)

Examines language, cognitive development and non-fiction reading and writing. Students work on their own writing and explore teaching methods and research related to expository writing. Students read non-fiction as models for writing and consider ways to teach non-fiction writing.

RDG 590 Special Problems in Reading (2, 4, 6, or 8)

Topics differ depending on student interests. Students pursue a topic independently but with instructor guidance. A written proposal is prepared and must be approved by faculty sponsor. Prerequisite: Instructor permission.

RDG 630 Seminar in Reading (4)

Analyzes the validity, reliability, methodology, results, conclusions, and implications of research and seminal literature in selected areas of reading and language arts.

RDG 631 Problems in Reading Instruction (4 or 8)

Analyzes diagnostic, methodological, organizational and administrative issues in reading and language arts. Topics vary depending on student and instructor interests.

RDG 632 Diagnosis of Reading Disabilities (4)

A laboratory course focusing on diagnosis of children's reading and language arts disabilities. Students develop, administer, interpret, and score formal and informal tests, write case reports, and analyze reading and language arts problems.

Prerequisite: Admission to the MAT, RDG 500 and/or permission of instructor. Must sign up with Reading Department secretary one semester prior to registration and have completed 20-24 credits.

RDG 633 Correction of Reading Disabilities (4)

A laboratory course focusing on instructional strategies for teaching reading and language arts to children with reading difficulties. Students work directly with children. Students plan and conduct developmental, remedial and corrective instruction under supervision of the instructor.

Prerequisite: Admission to the MAT program, RDG 632 and/or permission of instructor.

RDG 639 Clinical Issues in Early Literacy Instruction: Reading Recovery™ Teacher Leader Training (4)

A three semester sequence designed to prepare teachers to implement reading methods for use with young children most at risk for reading difficulty. Teachers observe, record, analyze, and modify the reading and writing behavior of children. Teachers develop understandings of the theoretical underpinnings of reading acquisition. May be repeated for a maximum of 10 credits.

Prerequisites: Students must be nominated by a participating school district and accepted into the Reading Recovery™ program, or by permission of the program director.

RDG 699 Terminal Project in Reading and Language Arts (4)

Planning and executing a research study or an educational project focused on reading and the language arts. A written research or project proposal must be prepared and approved by a faculty adviser before work is initiated. Work must be completed at least two weeks before the end of classes in the semester of graduation.

Prerequisite: Admission to MAT in Reading and Language Arts.

RDG 700A & B 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 computer analysis of multi variate procedures.

Prerequisite: Admission to Ph.D. program or instructor permission.

RDG 701 Introduction to Research in Reading

This course is designed as the first course in the program leading to the Ph.D. in reading and language arts. The content of the course will focus on a general overview of educational research with special emphasis on orienting students to the nature of reading and language arts research, searching reading and language arts literature, and initiating individual doctoral research.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 702 Applied Research in Reading and Language Arts (4)

Assists students in the process of successfully completing a thesis for the doctoral degree. Focuses on preparation of a proposal leading to a thesis project.

Prerequisite: Admission to the Ph.D. program, 700A, 700B, or instructor permission.

RDG 703 Advanced Diagnostic and Corrective Reading (4)

Two semester course wherein doctoral student serves as an instructional assistant to a faculty member who is teaching the master's level diagnosis and correction sequence.

Prerequisite: Admission to Ph.D. program, RDG 632 and 633, or instructor permission.

RDG 704 Perspectives in Literature (4)

Examines perspectives of literature for children and young adults. Research and critical essays on literary theory, the teaching and use of literature in classrooms, and other pertinent topics will be studied.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 705 Perspectives in Writing (4)

Examines research in writing, composition theory, philosophy of writing, the teaching of composition, relationship of composition and comprehension, and other pertinent topics. Opportunities to write poems, stories, and expository pieces.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 707 Theoretical Models and Historical Perspectives (4)

Examines contemporary models of reading, including automaticity, attention-capacity, interactive-compensatory, psycholinguistic, and other prominent models of reading. Traces the history and pertinent influences on the teaching of reading and reading practices from colonial to contemporary times.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 708 The Psychology of Reading

Explores the acquisition and operation of reading processes. Focuses on basic research on reading in cognitive and developmental psychology. Students will gain an understanding of the influences of psychology on reading theory as well as in depth knowledge of specific topics in the psychology of reading.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 709 Doctoral Seminar in Reading (4)

Advanced topics in reading and language arts selected by the instructor in consideration of the needs and interests of doctoral students. Research and seminal works are analyzed and interpreted. Research designs, procedures and findings are discussed.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 775 Learning Models: Applications in Computer-Assisted Learning (4)

Overviews theories of learning such as stimulus response, cognitive, cybernetic and integrative approaches. Examines applications, variations, and social aspects of learning environments. Uses and capabilities of the computer and its relationship to learning theories are examined.

Prerequisite: RDG 595 or instructor permission.

RDG 780 Independent Investigations in Reading/Language Arts (2, 4, 6, or 8)

Students investigate topics under faculty guidance. Student needs and interests determine topics chosen. Examination of diagnostic, methodological, organizational and administrative issues in reading are encouraged.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 790 Independent Study (2, 4, or 8)

Directed readings for doctoral students on a topic that is not available through regular course offerings. May be taken for a total of 8 credits.

Prerequisite: Admission to the Ph.D. program or instructor permission.

RDG 799 Dissertation Research (4 to 24)

Preparation of a research project culminating in the doctoral dissertation.

Prerequisite: Admission to the Ph.D. program, permission of the Ph.D. coordinator, and permission of the student's dissertation chairperson.

INSTRUCTIONAL SYSTEMS TECHNOLOGY**IST 590 Special Problems in Instructional Systems Technology (2, 4, 6, 8)**

Course content depends on student and staff needs and interests. Topics may differ each semester. This course may be elected for independent study and may be taken for a maximum of 8 credits.

Prerequisite: Instructor permission.

IST 594 Introduction to Technology Applications in the Classroom (4)

An introduction to the integration of audio, video, computing and telecommunications technologies in classroom teaching. A theoretical and practical foundation for the instructional use of integrated technologies is provided.

IST 595 Instructional Systems Technology Applications (4)

A practical examination of the applications software and telecommunications technologies. Emphasis is on using technology to support classroom learning experiences with a focus on assessing, comprehending, and communicating information. Students acquire proficiency in the use of these instructional tools.

Prerequisite: IST 594 or permission of instructor.

IST 630 Workshop in Educational Software and Related Technologies (4)

Emphasizes the examination of current software and the development of materials, resources and processes for incorporating software into various curriculum areas with an emphasis on cross-curricular, multicultural, and whole language issues. Includes workshops in digital literacy, comprehension issues related to hypermedia navigation, and other topics.

IST 679 Software Design (4)

An introduction to software design applied through a variety of integrated technologies. The student will become familiar with the procedures used in the development and evaluation of software based learning environments. The student will apply design skills to the development of a technology supported learning experience.

Prerequisite: IST 595.

IST 699 Terminal Project: Instruction Systems Technology (4)

A project which incorporates the skills and principles covered in IST 594, 595 and 679. Students design, carry out and evaluate a comprehensive technology related learning experience.

Prerequisite: IST 679.

IST 703 Advanced Instructional Systems Technology Applications (4)

Extensive application of a variety of technologies in a learning environment. The student's work in the Teacher Explorer Center will be determined by both the center's needs and student interest.

Prerequisite: Admission to Ph.D. program, completion of IST 594/595 or instructor's permission.

IST 706 Perspectives in Instructional Systems Technology (4)

Examines topics in Instructional Systems Technology in relation to literacy issues. Research in software design, roles of technology in support of learning, literacy needs of the future, new media authoring and other pertinent topics will be studied.

Prerequisite: Admission to Ph.D. program or instructor's permission.

IST 780 Independent Investigations in Instructional Systems Technology (2, 4, 6, or 8)

Students investigate topics under the direction of a faculty member. Student needs determine the topics. Design, methodological, organizational, administrative and theoretical issues in Instructional Systems Technology are encouraged.

Prerequisite: Admission to Ph.D. program or instructor's permission.

SPECIAL COURSES

The School of Education and Human Services offers interdepartmental courses, staffed by faculty from the various departments. Occasionally, with the approval of the Dean of Graduate Study and the concurrence of the Graduate Council, other courses of special interest to education students are offered by departments which do not have graduate programs.

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/U.)

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 Training 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 training.

VTE 511 Laboratory Planning for Training (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 training 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 Training 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 Training (2 or 4)

Topics on research studies and current trends and issues in training, 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 MAT 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, COMMUNICATION AND JOURNALISM

RCJ 515 Summer Workshop (2 or 4)

Concentrated two or four-week workshop on topics of interest to high school teachers and post-baccalaureate students. May be cross-listed with ENG 515.

SCHOOL OF NURSING

Dean: Justine J. Speer

Program director: Diane R. Wilson

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Lecturers:

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Donald Fill, M.S., CRNA, Mercy College

Howard Normile, Ph.D., Wayne State University

Adjunct assistant professors:

Therese Pilchak, M.S., C.R.N.A., R.N., Mercy College

Christine Zambricki, M.S., C.R.N.A., R.N., Wayne State University

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Lisa Mileto, M.S., C.R.N.A., R.N., Mercy College

The Master of Science in Nursing

The Master of Science in Nursing program prepares professional nurses for advanced practice in nursing administration, adult health nursing or nurse anesthesia. The graduate program prepares nurses for advanced nursing practice, leadership in the nursing profession and future doctoral study.

Nursing administration track

The nursing administration track prepares nurses for nursing management in the health care system. The administration focus and practicum in a variety of health care settings provide the opportunity for students to gain experience in nursing administration. The graduate is prepared to use nursing theory, administration theory and the research process to positively influence nursing practice and the delivery of health care. Students study nursing economics and management and choose electives from a variety of disciplines relative to their specific goals.

Adult health track

The program of study in adult health nursing prepares nurses as advanced generalists to function in a variety of roles, including clinical practice, teaching and management. Nursing courses provide the opportunity for students to develop skills in advanced nursing practice in a variety of clinical settings. The graduate is prepared to apply nursing theory, principles of

advanced practice and the research process in designing systems of care for adults. Knowledge in adult health nursing is synthesized from concepts in nursing and the natural and social sciences. Students select functional role preparation in either nursing education or nursing administration. Students may combine adult health track courses to complete a 45-credit post-master's Family Nursing Practice Certificate. Students choose electives from a variety of disciplines relative to their specific goals.

Nurse anesthesia track

The program of study in nurse anesthesia prepares nurses as specialists in anesthesia care. Nursing courses and clinical internships provide the opportunity for students to gain experience in nurse anesthesia practice in all specialty areas. Students study physiology, pathophysiology and anatomy in cognate courses. The graduate is prepared to apply nursing theory, principles of nurse anesthesia practice and the research process in the delivery of anesthesia care. Students must have taken graduate courses in nursing theory before entering the first clinical course in Winter term. Nurse anesthesia graduates are prepared to sit for the certification exam offered by the Council of Certification of Nurse Anesthetists leading to the designation C.R.N.A.

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 must have competencies of an undergraduate from Oakland University, show satisfactory achievement on the Graduate Record Examination general test, and have a current license to practice as a registered nurse in the state of Michigan. Nursing administration and adult health nursing applicants must carry minimum malpractice insurance of \$1 million; it is preferred that the applicant have at least one year prior clinical experience. Applicants for the nurse anesthesia track must have achieved a grade of 3.0 or better in inorganic and organic chemistry, anatomy and physiology; and have a minimum of one year of experience as a registered professional nurse during which time the applicant has had the opportunity to function as an independent decision maker, demonstrate advanced psychomotor skills, and use and interpret advanced monitoring techniques.

The admission process begins with application for admission to graduate study at Oakland University. Concurrently, the applicant is advised to schedule an appointment with the Program Adviser of the School of Nursing (810) 370-4482. Admission to the program is selective, and preference given to applicants judged to be best qualified to undertake the program of study.

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 colleagues who are able to attest to the applicant's ability, and 4) Graduate Record Examination results. Applicants are required to submit a goal statement of 500 to 1,000 words, with attention given to the applicant's professional goals and experience and contributions the applicant expects to make to nursing. An interview with the Admissions Committee is required for applicants to the nurse anesthesia track.

Admission deadlines for nursing administration and adult health tracks are July 15 and November 15. The admission deadline for the nurse anesthesia track is April 30.

Academic advising

Every student admitted to the M.S.N. program is assigned a faculty adviser with teaching responsibilities in the graduate program. These advisers discuss concerns regarding progression in the program and student's goals. A program adviser also is available for consultation on non-academic concerns.

Academic progress

Students are expected to earn a grade of 3.0 or better in each course and must maintain a cumulative grade point average of 3.00 in accordance with university requirements for graduate students. Graduate credit toward a graduate degree for completion of a course will be given for grades of 3.0 or above. Students who do not meet these standards will have their academic progress reviewed by graduate program faculty. Students who are not making satisfactory progress in the program may be placed on probation with conditions imposed for retention in the program or may be recommended for dismissal from the program.

Degree requirements

The program for the nursing administration and adult health nursing tracks is 36 semester hours beyond the bachelor's degree; the nurse anesthesia track is 50 semester hours. The program will accept a maximum of nine semester hours of prior graduate course work (nursing or non-nursing) for equivalent course credit. The program of study for the nursing administration and adult health nursing tracks allows full-time students to complete the requirements in two academic years and part-time students in three to four academic years. The program of study for the nurse anesthesia track requires 28 months of full-time study, with study commencing in January. The nurse anesthesia track requires extensive time in the clinical setting, beginning with 16 hours a week the first term and concluding with 40 or more hours a week during the final internship. Clinical requirements by the accrediting body require a minimum of 450 cases, in all specialty areas, with at least 800 hours of anesthesia time. *All thesis requirements must conform to university standards (see "master's thesis and doctoral dissertation" section in the Policies and Procedures section of this catalog).*

A maximum of six years is allowed for completion of all degree requirements according to university policy. This policy includes all transfer credits.

The 36 credits of graduate course work for the nursing administration and adult health nursing tracks are distributed as follows:

Core courses

NRS 500	Theoretical Foundations in Nursing (2)
NRS 520	Issues in Nursing (3)
NRS 530	Nursing Research I (3)
NRS 550	Nursing Research II (3)
NRS 600	Concepts of Advanced Nursing Practice (2)
NRS 690	Master's Thesis (2)

Nursing administration track

NRS 560	Quality Management in Health Care Services (3)
NRS 610	Economics in Nursing Administration (3)
NRS 630	Management Process in Nursing Administration (3)
NRS 640	Practicum in Nursing Administration (4)
ORG 531	Human Resources Management (3)
or	
MIS 524	Management Information Systems (3)
or	
POM 521	Operations Management (3)

Adult health nursing track

NRS 611	Human Physiologic Response in Health, Illness, and Disease (3)
NRS 612	Advanced Nursing in Adult Health I (3)
NRS 614	Advanced Nursing in Adult Health II (3)
NRS 642	Practicum in Adult Health Nursing (4)

Functional role options

NRS 630	Management Process in Nursing Administration (3)
	Management Elective Related to Administration Role (3)
or	
NRS 632	Curriculum and Instruction in Nursing Education (3)
NRS 634	Evaluation in Nursing Education (3)

Electives

Students may choose any graduate nursing or non-nursing electives that meet their professional goals in order to accumulate a minimum of 36 credits.

The 50 credits of graduate course work for the nurse anesthesia track are distributed as follows:

Core courses

NRS 500	Theoretical Foundations in Nursing (2)
NRS 520	Issues in Nursing (3)
NRS 530	Nursing Research I (3)
NRS 550	Nursing Research II (3)
NRS 600	Concepts of Advanced Nursing Practice (2)
NRS 690	Master's Thesis (2)

Nurse anesthesia track

NRS 605	Pharmacologic Basis of Nurse Anesthesia Practice (3)
NRS 615	Foundations of Nurse Anesthesia Practice I (6)
NRS 618	Theoretical Applications in Nurse Anesthesia Practice (2)
NRS 625	Foundations of Nurse Anesthesia Practice II (4)
NRS 635	Foundations of Nurse Anesthesia Practice III (3)
NRS 651	Pharmacology I (3)
NRS 652	Pharmacology II (3)
BIO 501	Physiology and Pathophysiology I (4)
BIO 502	Physiology and Pathophysiology II (4)
BIO 503	Gross Anatomical Dissection (3)

Course Offerings

NRS 500 Theoretical Foundations in Nursing (2)

Introduction to graduate education in nursing, including examination of philosophy and conceptual framework of Oakland University's master's program in nursing; discussion of current nursing theories and conceptual frameworks.

Prerequisite: Admission to M.S.N. program or permission of instructor. Corequisite: NRS 600.

NRS 520 Issues in Nursing (3)

Seminar exploring current issues impacting the discipline of nursing and the development of effective strategies for dealing with them.

Prerequisite: Admission to M.S.N. program or permission of instructor.

NRS 530 Nursing Research I (3)

A study of the research process and an analysis of the problems encountered in applying research designs to practice settings. Development of a research proposal including problem, hypotheses or research questions, literature review, and methodology.

Prerequisite or corequisite: NRS 500, 600.

NRS 550 Nursing Research II (3)

Focus on data analysis, statistical methods, computer usage and presentation of research findings.

Prerequisite: NRS 530.

NRS 560 Quality Management in Health Care Services (2, 3)

Examination of issues related to quality, utilization and risk management in health care settings, including the emerging trends in quality management from external regulatory agencies and fiscal intermediaries and the cultural dimensions which support quality. Can be taken as a two-credit elective by students not enrolled in the administration track.

Prerequisite: Admission to M.S.N. program or permission of instructor.

NRS 599 Topical Seminar in Nursing (2, 3)

Discussion of a selected topic relevant to the practice of a master's prepared nurse.

Prerequisite: Admission to M.S.N. program or permission of instructor.

NRS 600 Concepts of Advanced Nursing Practice (2)

Guided experience to design clinical practice based on selected nursing theories or conceptual frameworks. Emphasis is on application and evaluation of a conceptual framework for advanced nursing practice.

Corequisite: NRS 500.

NRS 605 Pharmacologic Basis of Nurse Anesthesia Practice (3)

The pharmacology of specific anesthetic agents and an introduction to basic pharmacologic principles applied to anesthesia administration.

Prerequisite: Admission to M.S.N. program. Corequisite: NRS 500, 600, BIO 501.

NRS 610 Economics in Nursing Administration (3)

Study of fiscal resources in health care agencies; emphasis on the principles of fiscal management, budgeting process, health care reimbursement and its effects on decision-making.

Prerequisite: NRS 600, undergraduate accounting class or equivalent learning experience.

NRS 611 Human Physiologic Response in Health, Illness, and Disease (3)

Advanced physiological concepts related to human health, illness and disease.

Prerequisite or corequisite: NRS 500, 600.

NRS 612 Advanced Nursing in Adult Health I (3)

Theoretical and research foundations of multidimensional health assessment and clinical decision-making in advanced nursing practice.

Prerequisite: NRS 611.

NRS 614 Advanced Nursing in Adult Health II (3)

Theoretical and research foundations of nursing intervention in advanced nursing practice.

Prerequisite: NRS 612.

NRS 615 Foundations of Nurse Anesthesia Practice I (6)

Basic principles of anesthesia administration including perioperative assessment, techniques and procedures for anesthesia delivery, airway management, orientation to safe use and care of anesthesia equipment.

Prerequisite: NRS 500, 600, 605, BIO 501. Corequisite: NRS 651, BIO 502.

NRS 618 Theoretical Application in Nurse Anesthesia Practice (2)

Principles of chemistry and physics as they relate to anesthesia practice; basic knowledge necessary for administering a safe, physiologic anesthetic, utilizing the anesthesia machine and monitoring devices.

Prerequisite: NRS 615, BIO 502. Corequisite: NRS 530, 625, 652.

NRS 625 Foundations of Nurse Anesthesia Practice II (4)

Exploration of strategies for the management of specialty cases including pediatrics, obstetrics, thoracic, cardiovascular, neurologic, eye, ear, nose and throat, genitourinary, and orthopedics.

Prerequisite: NRS 615, 651, BIO 502. Corequisite: NRS 530, 618, 652.

NRS 630 Management Process in Nursing Administration (3)

Examination of systems theory, organizational behavior and marketing principles; various nurse management roles will be explored and commonalities analyzed.

Prerequisite: NRS 610 or permission of instructor.

NRS 632 Curriculum and Instruction in Nursing Education (3)

Focus on the process of curriculum development in nursing education. May include a field experience.

Prerequisite: Admission to M.S.N. program or permission of instructor.

NRS 634 Evaluation in Nursing Education (3)

Application of evaluation theory to the development/selection and use of evaluation methods in nursing education. May include a field experience. Prerequisite: NRS 632.

NRS 635 Foundation of Nurse Anesthesia III (3)

Continued emphasis on advanced clinical practice with focus on respiratory care, mechanical ventilation, pulmonary physiology, regional anesthesia, pain management and cardiopulmonary resuscitation. Prerequisite: NRS 618, 625, 652. Corequisite: BIO 503, NRS 520, 550.

NRS 640 Practicum in Nursing Administration (4)

Guided experience in a health care agency integrating administrative theory and practice; concurrent seminar focuses on functions unique to nurse manager roles.

Prerequisite: All core and nurse administration track courses except NRS 690.

NRS 642 Practicum in Adult Health Nursing (4)

Guided experience in a health care agency integrating theories of adult development and health in advanced nursing practice; concurrent seminar focuses on role of advanced generalist.

Prerequisite: All core and adult health track courses except NRS 690.

NRS 650 Independent Study in Nursing (1 to 4)

Advanced independent study in a specialty area.

Prerequisite: Prior approval of independent study option by instructor and graduate program director.

NRS 651 Pharmacology I (1, 3)

General principles of pharmacology, including pharmacokinetics and pharmacodynamics. Specific classifications of drugs, beginning with those that exert their effects on the neurohumoral system.

Prerequisite: NRS 500, 600, 605, BIO 501. Corequisite: NRS 615, BIO 502.

NRS 652 Pharmacology II (2, 3)

Focus on drugs affecting the central nervous system, the heart, and the renal system as well as local and general anesthetics, non-steroidal anti-inflammatory agents, steroids and antihistamines.

Prerequisite: NRS 615, 651, BIO 502. Corequisite: NRS 530, 618, 625.

NRS 680 Terminal Project (1, 2)

Research project examining a nursing problem. Examples might include a quality assurance project or program evaluation. Seminars may be required.

Prerequisite: NRS 550.

NRS 690 Master Thesis (1, 2)

Application of research process to a nursing problem.

Prerequisite or corequisite: NRS 550.

The Post-Master's Certificate Program: Family Nurse Practitioner

The Family Nurse Practitioner component of the MSN program awards a post-master's certificate upon completion of 24 credits post-master's. The certificate component is planned as a full-time course of study over three academic terms. The major focus is primary care nursing and management of families in health and wellness, when experiencing common acute illnesses or common chronic illnesses. Concurrent courses include pharmacology and a seminar on the role of the family nurse practitioner.

Admission requirements for the post-master's student:

Master of Science in Nursing degree with a GPA of 3.00 or better; prior course work equivalent to NRS 611 and 612; a minimum of two years recent direct clinical experience; and a personal interview.

Admission requirements for the student enrolled in Oakland's master's program:

Completion of core courses (except thesis or terminal project); completion of adult health track cores NRS 611 and NRS 612; a minimum of two years recent direct clinical experience; and a personal interview. Admission to the certificate component of the MSN program will occur once each academic year.

Plan of Study

NRS 644	Primary Health Care: The Role of the Nurse Practitioner (2)
NRS 651	Pharmacology I (1)
NRS 652	Pharmacology II (2)
NRS 653	Primary Care Nursing: Management of Family Health and Wellness (6)
NRS 654	Primary Care Nursing: Management of Families Experiencing Common Acute Health Problems (5)
NRS 655	Primary Care Nursing: Management of Families Experiencing Chronic Health Problems (5)

Applied Drug Therapy (3) University of Washington, Distance Learning

Course Offerings

NRS 644 Primary Health Care: The Role of the Nurse Practitioner (2)

Focus is the analysis and synthesis of theories, concepts and research related to the expanded roles and functions of nurses as independent primary health care practitioners. The role of the advanced practitioner in primary care settings is examined. The role of the advanced practitioner as a consultant and collaborator is emphasized.

Prerequisite: Admission to Family Nurse Practitioner Certificate Program.

NRS 653 Primary Care Nursing: Management of Family Health and Wellness (6)

Integration of concepts of advanced nursing practice, theory and research applied to the primary health care of family health and wellness. In clinical practice students exercise clinical judgment in the primary nursing care management of well pediatric and obstetric clients and their families.

Prerequisite: Admission to Family Nurse Practitioner certificate program.

Corequisite: NRS 644.

NRS 654 Primary Care Nursing: Management of Families Experiencing Common Acute Health Problems (5)

Integration of concepts of advanced nursing practice, theory and research applied to the primary health care of families experiencing common acute health problems. In clinical practice students exercise clinical judgment and use skilled communication and a variety of therapeutic nursing interventions to restore and promote health in families.

Prerequisite: NRS 644 and 653.

Corequisite: NRS 651 and University of Washington, Distance Learning.

NRS 655 Primary Care Nursing: Management of Families Experiencing Chronic Health Problems (5)

Integration of concepts of advanced nursing practice, theory and research applied to the primary health care of families experiencing chronic health problems across the life span. In clinical practice students exercise clinical judgment in the primary nursing care management of families and evaluate the clinical effectiveness of strategies derived from diverse theoretical perspectives.

Prerequisite: NRS 654.

Corequisite: NRS 652 and University of Washington, Distance Learning.

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- 35. Art Gallery
- 42. Hall
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- 15. Music Festival Box Office Theatre
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- 13. Oakland Center
- 27. O'Dowd Hall
- 2. Public Safety & Service Bldg.
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- 6. Studio Theatre
- 37. Sunset Terrace
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- 5. Varner Recital Hall
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