



OAKLAND UNIVERSITY ROCHESTER, MICHIGAN

1991-93 GRADUATE CATALOG

# OAKLAND UNIVERSITY



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## **1991-93 GRADUATE CATALOG**

**March 1991**

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## For Information

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(313) 370-2100

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Dean of the School of Engineering and Computer Science, 370-2217  
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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 and Section 504 of the Rehabilitation Act of 1973. It is the policy of Oakland University that there shall be no discrimination on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, veteran status or other prohibited factors in employment, admissions, educational programs or activities. Inquiries or complaints should be addressed to: Director, Office of Equal Opportunity, 148 North Foundation Hall, Oakland University, Rochester, Michigan 48309-4401.

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## Service Offices

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## Academic Calendar

### Fall 1991

|                            |                |              |
|----------------------------|----------------|--------------|
| Registration               | Tuesday        | August 27    |
| Labor Day holiday          | Mon            | September 2  |
| Classes begin              | 7:30 a.m., Tue | September 3  |
| Fall commencement          | Sun            | September 22 |
| Thanksgiving recess begins | 10 p.m., Wed   | November 27  |
| Classes resume             | 7:30 a.m., Mon | December 2   |
| Classes end                | 10 p.m., Tue   | December 10  |
| Study period               | Wed            | December 11  |
| Exams begin                | 7 a.m., Thu    | December 12  |
| Exams end                  | 10 p.m., Wed   | December 18  |

### Winter 1992

|                      |                |             |
|----------------------|----------------|-------------|
| Registration         | Thu            | 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 2     |
| Classes end          | Noon, Sat      | April 18    |
| Study Period         | Sun            | April 19    |
| Exams begin          | 7 a.m., Mon    | April 20    |
| Exams end            | Noon, Sat      | April 25    |

### Spring 1992

|                      |              |             |
|----------------------|--------------|-------------|
| Registration         | Tue          | April 28    |
| Classes begin        | 6 p.m., Tue  | April 28    |
| Memorial Day holiday | Mon          | May 25      |
| Spring commencement  | Sat          | June 6      |
| Classes end          | 10 p.m., Wed | June 17     |
| Final exams          | Thu, Fri     | June 18, 19 |

### Summer 1992

|                         |                |               |
|-------------------------|----------------|---------------|
| Registration            | Tue            | June 23       |
| Classes begin           | 7:30 a.m., Wed | June 24       |
| Independence Day recess | 10 p.m., Thu   | July 2        |
| Classes resume          | 7:30 a.m., Mon | July 6        |
| Classes end             | 10 p.m., Wed   | August 12     |
| Final exams             | Thu, Fri       | August 13, 14 |

### Fall 1992

|                            |                |              |
|----------------------------|----------------|--------------|
| Registration               | Tuesday        | September 1  |
| Labor Day holiday          | Mon            | September 7  |
| Classes begin              | 7:30 a.m., Tue | September 8  |
| Fall commencement          | Sun            | September 20 |
| Thanksgiving recess begins | 10 p.m., Wed   | November 25  |
| Classes resume             | 7:30 a.m., Mon | November 30  |
| Classes end                | 10 p.m., Fri   | December 11  |
| Exams begin                | 7 a.m., Sat    | December 12  |
| Exams end                  | 10 p.m., Fri   | December 18  |

### Winter 1993

|                      |                |              |
|----------------------|----------------|--------------|
| Registration         | Mon            | January 4    |
| Classes begin        | 7:30 a.m., Tue | January 5    |
| Winter recess begins | 10 p.m., Sat   | February 27  |
| Classes resume       | 7:30 a.m., Mon | March 8      |
| Classes end          | 10 p.m., Mon   | April 19     |
| Study Period         | Tue, Wed       | April 20, 21 |
| Exams begin          | 7 a.m., Thu    | April 22     |
| Exams end            | 10 p.m., Wed   | April 28     |

### Spring 1993

|                      |              |             |
|----------------------|--------------|-------------|
| Registration         | Mon          | May 3       |
| Classes begin        | 6 p.m., Mon  | May 3       |
| Memorial Day holiday | Mon          | May 31      |
| Spring commencement  | Sat          | June 5      |
| Classes end          | 10 p.m., Wed | June 23     |
| Final exams          | Thu, Fri     | June 24, 25 |

### Summer 1993

|                         |                |               |
|-------------------------|----------------|---------------|
| Registration            | Tue            | June 29       |
| Classes begin           | 7:30 a.m., Wed | June 30       |
| Independence Day recess | 5:30 p.m., Fri | July 2        |
| Classes resume          | 7:30 a.m., Tue | July 6        |
| Classes end             | 10 p.m., Wed   | August 18     |
| Final exams             | Thu, Fri       | August 19, 20 |

Note: 1992 and 1993 calendars are subject to change.

## Admission Schedule

This is a general guide for submission of application material. International applicants should consult page 18 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, <i>all</i> application material must be in the Office of Admissions and Scholarships by: | For special graduate or post-master's admission, application materials must be postmarked by: |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Spring 1991                            | March 15, 1991                                                                                                                | April 5, 1991                                                                                 |
| Summer 1991                            | May 15, 1991                                                                                                                  | June 5, 1991                                                                                  |
| Fall 1991                              | July 15, 1991                                                                                                                 | August 5, 1991                                                                                |
| Winter 1992                            | November 15, 1991                                                                                                             | December 5, 1991                                                                              |
| Spring 1992                            | March 15, 1992                                                                                                                | April 5, 1992                                                                                 |
| Summer 1992                            | May 15, 1992                                                                                                                  | June 5, 1992                                                                                  |
| Fall 1992                              | July 15, 1992                                                                                                                 | August 5, 1992                                                                                |
| Winter 1993                            | November 15, 1992                                                                                                             | December 5, 1992                                                                              |
| Spring 1993                            | March 15, 1993                                                                                                                | April 5, 1993                                                                                 |
| Summer 1993                            | May 15, 1993                                                                                                                  | June 5, 1993                                                                                  |
| Fall 1993                              | July 15, 1993                                                                                                                 | August 5, 1993                                                                                |

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.

Admitted applicants to degree programs who do not enroll for the term in which they were admitted must apply for readmission to graduate study. If done within two years 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 two years.

## GENERAL INFORMATION

Oakland University is a comprehensive, state-assisted institution of approximately 12,500 students that offers diverse academic programs, from baccalaureate to doctorate. 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, Engineering and Computer Science, Health Sciences, Human and Educational Services, Nursing, and a program of Continuing Education and the Office of Graduate Study. All academic programs of the university are accredited by the North Central Association of Colleges and Schools.

The university's faculty, which now numbers more than 400, 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 \$6.5 million. Studies in biological and physical sciences and robotics 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. This institution takes pride in the many scholarly books and articles written by its faculty and in their contributions to pedagogy and the creative arts. Wherever possible, students are involved in research projects; 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.

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

Complementing its academic 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, located in the Baldwin Pavilion, is the summer home of the Detroit Symphony Orchestra. 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 1,500-acre estate and \$2 million to Michigan State University to begin a new college in Oakland County. Named Michigan State University-Oakland, the new campus enrolled its first students in 1959. In 1963, 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.

Located between the cities of Pontiac and Rochester, 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 1,700 residential students. Adjacent to the campus is the Oakland Technology Park, a research park where private-sector companies work hand-in-hand with higher education.

## Role and Mission

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

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

## Instruction

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

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

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

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

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

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

## Research and scholarship

Oakland University assumes an obligation to advance knowledge through the research and scholarship of its faculty and students. The university's research and scholarship mission takes expression in a variety of forms ranging from basic studies on the nature of things to applied research directed at particular problems to contributions to literature and the arts. Within its means the university provides internal financial support for research and scholarship. Simultaneously, it pursues with vigor external sources of support. Research institutes, financed primarily by outside grants, make an important contribution to this mission.

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

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

## Public service

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

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

## Student development

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

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

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

## Graduate Programs

The College of Arts and Sciences offers programs leading to the degrees of Doctor of Philosophy in Biomedical Sciences (biology of aging, medical physics and health and environmental chemistry); Master of Arts in English, history, linguistics, mathematics and sociology; Master of Science in biology, chemistry, industrial applied mathematics, applied statistics and physics; Master of Public Administration and Master of Music. The School of Health Sciences offers a Master of Science in exercise science and the Master of Physical Therapy. The School of Human and Educational Services offers programs leading to the Doctor of Philosophy in reading, the Education Specialist in school administration, the Master of Arts in counseling, the Master of Arts in Teaching in early childhood education, curriculum, instruction and leadership, reading and special education. The College of Arts and Sciences and the School



of Human and Educational Services jointly offer a program leading to the degree of Master of Arts in Teaching in English. The School of Engineering and Computer Science offers the Doctor of Philosophy in systems engineering and the Master of Science in computer science and engineering, electrical and computer engineering, mechanical engineering and systems engineering. The School of Nursing offers a Master of Science in Nursing and the School of Business Administration offers the Master of Business Administration.

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

## Development and Review of Graduate Programs

New programs are developed along established guidelines and within the framework of the university's role and mission statement. The painstaking approval process is monitored throughout by the 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 in full detail in timely fashion. Other changes will occur as a result of the dynamic, rather than static nature of the curricula. Thus, students should maintain contact with their advisers and the 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 Human and Educational 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 Central Michigan University, Eastern Michigan University, Michigan State University, Michigan Technological University, Northern Michigan University, Oakland University, University of Michigan, Wayne State University and Western Michigan University. Additional information is available in the Office of Graduate Study and from program directors.

## Centralized and Specialized Research Facilities

### Office of Research and Academic Development

The Office of Research and Academic Development 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 and internal funding, the office is also 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 which 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 Research and Academic Development, is responsible for evaluating all research that involves recombinant DNA molecules and hazardous agents.

The Office of Research and Academic Development 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. The Alumni Association funds a graduate student research program to support and encourage graduate student research. The Research Committee of the University Senate, with a representative from the Alumni Association, reviews applications each fall and makes recommendations for funding. Graduate students and faculty may contact the Office of Research and Academic Development 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 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.

## 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 1.4 million items: 2,400 journal titles, 900,000 microforms, 14,000 records and phonotapes, 59,000 periodical volumes and 300,000 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*. In 1990 information regarding the 193,000 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 including three mid-range DEC computers, one being a multi-user high speed RISC machine. 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). The repertoire includes several 3D graphics workstations, as well. 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

The Office of Institutional Research (OIR) 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 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.

Social science research projects related to the university's overall educational mission are routinely conducted such as 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 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 OIR for student-related information. There is no charge for OIR information.

## SHES Educational Resources Lab

The Educational Resource Lab (ERL) of the School of Human and Educational Services (SHES) 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.

## Psychology Clinic

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

The center offers a wide range of alcohol/substance abuse services for students. They include evaluation, outpatient counseling and (if necessary) referral for students concerned about substance abuse problems. Counseling is also available for family members of substance abusers. In this regard several Adult Children of Alcoholics (ACOA) support counseling groups are provided on an ongoing basis.

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

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

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

### Special Advising

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

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

The department also provides testing services. These include the administration of the MCAT, GMAT, GRE, LSAT, PPST and Miller Analogies Test. Information bulletins and registration forms may be obtained at the Special Advising Department.

### Placement and Career Services

The Department of Placement and Career Services provides individual placement counseling 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 biweekly job bulletin.

The department maintains an extensive Placement Library for the distribution and display of printed and videotaped employer literature, career guidance materials, 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.

## 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 admissions office. Detailed instructions are included in the "Application for Admission to Graduate Study," available from the Office of Admissions and Scholarships. 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 are required from those students who graduated from non-accredited schools and foreign institutions, including advanced (subject) tests when available. Some graduate departments offer Oakland undergraduate students the opportunity to take their bachelor's and master's degrees concurrently, but this is done only with written permission of the department involved and the dean of Graduate Study. A planned course of study to satisfy the requirements for both degrees is necessary, and a copy of the plan will be included in the student's official graduate file 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

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

### Special graduate status

Special graduate status may be granted by some departments to students who wish to take graduate courses but not work toward a degree. Students will be allowed to take no more than a total of 12 credits while in this status. There may also be constraints placed on their times of registration because students admitted to programs are given enrollment priority. The admission schedule on page 8 of this catalog and the *Schedule of Classes* published by the registrar each semester should be consulted for information pertaining to particular semesters.

Credit earned at Oakland University under special graduate status — but none that has been earned at another institution — will be officially recorded. This credit may be applied toward degree requirements if a student later is admitted to a degree program and if the credit is appropriate to the degree objective. However, admission as a special graduate student in no way assures subsequent admission to a degree program. If students in this status wish to apply for admission to a program, they must apply at the Office of Admissions and Scholarships 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 Admissions and Scholarships and providing the application material required by the particular program.

### Post-baccalaureate status

Post-baccalaureate status may be granted applicants who have a bachelor's degree from an accredited college or university and who wish to enroll in undergraduate courses, either to develop an additional major or to prepare for admission to a degree program.

### Application for admission by international students

International applicants should submit applications at least one year before the date they hope to enter the university. Applications will be reviewed for fall and winter admission only. Application files must be completed by May 1 with department recommendations for admission received by the Office of Graduate Study by July 1 for fall admission. Applicants pursuing a winter semester admission must submit all application materials by September 1 with department recommendations for admission received in the Office of Graduate Study by November 1. An application will require the application fee, recommendations, official test scores and a statement attesting to the applicant's financial standing. If this application is approved, students will receive a certificate of admission to the university. International students are required to submit scores from the Graduate Record Examination General Test (GRE), including scores from subject tests in the area of interest, prior to admission. The Test of English as a Foreign Language (TOEFL) is also required. The Graduate Management Admission Test (GMAT) is required for admission to the M.B.A. program in lieu of the GRE.

International applicants who are presently in the United States on a student status may be required to provide statements from the International Student Advisers of their current institutions. 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 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 two years of the date of the original admission term, no readmission fee is charged; thereafter, a new application, documentation and application fee are required. Inactive files are destroyed after two years.

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. Readmission is not automatic. The readmission 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.

Note: This policy is currently under review.

### Transcripts

Academic records are maintained in the Academic Records Office, 102 O'Dowd Hall. Standing 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 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), the level of last course work (graduate or undergraduate) 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.

### Petition of exception

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

### Restriction of student records

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

### Time limit

Credit earned more than six years before a master's degree is to be granted may not be used to fulfill the degree requirements. This means, for example, that a course taken in fall 1991 may be used toward a degree only until the end of the fall 1997 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 course may be doctoral or dissertation research.



## Transfer credit

Students who are in good standing (not probationary or conditional) in a 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 nine 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 while 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 accelerated M.B.A. program on page 93.)

## Course competency credit

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

## Changes in enrollments (add/drop)

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

## Withdrawal

A graduate student wishing to withdraw from the university may do so by notifying the Office of Graduate Study which will initiate a withdrawal form and process it through the Office of the Registrar. If this is done by telephone, a written confirmation is needed from the student. The withdrawal is recorded by the registrar and the amount of refund, excluding the non-refundable enrollment fee, is determined. If a refund is due it will be mailed to the student. See grading policy, page 23.

## Academic probation

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

## Academic conduct of graduate students

All members of the academic community at Oakland 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 faculty and the dean.

### Appeal procedures for dismissals and denial of admission

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

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

1. The person making the appeal (henceforth called "student") should request that the program area reconsider its recommendation within 30 days of receipt of the denial or dismissal decision. This request should be directed to the program chair or the chair of its admission committee.
2. If the student is dissatisfied with the response received from the program area, a request may be made for an interview with the graduate dean to discuss the decision.
3. After these initial steps have been taken, and if the student continues to believe that there has been a violation of university procedures or if the student has evidence which was not considered, a written appeal of the decision may be made to the Graduate Council. The appeal should contain a full statement of the problem and should present any new evidence the student considers pertinent to the case.
4. Within thirty days, a three-member ad hoc committee will be appointed by the graduate dean from the Graduate Council to review the student's statement. The council members from the program area concerned may not be appointed to the committee.
5. The committee will obtain a written statement from the program area and may request additional information from the graduate dean. It may also interview the student and program representatives.
6. The committee recommendation will be either to sustain the denial or dismissal or to admit or reinstate the student. Conditions may be imposed on admission or reinstatement. The recommendation will be forwarded to the dean who may accept or reject the recommendation. The dean's decision will be final.

The entire appeal process shall not exceed 90 days from initiation.

### 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 their advisers.

### 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 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 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 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 are a "no-grade" period for dropping and adding full semester courses. (For "first-half" or "second-half" courses, this period is the first week of the appropriate "half-term.") Courses dropped during these periods are not indicated on the student's transcript.
3. The meanings of non-numeric grades are as follows:
  - a. "W" is assigned by the registrar if a student withdraws officially from a course or all courses between the end of the no-grade period and 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 grade of "P" (progress) 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 graduate dean for each course in which "P" grades are to be assigned. The "P" grade is given only for satisfactory work. "P" grades must be removed within two calendar years of the date of assignment; otherwise the "P" converts to 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. At the time of registration for a course taken previously, the student must file a "Repeat Course Form." 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.

### Doctoral dissertations and master's theses

Three copies of the approved manuscript must be delivered to the Office of Graduate Study by the last day of classes of the term in which the student expects to graduate. Students are urged to obtain a copy of the publication "A Guide to the Preparation of Graduate Dissertations/Theses" from the Office of Graduate Study and to follow the instructions contained therein.

### 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 semester or by the dates listed below. A candidate who does not graduate in that semester must reapply. Students may not graduate in the semester in which they were admitted.

| Expected term of graduation | Last date for applying for degree |
|-----------------------------|-----------------------------------|
| Spring 1991                 | May 14, 1991                      |
| Summer 1991                 | July 9, 1991                      |
| Fall 1991                   | October 4, 1991                   |
| Winter 1992                 | February 5, 1992                  |
| Spring 1992                 | May 13, 1992                      |
| Summer 1992                 | July 7, 1992                      |
| Fall 1992                   | October 6, 1992                   |
| Winter 1993                 | February 4, 1993                  |
| Spring 1993                 | May 13, 1993                      |
| Summer 1993                 | July 7, 1993                      |
| Fall 1993                   | October 7, 1993                   |

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

### Fees

#### Tuition and Fees

The Oakland University Board of Trustees reserves the right to change any and all rates of charge when circumstances make such a change necessary. Tuition and fees quoted in this catalog

are from the 1990-91 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 \$25 must accompany an application for admission. This is a nonrefundable processing fee.

### Registration fee

All students who register will be assessed an \$83 registration fee each term, of which \$40 is nonrefundable.

### Course fees

Course fees for each semester are assessed on the basis of the credit value of the course. One credit is the equivalent of one semester hour. On-campus graduate course fees for Michigan residents are \$122 per credit while nonresidents are assessed \$270 per credit. Some courses have additional special fees which are published in the semester class schedule. All fees are subject to change by the board of trustees.

### Computer technology fee

Upper division undergraduate students and graduate students in computer intensive majors are charged a computer technology fee. See the current *Schedule of Classes* for a complete listing of applicable majors. The fee is charged according to the following schedule:

|                                                   |      |
|---------------------------------------------------|------|
| Upper Division Undergraduate — 9 or more credits  | \$80 |
| Upper Division Undergraduate — 8 or fewer credits | \$50 |
| Graduate — 7 or more credits                      | \$80 |
| Graduate — 6 or fewer credits                     | \$50 |

### Student activities fees

Students who register for on-campus credits will be charged an activities fee according to the following schedule:

|                                  |        |
|----------------------------------|--------|
| Undergraduate—10 or more credits | \$9.75 |
| Undergraduate—9 or fewer credits | \$7.25 |
| Graduate—8 or more credits       | \$2.50 |
| Graduate—7 or fewer credits      | \$2    |

### Late registration fee

Students registering during the late registration period or paying initial fees after payment deadlines 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 of registration or assessment of the late registration fee.

### Course competency by examination fee

Students who register for degree credit by course competency examination will be assessed \$27 per 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 \$5 per billing. Balances due paid by checks that are returned by the bank are considered nonpayment and will result in assessment of the \$5 fee.

### Resident housing: Reservations, deposits, fees

The residence halls are financially self-supporting. Room and board fees reflect the annual cost of operation and are established by the university's board of trustees. The 1990-91 rate for room and board is \$3,257 for the academic year. Special options such as the "Wellness Hall" and a limited number of single rooms are available to graduate students. If a student signs a housing contract before or during fall semester, that contract is binding for both the fall and winter semesters. If the contract is signed during the winter semester or spring or summer session, it is binding for the single semester or session. The room and board fee is due at registration or may be paid in three installments, the first of which is due at registration. The second and third installments are due on the first day of the two months following registration. If a student withdraws from the university, housing funds are refunded on a prorated basis.

A limited number of apartments are available on campus for students with families. Applications and information are available from the Residence Halls Office, Oakland University, Rochester, Michigan 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 upon application to the appropriate office. Failure to drop or withdraw formally will result in forfeiture of any refund. Graduate students withdrawing from the university apply to the Office of Graduate Study. Changes in enrollment are processed in the Office of the Registrar. The amount of refund is specified in each *Schedule of Classes*. If a student living in the residence halls withdraws from the university, room and board fees are refunded on a prorated basis less an early withdrawal assessment. Formal notice of withdrawal must be given to the residence halls office.

### Out-of-state tuition regulations

Students enrolling at Oakland University shall be classified 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 his 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 the Provost, 520 O'Dowd 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 the Provost 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, 520 O'Dowd Hall, Oakland University, Rochester, Michigan 48309-4401.

## Financial Aid, Assistantships and Scholarships

### 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. Application for a Perkins Loan must be made through the Financial Aid Office.



**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. Application for work study assistance must be made through the Financial Aid Office.

**Stafford Loan:** The Stafford Loan Program is designed to provide loans to assist students in meeting their educational expenses. Loans are made by participating private lenders, such as banks, credit unions, and savings and loans associations. Interested applicants must first apply for financial aid and demonstrate financial need. Detailed information is available from the Financial Aid Office.

**Supplemental Loans for Students (SLS Loan):** A loan program which is not based on financial need. Like the Stafford Loan, SLS loans are made by private lenders and applicants are first required to apply for financial aid. The interest rate on SLS loans is a variable rate determined once each year and effective as of July 1. The repayment period begins the day the loan is disbursed. The minimum monthly payment is \$50 and deferment of payment on the principal is available.

### 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 graduate dean.

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

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

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 Admission prior to April 1. Presently enrolled students should apply to the Financial Aid Office by March 1.

Additional scholarships and fellowships are available to qualified students through the Martin Luther King, Jr./Cesar Chavez/Rosa Parks 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

Dean: John K. Urice

Associate dean: Isaac Eliezer

Associate dean: David J. Downing

## The Doctor of Philosophy in Biomedical Sciences

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

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

### Specialization in biology of aging

The study of the biology of aging and aging-associated disease is one of the major frontiers in modern biomedicine creating a critical need for research scientists in molecular, cellular and organismic biology. The goal of the program will be the thorough training of doctoral students through biotechnologically and environmentally based studies. This will be done using state-of-the-art materials and methods to conduct research on the problems associated with aging, the aging process itself, and the factors influencing aging. No other doctoral program in Michigan focuses specifically on this particular area of biology needed to address the important issues of aging and disease as our nation moves into the 21st century.

### Specialization in health and environmental chemistry

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

### Specialization in medical physics

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

## Biomedical sciences doctoral program committee

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

## Specialization committees

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

## Dissertation committee

A dissertation committee consisting of at least three members, one of whom will serve as 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 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: For students in Cellular Biology of Aging, physiology (BIO 321), biochemistry (BIO 407, BCM 453 or 454), genetics (BIO 341), developmental biology (BIO 323) and statistics (STA 226). Students in the Health and Environmental chemistry specialization must establish proficiency in computer programming and in analytical chemistry (CHM 426), biochemistry (CHM 454), inorganic chemistry (CHM 463), organic chemistry (CHM 235) and physical chemistry (CHM 343). Students in the Medical Physics specialization must establish proficiency in modern physics (PHY 371), physical chemistry

(CHM 343) and in at least three of the following: computer programming, differential equations (APM 257), electronics (PHY 341, 347), electricity and magnetism (PHY 381), physiology (BIO 207 or BIO 321) and statistics (STA 226).

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

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

**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*

**Professors:**

*Frank M. Butterworth, Ph.D., Northwestern University*  
*Esther M. Goudsmit, Ph.D., University of Michigan*  
*Egbert W. Henry, Ph.D., The City University of New York*  
*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*  
*George J. Gamboa, Ph.D., University of Kansas*  
*Sheldon R. Gordon, Ph.D., University of Vermont*  
*Robert D. Hunter, Ph.D., Syracuse University*  
*Paul A. Ketchum, Ph.D., University of Massachusetts*  
*Satish K. Walia, Ph.D., Maharshi Dayanand University*

**Assistant professors:**

*Thaddeus A. Grudzien, Jr., Ph.D., Virginia Polytechnic Institute and State University*  
*Feona M. Hansen-Smith, Ph.D., Medical College of Wisconsin*  
*Jon A. Yates, Ph.D., Tulane University*

**Adjunct professors:**

*M. Dave Poulik, M.D., University of Toronto Medical School*  
*James R. Wells, Ph.D., Ohio State University*

**Adjunct assistant professor:**

*Stan A. Beyer, Ph.D., University of Illinois*  
*Naomi Eliezer, Ph.D., Hebrew University (Jerusalem)*

**Consulting professor:**

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

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

**Coordinator:** Frank M. Butterworth

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

The study of the biology of aging and aging-associated disease is one of the major frontiers in modern biomedicine creating a critical need for research scientists in molecular, cellular and organismic biology. The goal of the program will be the thorough training of doctoral students through biotechnologically and environmentally based studies. This will be done using state-

of-the-art materials and methods to conduct research on the problems associated with aging, the aging process itself, and the factors influencing aging. No other doctoral program in Michigan focuses specifically on this particular area of biology needed to address the important issues of aging and disease as our nation moves into the 21st century.

### Required areas of graduate level proficiency

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

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

## The Master of Science in Biology

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

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

### Admission

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

### Requirements for the degree

The candidate for the cellular/molecular biology track must complete 36 credits (16 of which must be in courses numbered 500 and above) including at least 4 credits in each of the four areas (developmental biology-morphology, 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, 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 must be approved by a 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 and the graduate coordinator before it can be submitted to the dean of Graduate Study for his approval. Students of both tracks must attend department seminars each semester. All M.S. students are required to 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, 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, cold rooms, 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, mass spectrograph, 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 300-level courses recommended to the student by the departmental graduate committee may carry graduate level credit.

### BIO 401 Advanced Human Physiology (4)

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

Prerequisite: BIO 207 or 321.

### BIO 407 Cellular Biochemistry (4)

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

Prerequisite: BIO 325, CHM 304, and PHY 102.

### BIO 408 Cellular Biochemistry Laboratory (1)

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

Corequisite: BIO 407.

### BIO 421 Medical Microbiology (4)

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

Prerequisite: BIO 200.

### BIO 422 Medical Microbiology Laboratory (2)

To accompany BIO 421.

### BIO 423 Immunology (3)

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



**BIO 425 Biophysics (4)**

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

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

**BIO 426 Biophysics Laboratory (1)**

To accompany BIO 425.

**BIO 429 Cytochemistry (4)**

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

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

**BIO 430 Cytochemistry Laboratory (2)**

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

Corequisite: BIO 429.

**BIO 433 Advanced Microbiology (4)**

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

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

**BIO 434 Advanced Microbiology Laboratory (2)**

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

Corequisite: BIO 433.

**BIO 435 Developmental Genetics (4)**

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

Prerequisite: BIO 325 and 341 or equivalent.

**BIO 436 Developmental Genetics Laboratory (1)**

To accompany BIO 435.

**BIO 439 Biochemistry of the Gene (4)**

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

Prerequisite: BIO 407 or CHM 453.

**BIO 440 Biochemistry of the Gene Laboratory (2)**

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

Corequisite: BIO 439.

**BIO 441 Microbial Genetics (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 445 Ultrastructure (4)**

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

Prerequisite: BIO 305 and permission of instructor.

**BIO 446 Ultrastructure Laboratory (2)**

To accompany BIO 445.

**BIO 460 Neuroanatomy (4)**

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

Prerequisite: BIO 205 or 381 or permission of instructor.

**BIO 463 Cell Biology (4)**

Prerequisite: BIO 305 and permission of instructor.

**BIO 464 Cell Biology Laboratory (1)**

To accompany BIO 463.

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

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

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

Techniques course offered to small groups of students in faculty research laboratories.

Prerequisite: 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.

Prerequisite: 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.

Prerequisite: 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.

Prerequisite: BIO 517.

**BIO 581 Topics in Physiological Ecology (3)**

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

**BIO 582 Topics in Evolutionary Biology (3)**

Advanced topics in evolutionary biology including evolutionary rates, the nature of selection, adaptation, microevolution, 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)**

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

Prerequisite: BIO 353 or permission of instructor.

**BIO 690 Graduate Research (1 to 8)**

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

**BIO 721 Cellular biology of Aging (4)**

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

Prerequisite: BIO 407 or equivalent.

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

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

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

**BIO 751 Organismic Biology of Aging and Gerontology (4)**

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

Prerequisite: BIO 321 or equivalent.

**BIO 781 Seminar on Aging (2)**

Discussion of recent developments in the field of aging research.

Prerequisite: Permission of the instructor.

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

# DEPARTMENT OF CHEMISTRY

**Chair:** Paul Tomboulia

**Professor emeritus:**

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

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:**

Julien Gendell, Ph.D., University of Nebraska (Lincoln)

Tadeusz Malinski, Ph.D., University of Poznan (Poland)

Steven R. Miller, Ph.D., Massachusetts Institute of Technology

Kathleen H. Moore, Ph.D., Wayne State University

Mark W. Severson, Ph.D., University of Minnesota

Robert L. Stern, Ph.D., Johns Hopkins University

**Assistant professor:**

Arthur W. Bull, Ph.D., Wayne State University

**Adjunct professor:**

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

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

**Coordinator:** Michael D. Sevilla

The College of Arts and Sciences offers a biomedical sciences doctoral program with a specialization in health and environmental chemistry which is centered in the Department of Chemistry. The program requires a strong academic background in the physical sciences. Graduates will have completed a unified program of formal course work as well as independent 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 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 30.

### The Master of Science in Chemistry

The Master of Science in chemistry can be viewed as either a terminal or an intermediate degree. By itself it serves as preparation for employment in chemical and related industries, a wide range of government agencies and two-year college teaching. It also prepares the student for further study toward advanced degrees in chemistry, 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, 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 an American degree.

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

### Requirements for the degree

The candidate for the degree of Master of Science in chemistry must complete the following requirements: 32 credits in courses carrying graduate credit, of which 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 departmental thesis committee before receiving the degree. Since the degree is awarded for attaining a level of proficiency and maturity, no minimum amount of time can be specified for the degree program. Students working on a continuing research project should be registered concurrently for at least one credit of CHM 690.

### Research fields

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)

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

Prerequisite: CHM 225.

##### CHM 444 Physical Chemistry III (3)

Introduction to quantum and statistical mechanics; applications to chemical bonding, molecular structure and spectroscopy.

Prerequisite: CHM 343 and MTH 254 or an approved APM course.

##### CHM 453-454 Biochemistry (3 each)

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

Prerequisite: CHM 204 or 235.

##### CHM 457 Biochemistry Laboratory (2)

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

Prerequisite or corequisite: CHM 453.

##### CHM 458 Biochemistry Projects (2)

Advanced project-oriented instruction in biochemical laboratory techniques.

Prerequisite: CHM 457 and permission of instructor.

##### CHM 462-463 Inorganic Chemistry (2 each)

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

Prerequisite: CHM 342.

##### CHM 466 Inorganic Synthesis Laboratory (2)

Synthesis, analysis and characterization of inorganic and organometallic compounds.

##### CHM 470 Industrial Chemistry (3)

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

Prerequisite: CHM 235.

##### CHM 471 Macromolecular Chemistry (3)

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

Prerequisite: CHM 204 or 235.

##### CHM 472 Mechanical Properties of Polymers (3)

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

Prerequisite: CHM 204 or 235, and 471.

**CHM 477 Macromolecular Laboratory (2)**

Introduction to the synthesis and physical characterization of synthetic polymers.  
Prerequisite: CHM 238.

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

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

**CHM 486 Physical-Analytical Projects (1 or 2)**

Advanced experimentation in physical or analytical chemistry, with at least four hours per week per credit.  
Prerequisite: Permission of instructor.

**CHM 487 Synthesis Projects (1 or 2)**

Advanced synthesis work emphasizing modern techniques, with at least four hours per week per credit.  
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.  
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.  
Prerequisite: CHM 235.

**CHM 540 Symmetry in Chemistry (3)**

Detailed treatment of point group symmetry. Chemical applications of group theory with special emphasis on MO and VB theory, ligand field theory and vibrational and electronic spectroscopy.  
Prerequisite: CHM 343.

**CHM 541 Advanced Physical Chemistry (3)**

Application of quantum mechanics and statistical mechanics to chemical kinetics, molecular structure and molecular spectroscopy.  
Prerequisite: CHM 444.

**CHM 542 Topics in Physical Chemistry (3)**

Selected topics drawn from current areas of interest, such as quantum mechanics, statistical mechanics, thermodynamics, spectroscopy, kinetics and group theory.  
Prerequisite: CHM 343.

**CHM 553 Advanced Biochemistry (3)**

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

**CHM 554 Topics in Biochemistry (3)**

Selected subjects drawn from the current fields of interest, such as immunochemistry, biotechnology and molecular biology.  
Prerequisite: CHM 454.

**CHM 563 Advanced Inorganic Chemistry (3)**

Detailed treatment of the chemistry of the elements.  
Prerequisite: CHM 462.

**CHM 564 Topics in Inorganic Chemistry (3)**

Selected topics chosen from current areas of interest, such as transition metal chemistry, boron chemistry, ligand field theory and organometallic chemistry.  
Prerequisite: CHM 462.

**CHM 581 Biochemical Toxicology (3)**

Systematic treatment of toxicological principles at cellular and biochemical levels. Emphasis is on mammalian toxicology, including: uptake and distribution, activation and metabolism; modes of action; theories of carcinogenesis and mutagenesis.  
Prerequisite: ENV 484 or 486; CHM 454; physiology desirable.

**CHM 685 Seminar in Health and Environmental Chemistry (1)**

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

**CHM 690 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 190, BIO 200; CHM 204 or 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 190, BIO 200; CHM 204 or 234.



# DEPARTMENT OF ENGLISH

**Chair:** Mark E. Workman

**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

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

**Associate professors:**

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

Nigel Hampton, Ph.D., University of Connecticut

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

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

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

Mark E. Workman (English and Folklore), Ph.D., University of Pennsylvania

**Assistant professors:**

Mary E. Arshagouni, Ph.D., University of California (Los Angeles)

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

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

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

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

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

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

Harriet E. Margolis, Ph.D., Indiana University

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

## Admission

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

All entering graduate students must meet minimal university graduate admission standards. All will be enrolled conditionally until they are admitted by the department to degree candidacy. Consideration for candidacy comes after the student has successfully completed 16 credits of graduate work at Oakland University including at least 8 credits in the Department of English. Normally, all courses offered toward candidacy must be completed with grades of 3.0 or better. Two grades below 3.0 will automatically render a student subject to evaluation and possible

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

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

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

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

## The Master of Arts in English

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

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

### Requirements for the degree

Nine courses (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.

## The Master of Arts in Teaching in English

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

### Requirements for the degree

Nine courses (36 credits) are required, distributed as follows. **The Teaching Core** (12 credits): ENG 510; one course chosen from among these six alternatives: RDG 538, FE 601, 602, 603, 604 or 605; and either PSY 510 or FE 606. **The Literary Studies Core** (12 credits): ENG 533, a course in the methods of literary history (ENG 543, 544, 545, or 546); and a course in literary kinds (ENG 563, 564, 565, or 566). Completion of *The Literary Studies Core* must occur before a student is considered for candidacy and is a prerequisite for all 600-level courses. The three

remaining courses in English (12 credits), chosen in consultation with an adviser, must include two 600-level seminars, or a 600-level seminar and ENG 690, the Master's Project.

## Classification of Course Offerings

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

### 1. Undergraduate courses (300 and 400 levels)

The student may take up to two undergraduate courses from regular departmental 300- and 400-level offerings, with the exception of undergraduate writing courses and ENG 498 and 499. Such courses are useful preparation for seminars in areas of language and literature for which a student is not adequately trained. No more than five graduate students may enroll in any 300- or 400-level course. 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 creative, scholarly or pedagogical nature, proposed initially by the candidate. Any written work to be submitted in partial or total fulfillment of a project should not exceed 7,500 words. Projects normally arise out of graduate course work. The course is open only to students who can propose an independent project and who have made arrangements with a member of the department interested in supervising it. Students seeking approval to proceed should submit an application for ENG 690 (available in the department office) and a prospectus of the project.

### 4. Summer 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 Programs Committee.

## Cognate courses (M.A. program)

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

## Course Offerings

**ENG 500 Advanced Topics in Literature and Language (1 to 4)**  
Special topics and problems selected by the instructor. Not a core course.

**ENG 510 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 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 690 The Master's Project (4)**

Completion of a modest project of a creative, scholarly or pedagogical nature proposed by the degree candidate.  
 Prerequisite: Permission of the Committee on Graduate Programs.

**Related courses**

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

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

# DEPARTMENT OF HISTORY

**Acting chair:** Carl R. Osthaus

**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

**Professors:**

John Barnard, Ph.D., University of Chicago  
 Mary C. Karasch, Ph.D., University of Wisconsin (Madison)  
 Joseph A. Klaitz, Ph.D., University of Minnesota  
 Anne H. Tripp, Ph.D., University of Michigan  
 Richard P. Tucker, Ph.D., Harvard University

**Associate professors:**

De Witt S. Dykes, Jr., M.A., University of Michigan  
 Leonardas V. Gerulaitis, Ph.D., University of Michigan  
 James D. Graham, Ph.D., Northwestern University  
 Roy A. Kotynek, Ph.D., Northwestern University  
 Paul M. Michaud, Ph.D., University of Chicago  
 Lawrence D. Orton, Ph.D., Indiana University  
 Carl R. Osthaus, Ph.D., University of Chicago  
 A. Whitney Walton, Ph.D., University of Wisconsin (Madison)

**Assistant professors:**

Linda Benson, Ph.D., University of Leeds  
 Turk McCleskey, Ph.D., College of William and Mary  
 Sean Farrel Moran, Ph.D., American University

**Visiting assistant professor:**

Mary Hrabik Samal, Ph.D., Pennsylvania State 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 is 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 should appear on the applicant's record.

A grade point average of 3.00 (on a 4.00 scale) in undergraduate history courses and a GPA of 2.80 in all undergraduate work will ordinarily be considered the minimum standards for admission. Students of superior promise but with deficient preparation in history may be admitted

on condition of earning grades of 3.0 or above in the first two graduate history courses completed.

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

### Requirements for the degree

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

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

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

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

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

### Course Offerings

#### HST 502 American Labor History (4)

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

#### HST 503 American Constitutional History (4)

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

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

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

#### HST 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 507 American Religious History (4)

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

#### HST 510 The Young Republic and the Age of Jackson (4)

The social, political and economic development of the new nation, and the subsequent forces affecting 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 since 1928 (4)

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

#### HST 516 The American Mind to 1860 (4)

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

#### HST 517 The American Mind since 1860 (4)

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

#### HST 518 Topics in American Social History (4)

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

#### HST 519 History of the American South (4)

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

#### HST 521 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 Afro-American History (4)

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

#### HST 525 Medieval Europe (4)

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

#### HST 526 The Italian Renaissance (4)

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

#### HST 527 The Northern Renaissance (4)

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

#### HST 529 Europe in the Seventeenth Century (4)

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

#### HST 534 Victorian and Edwardian England (4)

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

#### HST 535 Twentieth Century Britain (4)

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



**HST 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 540 The Middle Class in Modern Europe: 1789 to 1968 (4)**

Analyzes the rise of and developments in the European bourgeoisie from the French Revolution to the events of 1968; includes questions of class formation and class relations, political strategies and ideologies, economic growth and change, and social developments regarding men, women and the family.

**HST 541 Europe since 1914 (4)**

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

**HST 543 Germany since 1848 (4)**

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

**HST 545 France since 1789 (4)**

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

**HST 546 European Witchcraft (4)**

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

**HST 548 Europe in the Eighteenth Century (4)**

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

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

The *ancien 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 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 563 History of Southern South America (4)**

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

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

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

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

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

**HST 567 History of Mexico (4)**

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

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

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

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

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

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

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

**HST 581 History of Early India (4)**

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

**HST 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 African History to 1945 (4)**

Continuity and change in African societies and states from earliest times until World War II; typical themes include the extended family system in African life and problems of transition in African political economics.

**HST 586 African History since 1945 (4)**

African history since World War II, emphasizing problems of economic development and political stability; special case studies, which focus on selected nations such as Kenya and Tanzania, provide opportunity for analyzing the historical background of contemporary issues.

**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 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.

# DEPARTMENT OF LINGUISTICS

**Chair:** Peter J. Binkert

**Professor emeritus:**

Don R. Iodice (*French and Linguistics*), M.A.T., Yale University

**Professors:**

Peter J. Binkert (*Linguistics and Classics*), Ph.D., University of Michigan  
William Schwab (*Linguistics and English*), Ph.D., University of Wisconsin

**Associate professor:**

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

**Assistant professor:**

Michael B. Smith (*Linguistics*), Ph.D., University of California-San Diego

**Adjunct assistant professor:**

Gregory Brown (*Linguistics*), Ph.D., Wayne State University

**Associated faculty:**

**Professors:**

Carlo Coppla (*Modern Languages and Literature, Linguistics*), Ph.D., University of Chicago  
Donald C. Hildum (*Rhetoric, Communications and Journalism, Linguistics*),  
Ph.D., Harvard University

**Associate professor:**

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 Admissions and Scholarships no later than six weeks before the beginning of their initial semester of registration. After that time, and until the beginning of classes, they may apply for admission as special graduate students. However, not more than 12 credits earned as a special graduate can be applied toward the degree; therefore, the application should be completed as soon as possible.

Upon completion of 12 credits, including LIN 501, students will be evaluated for admission to candidacy and will choose an area of specialization. Students intending to specialize in curricula 1 and 2 (below) must: either 1) demonstrate knowledge of a foreign language, or of American Sign Language, normally equivalent to completion of the 114-115 sequence at Oakland University (first year 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.

When graduate courses are cross listed with undergraduate courses, graduate students will be required to complete additional work at a 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*
4. 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)

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

Prerequisite: LIN 301 or 501.

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

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

Prerequisite: LIN 301 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 Phonetics (4)

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

Prerequisite: LIN 301 or 501.

#### LIN 403 Phonological Theory (4)

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

Prerequisite: LIN 301.

#### LIN 404 Syntactic Theory (4)

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

Prerequisite: LIN 301 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 or equivalent.

**LIN 590 Directed Readings (4)**

Directed individual research on specific topics.

**LIN 600 Special Topics in Linguistics (4)**

Topics and problems selected by the instructor. Prerequisite: Permission of instructor.

**LIN 601 The History of Linguistic Theory (4)**

Study of the development of linguistic sciences from ancient grammatical explanation to the nineteenth century Indo-European scholars and twentieth century structuralism and transformational grammar. Prerequisite: LIN 501.

**LIN 603 Advanced Phonology (4)**

An advanced course in generative phonology with emphasis on current issues in phonological theory. Prerequisite: LIN 501.

**LIN 604 Advanced Syntax (4)**

An advanced course in generative syntax with emphasis on current issues in syntactic theory. Prerequisite: LIN 501.

**LIN 610 Contrastive Analysis (4)**

A comparative structural analysis of individual languages and/or language groups. Prerequisite: LIN 501.

**LIN 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

**Acting chair:** Darrell P. Schmidt

**Professors emeriti:**

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)

**Professors:**

Harvey J. Arnold, Ph.D., Princeton University  
Louis R. Bragg, Ph.D., University of Wisconsin  
Baruch Cahlon, Ph.D., Tel Aviv University  
G. Philip Johnson, Ph.D., University of Minnesota  
Donald G. Malm, Ph.D., Brown University  
James H. McKay, Ph.D., University of Washington  
Louis J. Nachman, Ph.D., Ohio State University  
Darrell P. Schmidt, Ph.D., Montana State University  
Irwin E. Schochetman, Ph.D., University of Maryland  
Sze-kai Tsui, Ph.D., University of Pennsylvania

**Associate professors:**

Kevin T. Andrews, Ph.D., University of Illinois  
Charles Ching-an Cheng, Ph.D., Rutgers University  
J. Curtis Chipman, Ph.D., Dartmouth College  
David J. Downing, Ph.D., University of Iowa  
Jon Froenke, Ph.D., University of California (Berkeley)  
Jerrold W. Grossman, Ph.D., Massachusetts Institute of Technology  
Subbaiah Perla, Ph.D., University of Rochester  
Meir Shillor, Ph.D., Hebrew University  
J. Barry Turett, Ph.D., University of Illinois  
Stuart S. Wang, Ph.D., Cornell University  
Stephen J. Wright, Ph.D., Indiana University

**Assistant professors:**

Ian Bradbury, Ph.D., University of Birmingham  
Almira Karabeg, Ph.D., University of California (San Diego)  
Devadatta Kulkarni, Ph.D., Purdue University  
Robert Kushler, Ph.D., University of Michigan  
Theophilus Ogunyemi, Ph.D., Kansas State University  
Panajiotis Sakkalis, Ph.D., University of Rochester  
Peter Shi, Ph.D., University of Delaware  
T.N. Subramaniam, Ph.D., Brandeis University  
Winson Taam, Ph.D., University of Wisconsin

**Adjunct professors:**

Joseph R. Assenzo, Ph.D., Oklahoma University  
Seth Bonder, Ph.D., Ohio State University  
Thomas Hogaboam, Ph.D., University of Pittsburgh  
Jim I. Jones, Ph.D., Rutgers 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 seven 4-credit courses in mathematical sciences, arranged by the department's Committee on Graduate Programs, and two approved electives. For students who may have an interest in teaching in Michigan secondary schools it is suggested that the two elective courses consist of one 4-credit course in education and one in psychology. Students who are interested in secondary education but who have not previously taken a course in the teaching of reading should complete RDG 538. 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 (MTS 514 or 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, 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 427 and STA 428 are required unless the student has completed the equivalent course before admission. 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 425 or higher. The course selections for a particular student will be chosen to complement previous statistics study and to enhance the competency of the individual in his/her chosen field of application.

## Relationship to Master of Science in applied statistics

Four statistics courses (STA 501, 502, 503 and 504) each count as two credits toward the M.S. degree. Other STA courses numbered 425 or higher count fully toward the degree. It is anticipated that a graduate of the certificate program who has all of the prerequisites for the M.S. program can complete the additional 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.

### MTH 405 Special Topics (2 or 4)

Advanced study of some topic in mathematics. May be taken more than once.  
Prerequisite: Permission of the department.

### MTH 405 Special Topics (2 or 4)

Advanced study of some topic in mathematics. May be taken more than once.  
Prerequisite: Permission of the department.

### MTH 415 Foundations of Mathematics (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 351 or permission of the instructor.

### 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 351.

### 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 351.

### MTH 475-476 Abstract Algebra (4 each)

Algebra of sets and mappings, groups and homomorphisms, rings and ideals, factorization and divisibility, vector spaces, linear transformations, fields and field extensions.  
Prerequisite: MTH 256.

### MTH 505 Special Topics (2 or 4)

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

### MTH 551-552 Real Analysis (4 each)

The general theory of measure and integration, including development of the Lebesgue integral, and elements of functional analysis with applications to probability theory.  
Prerequisite: MTH 351.

### MTH 555-556 Complex Analysis (4 each)

Analytic functions, Cauchy's theorem, representation theorems, analytic continuation, conformal mapping and Riemann surfaces.  
Prerequisites: MTH 351 and MTH 352.

### 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.

## 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, Poincaré-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 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 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 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 (4)**

Prerequisite: Permission of 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 Committee on Graduate Programs of the department.

**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.

**STATISTICS****STA 425 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 427.

**STA 426 Statistical Analysis by Graphical and Rank Order Methods (4)**

Exploratory data analysis, rank tests for location and scale, power of competing tests, confidence intervals, nonparametric analysis of variance methods.

Prerequisite: STA 226 or permission of instructor.

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

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

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

**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.

Prerequisite: A good command of high school algebra.

**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.

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.

Prerequisite: STA 501 or permission of the instructor.

**STA 504 Discrete Data Analysis (2 or 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 501 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 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 operations; acceptance sampling.  
Prerequisite: STA 501.

**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.  
Prerequisite: STA 502 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.  
Prerequisite: STA 501 or permission of the instructor.

**STA 527 Linear Statistical Models (4)**

General linear model, multivariate normal, regression and design models, variance components.  
Prerequisites: STA 427 and STA 502 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.  
Prerequisite: STA 427 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.  
Prerequisite: STA 502 or permission of the instructor.

**STA 590 Directed Reading and Research (2 or 4)**

Prerequisite: Permission of the instructor.

**STA 595 Statistical Consulting (2 or 4)**

Prerequisite: Permission of the instructor.

**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.  
Prerequisite: 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 (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 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 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.

**MTS 627 Introduction to Probability Theory (4)**

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 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 (4)**

Prerequisite: Permission of Graduate Coordinator.

**Related Courses**

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

**RDG 538 Guiding Reading-Learning in Content Subjects (4)**

**PSY 510 Developmental Psychology (4)**

# DEPARTMENT OF MUSIC, THEATRE AND DANCE

**Chair:** Robert Facko

**Professor Emerita:**

Adeline G. Hirshfeld-Medalia, Ph.D., Wayne State University

**Professors:**

David Daniels, Ph.D., University of Iowa

Stanley Hollingsworth, B.Mus., Curtis Institute of Music and

Fellow of the American Academy of Rome

Lyle Nordstrom, D.M.A., Stanford University

John K. Urice, Ph.D., Florida State University

**Associate professors:**

James Dawson, A.Mus. D., University of Michigan

John Douvas, M.M., Northwestern University and D.Litt. (Honorary), Alma College

Robert Facko, Ed.D., Columbia University

Michael Gillespie, Ph.D., Stanford University

Carol Haksted, Ed.D., Wayne State University

Flavio Vaverai, M.M., Manhattan School of Music

**Assistant professors:**

Susan Barrett, M.A., Texas Tech University

Laurie Eisenhower, M.F.A., Arizona State University

John Paul White, Dipl., Curtis Institute of Music

**Adjunct professors:**

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

Terence E. Kilburn

Leonard Leone

**Adjunct assistant professors:**

Joyce Adelson, B.M., Eastman School of Music

Janice Albright, B.Mus. Ed., Indiana University

Thomas A. Aston, B.A., Wayne State University

**Lecturers:** Joyce Adelson, Steven Carryer, Philip Fox, Ervin Monroe, Patricia Adams Nordstrom, Phyllis White

**Applied music instructors:** Joyce Adelson (piano), Janice Albright (voice), Mary Bartlett (harp), Steven Carryer (jazz guitar), Douglas Cornelsen (clarinet), Penny Crawford (harpsichord), James Dawson (saxophone), Frederic DeHaven (organ), Robert Sherman (ultra), Edith Digory (voice), Ann Elliott (violin), Kirtland Farris (bassoon), John Hall (classical guitar), Pamela Highbaugh (cello), Joanna Hood (viola), Maxim Janowski (double bass), Kenneth Keltz (jazz double bass), Bryan Kennedy (French horn), Daniel Maslanka (jazz percussion), Ervin Monroe (flute), Brian Moon (trumpet), Lyle Nordstrom (recorder/flute), Patricia Adams Nordstrom (recorder/viola de gamba), Keith Oarey (percussion), Scott Peterson (jazz saxophone), Eddie Russ (jazz piano), Sharon Stanis (violin), Walter Szymanski (jazz trumpet), Flavio Vaverai (piano), John Paul White (voice)

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

## 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. Please consult the music department graduate handbook for details.

### Continuing certification

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

### Admission

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

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

### Requirements for the degree

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

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

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

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

### Program of study

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

#### Core (16 credits)

|             |                                             |
|-------------|---------------------------------------------|
| MUS 510     | 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                 | Early Music       |
| Piano Pedagogy                    | Music Education   |
| Instrumental or Choral Conducting | Vocal Performance |
| Composition                       |                   |

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

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

### Elective (4 credits)

The purpose of this elective is to allow the student, upon approval of the adviser, to strengthen a particular area within the major concentration (such as Orff pedagogy or applied music); or to improve in some other area (such as orchestration or conducting); or to explore areas outside of music (such as literature or art history). Any 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 before the beginning of the semester in which the work will take place. The graduate committee will act on requests for such approval upon recommendation of the graduate adviser.

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

### Comprehensive examination

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

## Course Offerings

### APPLIED MUSIC

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

|         |                 |         |                        |
|---------|-----------------|---------|------------------------|
| MUA 500 | Voice (2)       | MUA 516 | Timpani (4)            |
| MUA 501 | Piano (2)       | MUA 517 | Percussion (4)         |
| MUA 502 | Organ (2)       | MUA 518 | Harp (4)               |
| MUA 503 | Harpsichord (2) | MUA 519 | Guitar (Classical) (4) |
| MUA 504 | Violin (2)      | MUA 520 | Renaissance Winds (4)  |
| MUA 505 | Viola (2)       | MUA 521 | Viola da Gamba (4)     |
| MUA 506 | Violoncello (2) | MUA 522 | Lute (4)               |
| MUA 507 | Double Bass (2) | MUA 523 | Recorder (4)           |
| MUA 508 | Flute (2)       | MUA 524 | Saxophone (4)          |
| MUA 509 | Oboe (2)        | MUA 530 | Piano (Jazz) (4)       |
| MUA 510 | Clarinet (2)    | MUA 531 | Guitar (Jazz) (4)      |
| MUA 511 | Bassoon (2)     | MUA 532 | Trumpet (Jazz) (4)     |
| MUA 512 | French Horn (2) | MUA 533 | Saxophone (Jazz) (4)   |
| MUA 513 | Trumpet (2)     | MUA 534 | Percussion (Jazz) (4)  |
| MUA 514 | Trombone (2)    | MUA 535 | Double Bass (Jazz) (4) |
| MUA 515 | Tuba (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 (1)**

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

**MUE 504 Chamber Music Performance (1)**

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

**MUE 505 Accompaniment Practicum (1)**

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

**MUSIC THEORY****MUT 530 Graduate Seminar in Theory and Analysis (4)**

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

**MUT 540 Composition (2 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 Seminar in Secondary Choral Materials and Methods (2)**

The organization and conducting of choral music in the secondary schools. Repertoire, materials and techniques.

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

The organization and conducting of instrumental music in the secondary schools. Repertoire, materials and techniques.

**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 repertoire 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 repertoire 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 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 582 Orff Schulwerk (1 to 4)**

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

**MUS 583 Orff Schulwerk Ensemble Development (1 to 4)**

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

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

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

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

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

**MUS 595 Innovations in Music Education (1 to 4)**

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

**MUS 596 Supervision in Music Education (4)**

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

**MUS 599 Independent Study (2 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 682 Orff Pedagogy Master Class (4)**

Master class in instructive systems based on the Orff Schulwerk pedagogy.  
Prerequisite: Completion of Level IV of the Orff Schulwerk as prescribed by AOSA.

**MUS 686 Apprentice College Teaching (1 to 4)**

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

**MUS 690 Master's Project (2 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*

**Professors:**

*Michael J. Chopp, Ph.D., New York University*  
*Fred W. Hetzel, Ph.D., University of Waterloo, Ontario*  
*Abraham R. Liboff, Ph.D., New York University*  
*John M. McKinley, Ph.D., University of Illinois*  
*Roger Ordidge, Ph.D., Nottingham University*  
*Norman Tepley, Ph.D., Massachusetts Institute of Technology*  
*Robert M. Williamson, Ph.D., University of Wisconsin*

**Associate professors:**

*Beverly Berger, Ph.D., University of Maryland*  
*William D. Wallace, Ph.D., Wayne State University*

**Assistant professor:**

*Gopalan Srinivasan, Ph.D., Indian Institute of Technology*

**Adjunct professor:**

*Carl Bleil, Ph.D., University of Oklahoma*  
*Adrian Kantrowitz, M.D., Long Island College of Medicine*  
*Paul D. Stein, M.D., University of Cincinnati*  
*K.M.A. Welch, M.D., University of Bristol*

**Adjunct assistant professor:**

*Michael J. Borrelli, Ph.D., University of Illinois*  
*Bryan P. Shumaker, M.D., Michigan State University*

**Clinical professors of medical physics:**

*Peter M. Corry, Ph.D., University of Texas*  
*Howard J. Dworkin, M.D., Albany Medical College*  
*Harold Portnoy, M.D., Wayne State University*  
*Gerald C. Timmis, M.D., Wayne State University*

**Clinical associate professors of medical physics:**

*Donovan M. Bakalyar, Ph.D., University of Minnesota*  
*Joseph S. Rosenshein, Ph.D., Massachusetts Institute of Technology*

**Clinical assistant professors of medical physics:**

*Elwood P. Armour, Ph.D., University of Texas*  
*Morris I. Bank, Ph.D., University of Michigan*  
*Elsa R. Beck, Ph.D., University of Colorado*  
*Jack E. Juni, M.D., University of Michigan*  
*Yong J. Lee, Ph.D., University of Illinois*  
*Michael J. Parrott, Ph.D., University of Notre Dame*

**Adjunct assistant professor of medical physics**

*Joseph A. Halpern, Ph.D., Oakland 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 27, 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 203, 204 (or CHM 234 and 235), CHM 342, PHY 525 and PHY 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 30.

## The Master of Science in Physics

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

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

### Admission

An applicant for admission to the M.S. program should have a bachelor's degree from an accredited institution or proof of equivalent achievement. The 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 intracranial hemodynamics, radiation protection and dosimetry in diagnostic radiology, NMR imaging and *in vivo* NMR spectroscopy, hyperthermia, photodynamic therapy and image reconstruction in computerized tomography. The experimental nuclear physics group has been studying environmental radiation. The solid state and molecular physics group has been studying surface physics studies, silicon and germanium crystal growth, and electronic and magnetic properties of metals. The theoretical group has been concerned with nuclear structure studies, atomic collision theory, extragalactic radiation sources and general relativity and cosmology.

Research facilities include a 2-megawatt-pulsed CO<sub>2</sub> 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 10GHz, and the Kettering Magnetics Laboratory (unique in the United States), which provides a nonmagnetic environment. A number of telescopes with apertures of up to 10 inches and some research capability are housed in a separate observatory. In addition, an environmental radiation laboratory is operated. Among research facilities in neighboring hospitals available to medical physics students are 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, two Tektronix 4051 graphics computers and numerous Apple-2, Macintosh, and IBM microcomputers.

## Course Offerings

Selected 400-level courses may carry graduate credit.

### PHYSICS

#### PHY 418 Modern Optics Laboratory (2)

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

Prerequisite: PHY 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 104 and PHY 372 or permission of instructor.

**PHY 542 Advanced Electronics (4)**

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

**PHY 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 562 Mechanics II (4)**

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

**PHY 565 Physics of Continuous Media (4)**

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

**PHY 573 Nuclear Physics (4)**

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

**PHY 574 Introduction to Solid-State Physics (4)**

Introduction to the thermal, electrical and magnetic properties of solids, including periodic structure, lattice dynamics, electron interactions and behavior, transport properties, Fermi surface, optical behavior and superconductivity. Emphasizes current experimental techniques.  
Prerequisite: PHY 371 or 472.

**PHY 583 Classical Electrodynamics (4)**

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

**PHY 600 Seminar (1)****PHY 610 Current Topics in Medical Physics (4)**

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

**PHY 631 Biomechanics (4)**

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

**PHY 632 Introduction to Lasers and Masers (4)**

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

**PHY 665 Physics of Fluids in the Body (4)**

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

**PHY 673 Quantum Mechanics (4)**

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

**PHY 674 Advanced Quantum Mechanics (4)**

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

**PHY 690 Master of Science Research (2 to 12)****PHY 721 The Interaction of Non-Ionizing Radiation with Tissue (4)**

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

**PHY 726 Advanced Radiation Biophysics (4)**

In depth study of selected topics in Radiation Biophysics. Areas such as target theory, cell cycle distribution influences, molecular and cellular repair theories and concepts of 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  
 \*Edward Heubel, Ph.D., University of Minnesota  
 Vincent B. Khapoya, Ph.D., University of Denver  
 James R. Ozinga, Ph.D., Michigan State University  
 \*Carl R. Vann, Ph.D., Syracuse University

**Associate professor:**

\*William A. Macauley, Ph.D., University of Houston

**Assistant professors:**

\*John S. Klemanski, Ph.D., Wayne State University  
 \*J. Patrick Piskulich, Ph.D., SUNY-Binghamton

**Instructor:**

\*C. Michelle Piskulich, M.A., University of Missouri-Columbia

**Adjunct assistant professors:**

\*Gerald W. Hall, M.P.A., Wayne State University  
 \*Anthony R. Tersigni, M.P.A., Oakland University

\*Participants in the public administration program

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

**Graduate adviser:** John S. Klemanski

**Director of internships:** Edward J. Heubel

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. In addition to these requirements, the Department of Political Science will interview the applicants and assess their writing abilities.

### Undergraduate preparation for the M.P.A.

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

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

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

### Requirements for the degree

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

#### Core program

The following core courses are required:

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

Core total 24

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

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

|                       |    |
|-----------------------|----|
| Electives             | 12 |
| Internship or Project | 4  |

Total M.P.A. credits 40

The student is expected to complete 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, core courses and electives may be taken as follows:

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

## Concentrations in Public Personnel or Health Care Administration

In addition to the 24 credits in the core curriculum, a student may take all 12 of their elective credits in either public personnel administration or health care administration. Such a focus in either concentration can provide the student with those special skills necessary to cope with the many changes occurring in these dynamic fields.

The course making up the personnel concentration include at least:

|        |                                                   |
|--------|---------------------------------------------------|
| 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 559 | Public Policy and Health Care                                       |
| PA 568 | Health Planning: Policies and Processes                             |
| PA 569 | Organization and Administration of Health and Medical Care Programs |

### Conditional and special graduate status

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

## Course Offerings

### PA 503 Intergovernmental Relations (4)

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

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

### PA 522 Research Perspectives and Techniques (2)

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

### PA 523 Computer Applications in Administration (2)

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

### PA 541 Law and Public Policy (4)

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

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

### PA 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 620 Quantitative Methods in Public Administration (4)**

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

**PA 621 Government Information Systems (2 to 4)**

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

**PA 631 Grants: Politics and Administration (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 instructor.

**PA 633 Workshop in Fair Employment Practices (2)**

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

Prerequisite: Permission of instructor.

**PA 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 instructor.

**PA 658 Internship (4)**

Supervised assignment in a public agency for approximately 32 weeks; periodic reports and evaluations.

Prerequisite: Completion of core program.

**PA 660 Public Administration Workshop (1 to 4)**

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

**PA 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: Completion of core program.

**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 instructor.

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

Special topics in public policy offered by the department.

Prerequisite: Permission of instructor.



# DEPARTMENT OF SOCIOLOGY AND ANTHROPOLOGY

**Chair:** Jacqueline R. Scherer

**Professors:**

Peter J. Bertocci (Anthropology), Ph.D., Michigan State University  
Judith K. Brown (Anthropology), Ed.D., Harvard University  
Jacqueline R. Scherer (Sociology), Ph.D., Syracuse University

**Associate professors:**

William E. Bezdek (Sociology), Ph.D., University of Chicago  
James W. Dow (Anthropology), Ph.D., Brandeis University  
Harry Gold (Sociology), Ph.D., University of Michigan  
A. Gary Shepherd (Sociology), Ph.D., Michigan State University  
Richard B. Stamps (Anthropology), Ph.D., Michigan State University  
Donald I. Warren (Sociology), Ph.D., University of Michigan

**Assistant professors:**

Albert J. Meehan, Ph.D., Boston University

## The Master of Arts in Sociology

The M.A. program in sociology is undergoing review and admissions to the program have been temporarily closed. Contact the Department of Sociology or the Office of Graduate Study for a current status report on this program.

## Course Offerings

### SOCIOLOGY

**SOC 500 Theories of Society and Culture (4)**

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

**SOC 501 Survey and Interview Techniques (4)**

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

**SOC 502 Specialized Field Techniques of Social Research (4)**

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

**SOC 503 Computer Packages in Social Science (4)**

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

**SOC 514 Social Context of Social Work (4)**

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

**SOC 515 Sociology of Poverty and Social Welfare (4)**

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

**SOC 522 Sociology of Law (4)**

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

**SOC 525 Corrective and Rehabilitative Institutions (4)**

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

**SOC 527 Police and Society (4)**

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

**SOC 528 Sociology of Health and Medicine (4)**

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

**SOC 530 Sociology of Youth (4)**

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

**SOC 537 Sociology of the Courts (4)**

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

**SOC 541 Social Change (4)**

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

**SOC 543 Communities (4)**

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

**SOC 544 Neighborhood (4)**

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

**SOC 545 Urban Sociology (4)**

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

**SOC 560 Political Sociology (4)**

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

**SOC 565 Sociological Perspectives on Aging (4)**

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

**SOC 580 Independent Study and Research (2 or 4)**

Directed independent reading and research.

**SOC 590 Seminar in Applied Sociology (4)**

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

**SOC 600 Research Project (4)**

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

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

## ANTHROPOLOGY

**AN 500 Theories of Society and Culture (4)**  
Same as SOC 500.

**AN 501 Social Anthropology (4)**  
Examines social structure and social organization in anthropological perspective. Entails the study of economic, political, religious and kinship systems in the social life of man.

**AN 502 Specialized Field Techniques (4)**  
Same as SOC 502.

**AN 510 Cultural Ecology (4)**  
Examines current theory and data on cultural responses to environment and the processes that lead to human survival or extinction as groups and societies interact with their natural environments.

**AN 530 Systems of Wealth and Power (4)**  
Concepts and methods of political and economic anthropology, emphasizing the interrelated state of political and economic phenomena, with particular reference to preindustrial, non-Western societies.

**AN 540 Anthropology of Law (4)**  
The mechanisms of social control and legal institutions in non-Western, preliterate societies. Topics include the varying types of moral order and the problem of legal enforcement in stateless societies.

**AN 580 Independent Study and Research (2 or 4)**  
Directed independent reading and research.

**AN 590 Seminar in Applied Anthropology (4)**  
Same as SOC 590.

**AN 600 Research Project (4)**  
Same as SOC 600.  
Prerequisite: Admission to M.A. in sociology program and permission of instructor.

## SPECIAL COURSES

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

## ART AND ART HISTORY

**AH 505 African Art (4)**  
The arts of the indigenous peoples of West, Central and East Africa.

**AH 555 Michigan Architecture (4)**  
The development of the commercial domestic, industrial, public and religious architecture of Michigan from the period of early settlement to the present.

## MODERN LANGUAGES

**ML 520 Grammar Review Through Translation: French, German or Spanish (4)**  
Review of grammar through translation of a wide variety of materials from the foreign language into English. Emphasis on theory of more complex grammatical structures. Introduction to translation theory. Term paper required.

**ML 521 Advanced Composition: French, German or Spanish (4)**  
Practice in written composition. Techniques of textual analysis and exposition are introduced. Term paper in the foreign language required.

**ML 522 Advanced Oral Practice: French, German or Spanish (4)**  
Practice in speaking at an advanced level, which may include style and delivery appropriate to formal and informal speaking situations. May include oral presentations, self-recording and critique. Students will research underlying principles and current issues in the concept of communicative competence in second language learning.

## PSYCHOLOGY

**PSY 510 Developmental Psychology (4)**  
Description and evaluation of principles and theories of development from birth to maturity. Maturation processes, learning and emotional disturbances are considered.  
Prerequisite: Permission of instructor or acceptance into a graduate program.

**PSY 552 Sensation and Perception (4)**  
Approaches to the basic sensory systems and perceptual processes.  
Prerequisite: Permission of instructor.

**PSY 553 Cognitive Psychology (4)**  
The information processing approach to problems in pattern recognition, selective attention, mental operations, short- and long-term memory, the psychology of reading, problem solving and probabilistic reasoning.  
Prerequisite: Permission of instructor.

**PSY 590 Seminar: The Psychology of Reading (4)**  
Cognitive models of reading and reading-related information processing tasks. Empirical studies of the adult reading process.  
Prerequisite: Admission to Ph.D. program in reading.

**PSY 591 Seminar: The Development of Reading Ability, Individual Differences, and Learning Disabilities (4)**  
Empirical and theoretical studies of the causes and correlates of differences in reading skill. Developmental models of reading acquisition and individual differences. Analysis of the concept of learning disability.  
Prerequisite: Admission to the Ph.D. program in reading; PSY 590 or permission of instructor.

## RHETORIC, COMMUNICATIONS AND JOURNALISM

**RCJ 515 Summer 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.

# SCHOOL OF BUSINESS ADMINISTRATION

**Dean:** George E. Stevens

**Office of the dean:**

John E. Tower, associate dean

Julie A. Dziekan, administrator, master of business administration program

Winfred I. Robinson, computer facilities administrator

**Department chairpersons:**

Lizabeth A. Barclay, management and marketing

Gadis J. Dillon, accounting and finance

David P. Doane, decision and information sciences

Ronald L. Tracy, economics

**Professors:**

Eleftherios N. Botsas, Ph.D., Wayne State University

Daniel N. Braunstein, Ph.D., Purdue University

Joseph E. Champagne, Ph.D., Purdue University

Gadis J. Dillon, Ph.D., University of Michigan, CPA

David P. Doane, Ph.D., Purdue University

Karl D. Gregory, Ph.D., University of Michigan

Ronald M. Horwitz, Ph.D., Michigan State University, CPA

Robbin R. Hough, Ph.D., Massachusetts Institute of Technology

Oded Izraeli, Ph.D., University of Chicago

Sid Mittra, Ph.D., University of Florida

Ravi Parameswaran, Ph.D., Georgia State University

Miron Stano, Ph.D., Cornell University

George E. Stevens, D.B.A., Kent State University

**Associate professors:**

Lizabeth A. Barclay, Ph.D., Wayne State University

Edward J. Farragher, Ph.D., University of Illinois

Sherman T. Folland, Ph.D., University of Iowa

Augustin K. Fosu, Ph.D., Northwestern University

John W. Henke, Ph.D., Michigan State University

Albert L. Lederer, Ph.D., Ohio State University

J. Austin Murphy, Ph.D., University of Georgia

Kevin J. Murphy, Ph.D., Michigan State University

R. Mohan Pisharodi, Ph.D., University of Tennessee

Howard S. Schwartz, Ph.D., Cornell University

John E. Tower, Ph.D., State University of New York (Buffalo)

Ronald L. Tracy, Ph.D., Michigan State University

Mary P. Van Sell, Ph.D., University of Iowa

T.J. Wharton, Ph.D., University of Minnesota

Floyd G. Willoughby, Ph.D., Michigan State University

**Assistant professors:**

Mohammad S. Bazaz, Ph.D., University of Oklahoma

Bijoy Bordoloi, Ph.D., Indiana University

Sadik Cokelez, D.B.A., Texas Tech University

Addington M. Coppin, Ph.D., University of Illinois

Aleksandra E. Glowacka, Ph.D., Indiana University

Amir M. Hormozi, Ph.D., University of Houston

Sheila M. Jacobs, Ph.D., Arizona State University

John D. Kim, Ph.D., University of Cincinnati

Robert T. Kleiman, Ph.D., Michigan State University

Thomas W. Lauer, Ph.D., Indiana University

Donald O. Mayer, LL.M., Georgetown University

Kevin S. Nathan, Ph.D., University of Oregon

Mohinder Parkash, Ph.D., University of Arizona

James E. Payne, Ph.D., Florida State University

Eileen E. Peacock, Ph.D., University of Birmingham, England, CPA

Sandra S. Pelfrey, M.B.A., Wright State University, CPA

Anandi P. Sahu, Ph.D., Washington University

Barbara A. Theisen, M.S.T., Walsh College of Accountancy and

Business Administration, CPA

Kenneth M. York, Ph.D., Bowling Green State University

**Special instructor:**

David D. Sidaway, M.Acc., Ohio State University, CPA

**Visiting professor:**

V.K. Chetty, Ph.D., University of Wisconsin

**Visiting instructors:**

Joseph H. Callaghan, M.B.A., J.D., University of Detroit

Mark R. Greer, Ph.D., University of Michigan

**Adjunct professors:**

Rikuma Ito, Ph.D., University of Illinois

Paul O. Kingstrom, Ph.D., Wayne State University

Paul F. Lorenz, M.B.A., University of Chicago

Diane B. Stricker, Ph.D., Cornell University

## The Master of Business Administration

A program leading to the Master of Business Administration (M.B.A.) with a special emphasis on the management of information resources is offered by the School of Business Administration. It is designed to educate students for managerial roles in either the private, public or not-for-profit sectors of the economy. Given the increasing importance of managing information resources at all levels of management, the Oakland University M.B.A. program integrates an emphasis on information systems with accounting, behavioral science, quantitative methods and the functional areas of managerial and business problems — marketing, finance, human resources management and operations management.

### Program philosophy

The M.B.A. program is designed for undergraduate majors from any discipline, including business or management. It is preferred that students with an undergraduate degree in business or one of the functional areas of management have two years of work experience before entering the M.B.A. program. A typical entering class may consist of undergraduate majors from engineering, the natural sciences, the social sciences, computer science, mathematics, business, health care, education and the humanities. The program is based on the belief that an education in management should:

1. Prepare students for careers involving problem identification, problem solving, decision making and leadership in any type of organization.
2. Emphasize the determination of goals and the effective utilization of scarce resources.
3. Help students to understand their social environment.

4. Stress understanding of human behavior and the organizational setting, for much of management relates to people — understanding them, communicating with them, working with them and leading them.
5. Stress the importance of the management of information and information resources in the successful operation of an organization.

### Accreditation

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

### Board of Visitors

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

*Thatcher W. Root, Vice President, Prudential-Bache Securities, Inc.;  
chairman, Board of Visitors*

*James A. Aliber, Chairman of the Board (retired), First Federal of Michigan*

*Joseph A. Campana, President, Automotive Division, Carlson Companies, Inc.*

*Robert L. Condon, Executive Vice President, Operations Center—Auburn Hills, Comerica, Inc.*

*James K. Croll, Sales Vice President, AT&T*

*Michael W. Grieves, President, Data Systems Network Corporation*

*William R. Halling, Managing Partner, KPMG, Peat Marwick*

*John G. Middlebrook, General Manager, Pontiac Motor Division, General Motors Corporation*

*Kenneth E. Myers, President, William Beaumont Hospital Corporation*

*Harold A. Poling, Chairman and Chief Executive Officer, Ford Motor Company*

*Arthur P. Ronan, President, Automotive Operations, Rockwell International Corporation*

*Alan E. Schwartz, Senior Partner, Honigman, Miller, Schwartz & Cohn*

*George H. Seifert, Vice President, Corporate Planning and Development, Ameritech Publishing, Inc.*

*Robin W. Sternbergh, Vice President and Area General Manager, IBM*

*A. Robert Stevenson, Vice President—Public Affairs, Kmart Corporation*

*James R. Wilbert, Partner, Coopers & Lybrand*

### Admission

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

1. A bachelor's degree or equivalent from an institution of recognized standing except for Oakland University students admitted to the "Accelerated Program."
2. A college course in 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 in any language, but a structured programming course in Pascal, PL/1, COBOL, BASIC or FORTRAN is preferred.
5. The Graduate Management Admission Test (GMAT) in the previous five years.

Applicants must also meet the general admission requirements for graduate study at Oakland University. Applications are considered by the Graduate Admission Committee of the School of Business Administration. In making admission recommendations, the admission committee assesses the potential of applicants for success in the M.B.A. program by examining their undergraduate records, their GMAT scores, their responses to questions on the supplemental application and their work experience. Letters of recommendation also may be required by the Graduate Admission Committee.

### Graduate Management Admission Test (GMAT)

All applicants for admission must submit scores for the GMAT. This test is administered throughout the world by the Educational Testing Service four times a year, usually in October, January, March and June. For more information write GMAT, Educational Testing Service, 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 will be required to retake the GMAT.

### Part-time status

All students should be aware of the high demands placed upon them by graduate work in the Oakland University M.B.A. program. Prospective students should carefully consider the effect of coordinating graduate study with commitments to work, family and other activities. The "part-time" label should not mislead students about the workload or the commitment required for successful completion of the M.B.A. program. It is required that part-time students complete at least five M.B.A. courses per year. However, the scheduling of M.B.A. classes is based on the assumption that students will be enrolled in the 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 M.B.A. program varies from 39 to 60 credits, depending on the student's prior preparation. The minimum program consists of 39 credits of required courses and electives that must be completed by all candidates.

Students may begin the M.B.A. program in the fall, winter, spring or summer sessions depending upon their background. Full-time students normally take 12 credits (four courses) in the fall and winter semesters and three credits (one course) in the spring and summer sessions. The full-time student can finish the complete 60-credit program in less than two years (20 months). Students with sufficient background in business courses may be able to complete the minimum 39 credit M.B.A. program in one year (12 months) of full-time study.

The part-time student taking six courses per year should finish the complete 60 credit program in three and one-third calendar years (40 months) in a year-around program.

In keeping with university regulations, all credits used to meet requirements of the M.B.A. program must be earned within six years of the date that the M.B.A. is awarded.

### Accelerated program for undergraduates

The School of Business Administration, in conjunction with other schools and departments of the university, offers an accelerated program which can result in a student earning an M.B.A. and a baccalaureate in a non-business field, in the equivalent of five years of full-time study. Students interested in the accelerated program should apply after they have earned a total of 80 credits and at least one term before they plan to take M.B.A. courses. Students who participate in this track must satisfy all undergraduate degree requirements for their major. They may meet part of these requirements by counting the M.B.A. courses taken before receiving the baccalaureate as "free" undergraduate electives. The Graduate Management Admission Test (GMAT) must be completed before any M.B.A. courses can be taken. This program is available to both full-time and part-time students.

The departments which administer the majors of the accelerated program must certify that the students have a GPA in the top 15% of their class and approve their application for the accelerated program. Upon acceptance into the program, the students are considered undergraduates (paying undergraduate tuition) until the baccalaureate is earned and a graduate student (paying graduate tuition) thereafter. M.B.A. courses used to satisfy undergraduate degree requirements will be reflected on the undergraduate transcript only. Formal admission into the



M.B.A. is presumed subject to satisfactory performance in the final courses taken to meet the undergraduate degree requirements. Accelerated program students must satisfy all M.B.A. degree requirements, and must take at least 33 graduate credits in the M.B.A. program after receiving the baccalaureate. Additional information and applications may be obtained from the M.B.A. office.

### Graduate assistantships

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 M.B.A. office.

### M.B.A. program of study

The M.B.A. program consists of three parts: the precore program, the core program and a set of at least four electives. Each part of the program will be detailed below.

### M.B.A. precore program

The precore program is designed to develop basic skills in management for the M.B.A. student. These courses do not assume any previous education in business or management. Students entering the M.B.A. program are required to have college courses in economics, algebra and computer programming or the equivalent experience. In some cases, M.B.A. applicants may be directed to enroll in appropriate undergraduate courses prior to admission to obtain the required background in economics, college algebra and computer programming. In such cases, eventual admission to the M.B.A. program will depend upon the successful completion of these courses, along with the usual criteria for admission.

The precore program of 21 credits consists of the following seven courses:

| Precore courses                             | Credits | Who will probably need it?                                                                                                                                                                                                      |
|---------------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QMM 501 Quantitative Methods for Management | 3       | Applicants without a calculus background or who need a review in math through calculus.                                                                                                                                         |
| MIS 502 Computer Methods for Management     | 3       | Applicants without a course that covers operating systems, word processing, spreadsheets, data base management, graphics, data communication, programming in a fourth generation language and related workstation capabilities. |
| or MIS 503 Computer Orientation             | 1       | Applicants with a course in the workstation capabilities noted above. This is an orientation to computer lab resources available to M.B.A. students.                                                                            |
| QMM 510 Statistical Analysis for Managers   | 3       | Applicants without a calculus-based business statistics course.                                                                                                                                                                 |
| ECN 520 Microeconomic Decision Analysis     | 3       | Applicants without an intermediate level microeconomic theory course.                                                                                                                                                           |
| ACC 511 Financial Accounting                | 3       | Applicants without a financial accounting course or two-course principles of accounting sequence.                                                                                                                               |
| ORG 530 Organizational Behavior             | 3       | Applicants without the required course work in organizational behavior.                                                                                                                                                         |
| MGT 550 Legal Environment of Business       | 3       | Applicants without a course in the legal environment of business, including ethics, an outline of the legal system and the law and politics of regulation.                                                                      |

Only students formally admitted into the M.B.A. program or another graduate program at Oakland University may register for the M.B.A. precore courses.

To be exempted from the precore courses the applicant must have passed an equivalent undergraduate or graduate course with a grade of 3.0 (B) or better within the previous 10 years. Exemption from a precore course reduces the total credit requirement for the M.B.A. Students exempted from all the precore courses will be required to take the minimum M.B.A. program of 39 credits. Exemptions from precore courses are determined by the M.B.A. office after an evaluation of the student's transcript. Credit toward M.B.A. degree requirements will not be granted for the completion of a precore course from which a student has been exempted.

### M.B.A. core program

The core program introduces the M.B.A. student to the functional areas of management and applies the tools of accounting, economics, quantitative methods, organizational behavior, management information systems, marketing and finance to problems and cases in management policy and strategy. All students must complete 27 credits of core course work, or approved replacement electives.

| Core courses |                                     | Approved M.B.A. Electives | Credits |
|--------------|-------------------------------------|---------------------------|---------|
| ACC 512      | Managerial Accounting Systems       | ACC Elective              | 3       |
| ECN 522      | Macroeconomic Analysis              | Any M.B.A. Elective       | 3       |
| FIN 533      | Managerial Finance                  | FIN Elective              | 3       |
| MKT 560      | Marketing                           | MKT Elective              | 3       |
| MIS 524      | Management Information Systems      | MIS Elective              | 3       |
| MIS 525      | Management of Information Resources | Any M.B.A. Elective       | 3       |
| ORG 531      | Human Resources Management          | ORG Elective              | 3       |
| POM 521      | Operations Management               | POM or QMM Elective       | 3       |
| MGT 535      | Policy, Strategy, and Goals         | MGT 535 Required          | 3       |
|              |                                     |                           | 27      |

M.B.A. students may be exempted from any of the core courses except MGT 535, the policy course. To be exempted the student must have earned a grade of 3.0 (B) or better in an equivalent or higher level course at the undergraduate or graduate level within the past 10 years. Students exempted from ACC 512, FIN 533, MIS 524, MKT 560 or ORG 531 will be required to take an elective in the same area to replace the core course. Students exempted from POM 521 will be required to take an elective in either Production and Operations Management (POM) or Quantitative Methods (QMM). Students exempted from ECN 522 or MIS 525 will be required to take an additional M.B.A. elective in any area to replace the core course. M.B.A. elective courses are numbered at the 600 level. MGT 535 is required of all M.B.A. candidates. Exemptions from core courses and acceptable elective courses are determined by the M.B.A. office after an evaluation of the student's transcript.

### M.B.A. electives

M.B.A. candidates complete their program by selecting a minimum of 12 credits of M.B.A. electives. These credits may be drawn from M.B.A. elective courses offered by the School of Business Administration or from a very limited set of approved courses offered by other units of Oakland University. Six of the elective credits may be a master's project. M.B.A. students may not take more than three of their electives in one area of business (ACC, ECN, FIN, MKT, MIS, MKT, ORG, POM or QMM). All M.B.A. electives are numbered at the 600 level.

### Standard schedule for 60-credit part-time program

The following program is the standard structured schedule for the M.B.A. student that takes the complete 60 credit part-time program on two evenings per week, from 6:30 to 9:20 p.m.



**First year**

|         |                                     |
|---------|-------------------------------------|
| QMM 501 | Quantitative Methods for Management |
| MIS 502 | Computer Methods for Management     |
| ACC 511 | Financial Accounting                |
| QMM 510 | Statistical Analysis for Managers   |
| ECN 520 | Microeconomic Decision Analysis     |
| ORG 530 | Organizational Behavior             |

**Second year**

|         |                                |
|---------|--------------------------------|
| MGT 550 | Legal Environment of Business  |
| ECN 522 | Macroeconomic Analysis         |
| ACC 512 | Managerial Accounting Systems  |
| MIS 524 | Management Information Systems |
| MKT 560 | Marketing                      |
| POM 521 | Operations Management          |

**Third year**

|                 |                                     |
|-----------------|-------------------------------------|
| FIN 533         | Managerial Finance                  |
| ORG 531         | Human Resources Management          |
| MIS 525         | Management of Information Resources |
| MGT 535         | Policy, Strategy, and Goals         |
| MBA Elective #1 |                                     |
| MBA Elective #2 |                                     |

**Fourth year**

|                 |  |
|-----------------|--|
| MBA Elective #3 |  |
| MBA Elective #4 |  |

Some M.B.A. 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 Admissions and Scholarships, 205 Wilson Hall, including an Application for Graduate Study, an M.B.A. supplemental application, transcripts sent directly to the Office of Admissions and Scholarships from all previous colleges and universities, and a GMAT score.

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

**Transfer credit**

In accordance with the regulations of the Graduate Council, up to 9 credits of relevant M.B.A. course work may be transferred from an M.B.A. program at an accredited institution. For credit to transfer the student must have earned a grade of 3.0 (B) or better in the course. The transfer credit will reduce the number of credits required in the M.B.A. program. The acceptance of transfer credit and the related course exemptions are determined after an evaluation of a student's transcript. They must be approved by the M.B.A. office and the dean of Graduate Study.

**Student evaluation and grading**

M.B.A. students must maintain at least a 3.00 grade point average in accordance with the university requirements for graduate students. Dismissal may result from severe deficiencies, such as two or more course grades below 3.0, one grade below 2.5, a grade point average in M.B.A. courses of less than 3.00 or insufficient progress toward a degree. Any course resulting in a grade less than 2.0 must be repeated.

In making dismissal recommendations, three criteria are considered: the student's overall grade point average, the number of course grades below 3.0 and the faculty assessment of the student's academic potential and ability to master the skills emphasized in the program. Hence, a 3.00 grade point average does not necessarily guarantee continuation in the program. Generally, two course grades below 3.0 or one course grade below 2.5 within the first 24 credits of graduate work is viewed as excessive, especially when accompanied by a marginal GPA. Similarly, failure to complete individual courses on schedule jeopardizes progress toward the degree, regardless of GPA, making the student liable for probation or dismissal. Students who do not complete an M.B.A. course for 12 months must formally apply for readmission to the M.B.A. program. Even if students leave the program voluntarily and in good standing, readmission is not automatic.

**Master's project (optional)**

The optional master's project (equal to six elective credits) requires the application of classroom training and extra-classroom study to a practical management problem. It must involve collection and analysis of data in an actual organizational setting as well as cogent recommendations to management for resolving the problem. The master's project is not designed to be a theoretical master's "thesis." It should be organized around a management problem which requires input from several functional areas of management. Additional information about the master's project may be obtained from the M.B.A. office.

**Course Offerings****ACCOUNTING****ACC 511 Financial Accounting (3)**

Focus is on financial accounting for external reporting: communications addressed to shareholders, government agencies, potential investors, and the public.  
Prerequisite: Admission to the M.B.A. program.

**ACC 512 Managerial Accounting Systems (3)**

Emphasizes recording, reporting, and the use of data within the enterprise. Cost accounting, budgeting, and internal control systems are covered.  
Prerequisite: M.B.A. precore.

**ACC 615 Tax Accounting (3)**

Examination of the concepts of taxation and the essential logic underlying the federal tax laws. The class will analyze individual and corporate income tax laws rather than train students to prepare current-year tax returns.  
Prerequisite: M.B.A. precore and ACC 512.

**ACC 618 Computer-Based Accounting and Systems (3)**

Examination of computer applications in accounting integrated with inventory control and related operating and sales data processing. Internal control, security, and auditing features will be stressed. Includes analysis of computer hardware and software needs, systems analysis, system development, and implementation.  
Prerequisite: M.B.A. precore, MIS 524 and ACC 512.

**ACC 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: M.B.A. precore and ACC 512.

**ACC 690 Independent Study in Accounting (3)**

Independent individual research on a topic chosen by the student. Written approval must be obtained from a faculty member in accounting prior to registering for this course. Offered every term.  
Prerequisite: M.B.A. precore, ACC 512, and prior approval of instructor.

**ECONOMICS****ECN 520 Microeconomic Decision Analysis (3)**

Analysis of microeconomic decision makers in a market environment. Includes models of: consumer theory, the firm, production processes, costs, pricing, resource allocation, market and industry structure, decision making under certainty, and an introduction to decision making under uncertainty.  
Prerequisite: QMM 501 and QMM 510.

**ECN 522 Macroeconomic Analysis (3)**

Construction, analysis, and interpretation of models of national and international aggregate economic behavior, including policy implications of alternative models, with emphasis on current economic events. International economic interrelationships are explored.  
Prerequisite: M.B.A. precore.

**ECN 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.  
Prerequisites: M.B.A. precore, ECN 522 and FIN 533.

**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: M.B.A. precore and ECN 522.

**ECN 673 International Trade and Finance (3)**

Examination of the theory of international trade, international monetary mechanisms, exchange-rate regimes, the balance of payments, and economic interdependence.  
Prerequisite: M.B.A. precore and ECN 522.

**ECN 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: M.B.A. precore and 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: M.B.A. precore, 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: M.B.A. precore.

**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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore, FIN 533, and prior approval of instructor.

**MANAGEMENT (Including Business Policy and Legal Environment of Business)****MGT 535 Policy, Strategy, and Goals (3)**

Application of management tools of economics, statistics, organizational behavior, accounting, marketing, finance, operations management, and management information systems to the analysis of organizational case studies. International and ethical issues related to strategic management are discussed.  
Prerequisite: M.B.A. precore and core.

**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 M.B.A. program.

**MGT 611 Master's Project (3)**

Independent elective project.  
Prerequisite: M.B.A. precore and core.

**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: Completion of the core of the M.B.A., excluding MGT 535.

**MGT 638 Labor-Management Relations (3)**

Analysis of management-employee relations in modern organizations and public policy in labor-management areas.  
Prerequisite: M.B.A. precore and ORG 531.

**MGT 660 Launching and Managing Small Businesses (3)**

Analysis of the role of small businesses in the U.S. economy, the Small Business Administration, franchise opportunities, consulting as a business and the launching, financing, and managing of a small business. A significant project is required.  
Prerequisite: M.B.A. precore and core.

**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: Completion of the core of the M.B.A., excluding MGT 535.

**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: Completion of the core of the M.B.A., excluding MGT 535.

**MGT 690 Independent Study in Management (3)**

Independent individual research on a topic chosen by the student. Written approval must be obtained from a management faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precourse 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 M.B.A. 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).

Prerequisite: Admission to the M.B.A. 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: M.B.A. precourse.

**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: M.B.A. precourse and MIS 524.

**MIS 600 Analysis of Complex Systems (3)**

Modeling, instrumentation and control of complex systems. Emphasizes design, implementation, and testing of information and control systems in unstructured and realistic contexts. Includes specification, evaluation and selection of hardware and software systems, ranging from applications in microcomputers to large-scale computers.

Prerequisite: M.B.A. precourse, MIS 524, and POM 521.

**MIS 604 Database Management (3)**

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

Prerequisite: M.B.A. precourse and 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, wide area networks, telephone systems, electronic mail, transborder data flows and communication protocols. Includes exercises using various network configurations.

Prerequisite: M.B.A. precourse and MIS 524.

**MIS 636 Decision Support Systems (3)**

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

Prerequisite: M.B.A. precourse and MIS 524.

**MIS 644 Simulation in Management (3)**

Computer simulation models of management processes using GPSS or an equivalent simulation language, and using standard programming languages. Implications of models and sensitivity analyses for forecasting, planning and decision making in the management environment are explored.

Prerequisite: M.B.A. precourse, MIS 524, POM 521 and knowledge of BASIC or FORTRAN.

**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: M.B.A. precourse and 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 information systems faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precourse, 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: M.B.A. precourse.

**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: M.B.A. precourse and MKT 560.

**MKT 605 Marketing Research (3)**

Focus on the generation and management of information in marketing decisions. Covers the evaluation of additional marketing information; how it is acquired and used; the manager's role in market research; the researcher's role in supplying marketing information.

Prerequisite: M.B.A. precourse and MKT 560.

**MKT 608 Marketing Management (3)**

In-depth study of a selected topic relevant to management of the marketing function. Possible topics include marketing and society, advertising and mass media, institutional marketing, distribution channel management, operations marketing, and promotion policies.

Prerequisite: M.B.A. precourse and 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: M.B.A. precourse and core.

**MKT 690 Independent Study in Marketing (3)**

Independent individual research on a topic chosen by the student. Written approval must be obtained from a marketing faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precourse, 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 M.B.A. 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: M.B.A. precore.

### ORG 635 Decision Making in Organizations (3)

A comparison of current cognitive, social and organizational approaches to the study of decision making. Behavioral information processing concepts will be used as an aid to understanding how managerial decisions are made. Examples are introduced from functional management, as well as policy and strategy.

Prerequisite: M.B.A. precore and ORG 531.

### ORG 636 Leadership and Group Performance (3)

Comprehensive examination of different leadership theories, with emphasis on relevant empirical evidence and application of the theories to case studies.

Prerequisite: M.B.A. precore and ORG 531.

### ORG 637 Motivation and Work Behavior (3)

Analysis of the individual 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: M.B.A. precore and ORG 531.

### ORG 680 Special Topics in Organizational Management (3)

Study of selected topics related to organizational behavior and/or human resources management. Topics may include: job design, career development, compensation, management across cultures, research methods and power in organizations. See *Schedule of Classes* for current offering. A maximum of two Special Topics courses may be taken in one rubric.

Prerequisite: M.B.A. precore and ORG 531.

### ORG 690 Independent Study in Organizational Behavior (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from an organizational behavior faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore, ORG 531, and prior approval of instructor.

## 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: M.B.A. precore.

### 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore, POM 521, and prior approval of instructor.

## QUANTITATIVE METHODS

### QMM 501 Quantitative Methods of Management (3)

Theory and application of mathematical skills required for courses in the M.B.A. program. Covers linear algebra, linear programming, calculus, probability, and their applications in management.

Prerequisite: Admission to the M.B.A. program and college algebra.

### QMM 510 Statistical Analysis for Managers (3)

Statistical methods useful in management. Includes statistical description, discrete and continuous probability models, estimation, hypothesis testing, control charts, simple time-series modeling, and regression analysis. Real-world applications and use of "canned" computer programs are stressed.

Prerequisite: QMM 501.

### QMM 640 Operations Research (3)

Topics in modeling of managerial decision problems under certainty and under uncertainty. Includes linear programming, game theory, PERT and CPM, Bayesian analysis, simulation, chance-constrained programming, queuing theory, and Markovian analysis. Designed to refine the student's scientific problem-solving skills with emphasis on applications of these skills.

Prerequisite: M.B.A. precore and 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: M.B.A. precore and 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: M.B.A. precore.

### QMM 690 Independent Study in Quantitative Methods (3)

Independent individual research on a topic chosen by the student. Written approval must be obtained from a quantitative methods faculty member prior to registering for this course. Offered every term.

Prerequisite: M.B.A. precore and prior approval of instructor.

# SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

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Ka C. Cheok, Ph.D., *Oakland University*  
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Sarima R. Vishnubhotla, Sc.D., *Washington University*  
Christian C. Wagner, Ph.D., *Michigan State University*  
Mohamed A. Zohdy, Ph.D., *University of Waterloo*

**Assistant professors:**

Frank A. Cioch, Ph.D., *University of Michigan*  
You L. Gu, Ph.D., *Purdue University*

Chin L. Ko, Ph.D., *University of Oklahoma*  
Michael Latcha, Ph.D., *Wayne State University*

**Visiting assistant professors:**

Gary C. Barber, Ph.D., *University of Michigan*  
Seyoung Kim, Ph.D., *Pennsylvania State University*

**Special instructor:**

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

**Adjunct professors:**

Martin A. Erickson, M.M.E., *Chrysler Institute of Engineering*  
Donald R. Falkenburg, Ph.D., *Case Western Reserve University*  
Grant R. Gerhart, Ph.D., *Wayne State University*  
Michael Marcotty, B.S., *University of Reading*

**Adjunct associate professors:**

Osman D. Altan, Ph.D., *University of California (Berkeley)*  
Ronald R. Beck, Ph.D., *University of Iowa*

## Board of Visitors

The Board of Visitors 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.



The School of Engineering and Computer Science is housed in Dodge Hall of Engineering, a modern facility with extensive laboratories for research and design studies. Laboratories cover robotics, machine vision, experimental stress analysis, heat transfer, fluid flow, system simulation, circuits and communications, control, mechanical and electrical properties of materials, solid state devices and microelectronics, microprocessors, mini-computers, computer graphics and computer-aided design. The school has a fully equipped CAD/CAM system consisting of VAX 11/750, VAX 11/780 and Prime 9750 digital computers. Students have access to the various computing facilities of the school and the university's mainframe computing 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. It is well equipped with modern facilities and supports the research and instructional programs in the school.

## 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 27 of this catalog and the Graduate Student Handbook of the School of Engineering and Computer Science.

## Graduate Student Handbook

This section of the catalog describes the requirements and conditions for the various graduate programs of the School of Engineering and Computer Science. To assist students in program planning and to clarify regulations pertaining to progress and academic standing, the school also publishes a Graduate Student Handbook. Copies are available in the 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 specifically for students who plan careers in industrial or governmental research and development laboratories or problem-oriented agencies as well as in the academic field. Students can begin doctoral study on a part-time basis, availing themselves of late afternoon or evening courses while working full time in local industry. However, later phases of study and research will require full-time devotion to the program. Students must also fulfill a residency requirement.

## Admission

The Ph.D. program is designed for students with academic backgrounds in engineering. Students with backgrounds in computer science, mathematics or the physical sciences may also be admitted to the program, but will be required to build up basic engineering knowledge through 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. Foreign applicants must submit scores from the Graduate Record Examination general and engineering subject tests and the Test of English as a Foreign Language (TOEFL).

## Entrance classification

All students who have been accepted for admission to doctoral study are classified as regular Ph.D. students and are subject to all of the general degree requirements listed below. Although students who have compiled extraordinary undergraduate academic records may be admitted directly as doctoral students, possession of an appropriate master's degree is normally the minimal admission requirement. Applicants with a master's degree who do not intend to pursue a degree program but wish merely to attend one or two courses are classified as post-master's students. Credits earned as a post-master's student are not applicable toward a doctoral degree unless the student subsequently transfers to regular status and the courses are accepted as part of the Ph.D. program.

## Transfer from post-master's to regular status

Post-master's students who have demonstrated outstanding achievement and who later wish to become degree-seeking may request transfer of status. Students desiring to transfer status must complete a new application form, available from the Office of Admissions and Scholarships, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the 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 chairperson and one selected from a department outside the School of Engineering and Computer Science.
2. One member appointed by the dean.
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.

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  
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 fulfill 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 the other areas as deemed appropriate.

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

**Continuous Systems\***

Optimal Control  
Dynamic Systems  
Robotics  
Classical Control  
Semiconductor Devices  
Communications  
Electronics and Signal Processing  
Advanced Systems Theory  
Optimization and Decision Theory  
Energy Systems  
Thermal Energy Transport  
Fluid Transport  
Experimental Stress Analysis  
Solid Mechanics  
Dynamics and Vibrations

**Discrete Systems\***

Manufacturing Systems  
Probability and Statistics in  
Manufacturing  
Graphics and CAD/CAM  
Computer Hardware Design  
Software Systems  
Computer Communications  
Artificial Intelligence  
Software Engineering  
Theory of Computing Systems  
Microprocessors  
Numerical Techniques

\*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 that research in a secondary role. Doctoral students are required to be full-time students for at least one year of their active dissertation research. The doctoral student should arrange such a period of residency by (1) registering for at least 8 credits of doctoral dissertation research for two consecutive semesters, and (2) making a commitment, in a statement addressed to his/her advisory committee, to a program of full-time (at least 20 hours per week) research.

The above represents the normal residency requirement. However, if the present occupation of the candidate (e.g., industrial research or teaching) is conducive to the intended research, there is an alternative method to fulfilling the residency requirement. To arrange for that kind of residency, the candidate must apply in writing to his/her advisory committee at the time of the dissertation proposal 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 (at most 8 credits) for at least two consecutive semesters.

The work of the latter Ph.D. students will be documented by term reports, reviewed and accepted by the chairman of the advisory committee. A copy of every report will be kept in the student's file. The advisory committee will review these reports. If the progress is unsatisfactory or the student and the employer are unable to fulfill the terms of the residency agreement, the advisory committee can declare the residency requirements unfulfilled.

**Course work credits:** At least 56 credits must be earned for course work beyond the bachelor's degree (exclusive of dissertation). The normal full-time load is 8 to 12 credits per semester. Students who have earned credits in a master's degree program may petition to have these credits applied toward the 56. The advisory committee will evaluate the student's prior work and allow Ph.D. credits for courses relevant to the proposed Ph.D. course of study. All candidates must complete at least 16 credits of 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.

### Dissertation proposal review

As soon as a candidate and the advisory committee chairperson agree on a specific research topic, the candidate must write a dissertation proposal. This document contains a formulation of the problem, the background work leading to the formulation and a plan for the subsequent research. Candidates must orally present the proposal to their advisory committees and any other interested faculty, at which time the committee may question the preparedness of the student to carry out the research.

### Research credits

Students who have advisory committee approval of their dissertation proposals and are conducting research should register for EGR 790. At least 24 credits in EGR 790 are required of all doctoral candidates. However, merely amassing credits does not indicate satisfactory progress toward or completion of the dissertation. These judgments are made by the advisory committee. The dissertation is judged completed upon successful completion of the final examination.

### Final examination

Each Ph.D. candidate must satisfactorily defend the dissertation in a final oral examination administered by the advisory committee. The examination is taken after the advisory committee certifies that the dissertation is ready for final review. At the committee's option, one reexamination may be permitted if a candidate fails to pass the final examination.

### Time limit

Students have a seven-year time limit to complete all requirements for the Ph.D. beginning with the first term of enrollment in the program. Credits earned prior to entry into the program will be evaluated by the advisory committee for their currency before completion of 16 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 card at the Office of the Registrar and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

## General Regulations for Master's Degree Programs

### Admission

The engineering programs leading to a Master of Science degree build upon the preparation acquired in a baccalaureate engineering curriculum. A bachelor's degree in physics, mathematics or other field of science may be acceptable, but a student presenting such a degree should plan to spend additional time in residence to gain proficiency in the fundamentals of engineering.

A suitable background for the program leading to the Master of Science in computer science and engineering is a baccalaureate in computer science, mathematics or engineering. A degree in another field may be acceptable but remedial course work may be required to overcome deficiencies.

Admission to master's study is selective; applicants should have an undergraduate GPA of 3.00 or better in their major area of study and in their mathematics and science courses. Applicants should present academic transcripts and recommendations from two members of the undergraduate major department who are familiar with their accomplishments and promise.

These recommendations form an important part of the admission credentials. Graduate Record Examination general and subject test scores are required of graduates of foreign institutions, of engineering applicants who are graduates of programs not accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology (ABET), and are encouraged for other applicants whose credentials do not meet regular admission criteria. The TOEFL score must be submitted by applicants who are graduates of programs taught in a language other than English. Additional entrance requirements for the computer science and engineering program are listed on page 106.

### Entrance classification

A graduate student is classified in one of three categories:

**Regular status:** For students who meet normal entrance requirements and who are seeking the Master of Science degree.

**Conditional status:** For students whose credentials do not meet criteria for regular admission and who are seeking the Master of Science degree; this category is not used to admit students who present substantially weak credentials for graduate study. Conditional status may be granted for one semester; the minimum requirement for continuation in the program is a GPA of 3.00 for the semester.

**Special 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 and must 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 subsequently transfers to regular status and the courses are accepted as part of the Master of Science program. In addition, no more than 12 credits earned in this status can be applied toward the degree.

**Post-baccalaureate status:** For students who have a bachelor's degree from an accredited college or university and wish to enroll in undergraduate courses to prepare for an advanced degree program. Application for this type of admission should be made through the undergraduate admissions office.

### Transfer to regular status

Students desiring to transfer to regular status must complete an application form available from the Office of Graduate Admissions, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the faculty will weigh heavily the applicant's performance at Oakland University. A 3.00 cumulative average in graduate courses is a minimal requirement.

### Master's adviser

The progress of each regular student toward the Master of Science degree is directed by the student's adviser, who is a faculty member of the School of Engineering and Computer Science assigned at time of admission. Incoming students seeking the degree are urged to discuss their proposed concentration area with their adviser or faculty members in that area. Students who wish to change their adviser can do so with the approval of the 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 (EGR 690) or a directed master's thesis research (EGR 691) may be included as part of the program in place of elective courses. Students choosing the thesis option (EGR 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 theses and 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 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 normally register for 8 to 12 credits per semester. Graduate assistants must be full-time students and commit 20 hours per week toward their research or teaching assistantship assignment. Graduate assistants normally register for only 8 credits per semester; however, a 12 credit load can be taken with the approval of the 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 (EGR 690) or master's thesis research (EGR 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 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.

### Electrical and computer engineering requirements

In addition to the general degree requirements a student must fulfill the following program requirements to be awarded the Master of Science in electrical and computer engineering:

#### Mathematics: 4-8 credits from

- |             |                                              |
|-------------|----------------------------------------------|
| APM 541-542 | Mathematical Analysis for Engineers (4 each) |
| APM 563     | Applied Mathematics: Discrete Methods (4)    |
| MTH 555-556 | Complex Analysis (4 each)                    |
- (Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree.)

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 4-8

#### Required courses: (16 credits)

Select three from the following:

- |         |                                       |
|---------|---------------------------------------|
| SYS 520 | Signal and Systems Analysis (4)       |
| EE 534  | Principles of Data Communications (4) |
| EE 581  | Integrated Circuits and Devices (4)   |
| EE 625  | Analog Integrated Circuit Design (4)  |
- and one of the following:
- |         |                                            |
|---------|--------------------------------------------|
| CSE 564 | Computer Organization and Architecture (4) |
| CSE 570 | Micro processor-based System Design (4)    |

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#### Electives:

Students with specialized interests should consider choosing 4-8 credits of electives within one of the depth areas listed below:

#### Communications

- |         |                                                                        |
|---------|------------------------------------------------------------------------|
| EE 533  | Random Signals and Processes (4)                                       |
| EE 535  | Information Theory and Coding in Digital and Computer Applications (4) |
| EEE 545 | Electromagnetic Engineering (4)                                        |
| EE 633  | Signal Detection and Estimation Theory (4)                             |
| EE 637  | Digital Signal Processing (4)                                          |

#### Computers

- |         |                                            |
|---------|--------------------------------------------|
| EE 570  | Microprocessors and Microcomputers (4)     |
| CSE 564 | Computer Organization and Architecture (4) |
| CSE 571 | Microprocessor Systems Applications (4)    |
| SYS 569 | Computer Simulation in Engineering (4)     |



**Controls**

|         |                                           |
|---------|-------------------------------------------|
| EE 572  | Microcomputer-Based Control Systems (4)   |
| SYS 532 | Analysis of Nonlinear Control Systems (4) |
| SYS 574 | Digital Control Systems (4)               |
| SYS 630 | Optimal Control Theory (4)                |
| SYS 631 | Estimation and Control Theory (4)         |

**Electronics**

|        |                                                      |
|--------|------------------------------------------------------|
| EE 487 | Integrated Electronics (4)                           |
| EE 526 | Instrumentation and Measurements (4)                 |
| EE 682 | Field-Effect Devices (4)                             |
| EE 683 | Introduction to 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 4-8 credits of electives either from those listed under depth areas above and/or from the following:

EE 526, 545, 567, 581, 620, 625, 725,  
SYS 510, 523, 563, 664, 722, 731,  
CSE 513, 517, 518, 547, 564, 570, 571  
PHY 562, 574, 583, 632, 673  
EGR 594, 595, 690, 691, 795

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**Thesis Option**

Students electing this option must accumulate a minimum of 8 credits of EGR 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits.

**Mechanical engineering requirements**

In addition to the general degree requirements a student must fulfill the following program requirements to be awarded the Master of Science in mechanical engineering.

**Mathematics:** 4-8 credits from

APM 541-542 Mathematical Analysis for Engineers (4 each)  
(Students who feel they need a refresher course in mathematics may elect to take APM 407. This is a review course and does not count toward fulfilling the requirements for the master's degree. Students are encouraged to ask their adviser if APM 407 may benefit them.)

4-8

**Required course:** One of

|         |                                      |
|---------|--------------------------------------|
| ME 521  | Dynamics (4), or                     |
| ME 582* | Fluid and Thermal Energy Systems (4) |

4

**Depth areas:** Two courses from each of two of the following depth areas:**Energy systems**

|                           |                                        |
|---------------------------|----------------------------------------|
| ME 582*                   | Fluid and Thermal Energy Systems (4)   |
| and one of the following: |                                        |
| ME 554*                   | Solar and Alternate Energy Systems (4) |
| ME 555                    | Combustion Processes (4)               |

**Thermal Energy Transport**

|         |                                 |
|---------|---------------------------------|
| ME 548* | Thermal Energy Transport (4)    |
| ME 648  | Thermal Transport Phenomena (4) |

**Fluid Transport**

|         |                                    |
|---------|------------------------------------|
| ME 538* | Fluid Transport (4)                |
| ME 638  | Convective Transport Phenomena (4) |

**Solid Mechanics**

|                           |                        |
|---------------------------|------------------------|
| ME 663                    | Applied Elasticity (4) |
| and one of the following: |                        |
| ME 524                    | Vibration Analysis (4) |
| ME 569                    | Finite Elements (4)    |

**Experimental Stress Analysis**

|        |                                                               |
|--------|---------------------------------------------------------------|
| ME 565 | Experimental Stress Analysis I<br>(Traditional Methods) (4)   |
| ME 665 | Experimental Stress Analysis II<br>(Contemporary Methods) (4) |

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**Electives:**

Remaining 4-8 credits from those listed under depth areas above or from the following:

ME 549, 561, 567, 572, 610, 639, 664  
SYS 520, 557, 630  
CSE 517, 518

With adviser's consent, courses may be taken from:  
EGR 594, 595, 690, 691, 795

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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.

**Thesis Option**

Students electing this option must accumulate a minimum of 8 credits of EGR 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits.

\*These courses are cross-listed as advanced undergraduate and graduate courses. Students who have completed these as 400-level courses or their equivalent may consider them in meeting depth requirements, but may not count them toward the 32-credit requirement of graduate-level work.

**Systems engineering requirements**

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

1. Dynamic systems and control
2. Robotics
3. Manufacturing systems

In addition to the general degree requirements a student must fulfill the program requirements for one of the options to be awarded the Master of Science in systems engineering.

**Dynamic systems and control engineering option****Mathematics:** 4-8 credits from

|             |                                              |
|-------------|----------------------------------------------|
| APM 541-542 | Mathematical Analysis for Engineers (4 each) |
| APM 553     | Advanced Ordinary Differential Equations (4) |
| MTH 555     | Complex Analysis (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 574 | Digital Control Systems       | 4        |
| SYS 630 | Optimal Control Theory        | 4        |
| SYS 631 | Estimation and Control Theory | 4        |
| EE 533  | Random Signals and Processes  | 4        |
|         |                               | <hr/> 20 |

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

SYS 510, 523, 532, 721, 722, 731,  
CSE 517, 518, 570, 571, 578  
EE 570, 572, 625, 637  
ME 521  
PHY 562  
EGR 594, 595, 690, 691, 795

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4-8

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**Thesis Option**

Students electing this option must accumulate a minimum of 8 credits of EGR 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits.

**Robotics engineering option**

**Mathematics:** 4-8 credits from

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

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4-8
**Required courses (16 credits)**

|         |                                            |          |
|---------|--------------------------------------------|----------|
| SYS 520 | Signal and System Analysis                 | 4        |
| SYS 523 | Dynamics and Control of Robot Manipulators | 4        |
| EE 570  | Microprocessors and Microcomputers         | 4        |
| ME 521  | Dynamics                                   | 4        |
|         |                                            | <hr/> 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**

|         |                                                 |
|---------|-------------------------------------------------|
| SYS 532 | Analysis of Nonlinear Control Systems (4)       |
| SYS 574 | Digital Control Systems (4)                     |
| CSE 513 | Pattern Recognition (4)                         |
| CSE 515 | Expert Systems and Decision Support Systems (4) |
| CSE 516 | Artificial Intelligence (4)                     |
| 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 533; PHY 562; EGR 594, 595, 690, 691, 795

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8-12

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32
**Thesis Option**

Students electing this option must accumulate a minimum of 8 credits of EGR 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.

**Manufacturing systems engineering option**

**Mathematics:** 4-8 credits from

|         |                                             |
|---------|---------------------------------------------|
| 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.)

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4-8
**Required courses: (20 credits)**

|         |                                           |          |
|---------|-------------------------------------------|----------|
| CSE 545 | Database Systems (4)                      | 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        |
|         |                                           | <hr/> 20 |

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

SYS 510, 520, 523, 532, 574, 585, 630, 664, 788  
CSE 513, 516, 571  
EE 526, 567, 570  
ME 569, 572  
EGR 594, 595, 690, 691, 795

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4-8

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32
**Thesis Option**

Students electing this option must accumulate a minimum of 8 credits of EGR 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits.

It is recommended, but not required, that students elect two courses within one of the following depth areas. The student's adviser should be consulted for assistance in course selection.

**Computer science**

|         |                             |
|---------|-----------------------------|
| CSE 513 | Pattern Recognition (4)     |
| CSE 516 | Artificial Intelligence (4) |
| CSE 545 | Database Systems (4)        |

**Mechanical engineering**

|        |                                        |
|--------|----------------------------------------|
| ME 569 | Finite Elements (4)                    |
| ME 572 | Materials Properties and Processes (4) |

**Robotics**

|         |                                                |
|---------|------------------------------------------------|
| SYS 422 | Intelligent Robotics (4)                       |
| SYS 520 | Signals and Systems Analysis (4)               |
| SYS 523 | Dynamics and Control of Robot Manipulators (4) |

**Manufacturing systems**

|         |                                                  |
|---------|--------------------------------------------------|
| SYS 510 | Systems Optimization and Design (4)              |
| SYS 517 | Probability and Its Engineering Applications (4) |
| SYS 585 | Statistical Quality Control (4)                  |
| SYS 664 | Advance Computer-Aided Design (4)                |
| SYS 788 | Propagation of Error (4)                         |

**Dynamic systems**

|         |                                           |
|---------|-------------------------------------------|
| SYS 520 | Signals and Systems Analysis (4)          |
| SYS 532 | Analysis of Nonlinear Control Systems (4) |
| SYS 574 | Digital Control Systems (4)               |
| SYS 630 | Optimal Control Theory (4)                |

## Energy engineering

Master of Science students in any of the engineering programs can elect courses which focus on power and energy engineering. The specific courses that apply include the following:

### Energy systems courses

|         |                                    |
|---------|------------------------------------|
| ME 456  | Energy Systems Analysis            |
| ME 554  | Solar and Alternate Energy Systems |
| ME 555  | Combustion Processes               |
| ME 582  | Fluid and Thermal Energy Systems   |
| SYS 557 | Energy Conservation Systems        |
| SYS 558 | Electrical Energy Systems          |
| SYS 721 | Large Scale Dynamic Systems        |
| EGR 595 | Special Topics in Energy Systems   |
| EGR 690 | Graduate Engineering Project       |
| EGR 795 | Special Topics                     |

Related courses include: CSE 570, 571; EE 526; ME 538, 548, 549, 572, 638, 648; SYS 520, 569, 630, 685, 731, 734 and PHY 573.

## The Master of Science in Computer Science and Engineering

The Master of Science program in computer science and engineering is designed to prepare students for significant computer-related careers in business and industry and simultaneously for further graduate study. The Master of Science program in computer science and engineering offers a natural continuation of studies for students who have received a baccalaureate in computer engineering or computer science. The advanced level prerequisite courses CSE 501-504 afford an opportunity for students with strong academic or professional records in related fields to prepare for graduate studies in computer science and engineering in minimal time.

To be accepted into the Master of Science degree program in computer science and engineering, an entering student must have a bachelor's degree from an accredited institution. Preference will be given to students with majors in computer engineering, computer science, mathematics, and engineering. Applicants should have an undergraduate GPA of 3.00 or better in their major area of study and in their science, engineering, and mathematics courses. In addition, prospective students must:

1. Demonstrate proficiency in at least one high-level programming language and familiarity with assembly language programming.
2. Have received credit for at least two years of college computer science or engineering, including data structures, digital logic and microprocessors, computer organization and assembly programming and one of the following: foundations of computer science, computer hardware design or operating systems.
3. Have received credit for at least two years of college mathematics, including differential calculus, integral calculus, linear algebra and discrete mathematics. Course work in statistics is beneficial.

Students who do not meet these requirements but have strong academic or professional records will be required to complete appropriate advanced level, prerequisite courses from CSE 501-504 before being admitted to the program.

### Degree requirements

To fulfill the requirements for a Master of Science degree in computer science and engineering a student must:

1. Successfully complete at least 32 credit hours of approved graduate-level work. (Of these 32 credits, at least 24 credits must be in courses of the School of Engineering and Computer Science.)
2. Earn a cumulative grade point average of at least 3.00 in courses applied toward the degree.
3. Complete required and elective courses as described below. These requirements are based on the table of course groups in the CSE curriculum, which follows. The specific choice of courses must be approved by the student's adviser. Students who have previously

completed course work that is equivalent to a course listed in any of the groups may wish to consult with their adviser regarding a modification of these requirements.

- a. Required courses include:
  - i. Two courses from the theory group, one of which must be an APM course;
  - ii. Two courses from the system software group; and
  - iii. One course from the hardware group.
- b. Elective courses include any other three courses chosen from: the table of course groups in the CSE curriculum; EGR 595 Special Topics; EGR 690 Graduate Engineering Project; EGR 691 Master's Thesis Research. Not more than 8 credits of EGR 690 may be applied toward the degree. Both EGR 595 and EGR 690 require approval of the CSE department chair. Students electing the thesis option must accumulate 8 credits of EGR 691. Successful completion and defense of a thesis is a prerequisite for earning thesis credits.

## Course groups in the CSE curriculum

### Theory Group

|         |                                            |
|---------|--------------------------------------------|
| APM 563 | Applied Mathematics: Discrete Methods I    |
| APM 564 | Applied Mathematics: Discrete Methods II   |
| APM 577 | Computer Algebra                           |
| APM 581 | Theory of Computation                      |
| CSE 511 | Design and Analysis of Algorithms          |
| CSE 542 | Data Structures                            |
| EE 533  | Random Signals and Processes               |
| STA 425 | Elements of Stochastic Processes           |
| STA 427 | Introduction to Mathematical Statistics I  |
| STA 428 | Introduction to Mathematical Statistics II |
| SYS 520 | Signal and System Analysis                 |

### System Software Group

|         |                                              |
|---------|----------------------------------------------|
| CSE 535 | Run-Time Structures in Programming Languages |
| CSE 545 | Database Systems                             |
| CSE 550 | Operating Systems                            |
| CSE 565 | Compiler Design                              |

### Hardware Design Group

|         |                                            |
|---------|--------------------------------------------|
| CSE 508 | Digital Logic and Computer Hardware Design |
| CSE 564 | Computer Organization and Architecture     |
| CSE 568 | Fault Tolerant Computing                   |
| CSE 578 | Switching Theory and Digital Logic         |
| CSE 665 | Parallel and Distributed Processing        |

### Artificial Intelligence Group

|         |                                             |
|---------|---------------------------------------------|
| CSE 513 | Pattern Recognition                         |
| CSE 515 | Expert Systems and Decision Support Systems |
| CSE 516 | Artificial Intelligence                     |
| LIN 615 | Problems in Computational Linguistics       |

### Applications Group

|         |                                              |
|---------|----------------------------------------------|
| CSE 517 | Applied Numerical Methods: Approximations    |
| CSE 518 | Applied Numerical Methods: Matrix Methods    |
| CSE 570 | Microprocessor-based System Design           |
| CSE 571 | Design of Embedded Software Computer Systems |
| EE 526  | Instrumentation and Measurements             |
| EE 572  | Microprocessor-Based Control Systems         |
| SYS 569 | Simulation in Engineering                    |
| SYS 574 | Digital Control Systems                      |

### Software Engineering Group

|         |                                        |
|---------|----------------------------------------|
| CSE 538 | Formal Methods in Software Development |
| CSE 539 | Software Engineering                   |
| CSE 540 | Software Quality                       |

**Communications Group**

- CSE 547 Computer Communications  
 EE 534 Principles of Data Communications  
 EE 535 Information Theory and Coding in Digital and Computer Communication  
 EE 567 Computer Networks  
 EE 637 Digital Signal Processing

**CAD/CAM Group**

- CSE 555 Introduction to Computer Graphics  
 CSE 556 Advanced Computer Graphics  
 ME 487 Mechanical Engineering CAD/CAM Systems  
 ME 569 Finite Elements  
 SYS 422 Intelligent Robots  
 SYS 563 Foundations of Computer-Aided Design  
 SYS 664 Advanced Computer-Aided Design  
 SYS 684 Computer-Integrated Manufacturing Systems

**Course Offerings****ENGINEERING****EGR 500 Engineering Seminar (1)**

Lectures and discussions conducted by faculty, graduate students, and speakers from industry and other universities. Emphasis is on current research interests of the school.

**EGR 594 Independent Study (2 to 4)**

Advanced independent study in a special area. Topic must be approved prior to registration.

**EGR 595 Special Topics (2 to 4)**

Advanced study of special topics in engineering. May be taken more than once.

**EGR 690 Graduate Engineering Project (2 to 12)**

Independent work on an advanced project. Topic must be approved prior to registration.

**EGR 691 Master's Thesis Research (2 to 8)**

Directed research leading to a master's thesis.

**EGR 790 Doctoral Dissertation Research (2 to 12)**

Directed research toward the dissertation.

**EGR 794 Independent Study (2 to 4)**

Advanced independent study in a special area. Topic must be approved prior to registration.

**EGR 795 Special Topics (2 to 4)**

Advanced study of special topics in engineering. May be taken more than once.

**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 a major, high-level language such as PASCAL; structured, modular programming; data structures such as stacks, queues, lists, trees and graphs; applications such as discrete simulation. Credit not applicable toward the M.S. degree in CSE.

Prerequisite: Differential and integral calculus and a knowledge of at least one high-level programming language.

**CSE 502 Microprocessors, Computer Organization, and Assembly Language Programming (4)**

Introduction to digital data representation, digital arithmetic and logic circuits. Architecture and operation of a microprocessor such as the 8088; assembly language programming. Credit not applicable toward the M.S. degree in CSE. This course has a scheduled laboratory component.

Prerequisite: CSE 501.

**CSE 504 Discrete Structures and Foundations of Computer Science (4)**

Basics of set theory, relations, propositional logic and Boolean algebra. Graphs, trees, their traversal, iteration and recursion. Algorithms, time and space orders, proof of correctness of algorithms. Topics in finite automata, Turing machine, and halting problem. Credit not applicable toward the M.S. degree in CSE.

Prerequisite: CSE 501.

**CSE 508 Digital Logic and Computer Hardware Design (4)**

Number systems, Boolean functions, simplification, and their design using LSI and VLSI. Electronic logic families. Sequential logic, flip-flops, registers, data transfer, and memory devices. Control unit design, microprogramming and input/output unit design. This course has a scheduled laboratory component.

Prerequisite: CSE 502 or equivalent.

**CSE 511 Design and Analysis of Algorithms (4)**

Top-down structured programming and program correctness; a survey of algorithm design methods including: subgoals; hillclimbing; working backward; heuristics; backtrack programming; branch and bound; and recursion. Applicants to current computer science algorithms such as: sorting, searching, arithmetic and logical expressions.

Prerequisite: Background in data structures and discrete mathematics.

**CSE 513 Pattern Recognition (4)**

Application of digital computer techniques to a variety of problems in pattern recognition; linear decision functions, Bayes decision theory, maximum likelihood estimation, multivariate normal features, non-parametric techniques, feature selection, clustering, and unsupervised learning.

Prerequisite: Background in linear algebra and statistics.

**CSE 515 Expert Systems and Decision Support Systems (4)**

The study of expert systems and decision support systems technologies. Both kinds of systems deal with reasoning with incomplete knowledge. Inexact logic; decision models; knowledge representation methods and design issues such as architecture of the systems, iterative design methods and evaluation. A project is required.

Prerequisite: One course in artificial intelligence.

**CSE 516 Artificial Intelligence (4)**

Introduction to artificial intelligence including: (1) current techniques in AI for knowledge representation and use, search methods, means-end analysis, network systems, production systems, frames, expert systems, genetic and other learning algorithms; (2) existing applications of AI with MYCIN, NETL, DENDRAL, checker player, chess player, natural language understanding; (3) an AI project requiring the creating of a working intelligent system in the student's area of interest.

Prerequisite: CSE 335, CSE 262 or equivalent.

**CSE 517 Applied Numerical Methods: Approximations (4)**

Propagation of errors; classical methods for the solution of non-linear equations, summation of series, approximation of functions, numerical integration, numerical solution of differential equations and the Fast Fourier Transform. Emphasis on student development of general purpose subroutines for use in engineering and scientific applications.

Prerequisite: A course in statistics and knowledge of a scientific language.

**CSE 518 Applied Numerical Methods: Matrix Methods (4)**

Systems of linear and nonlinear equations, eigenvalue problems, optimization methods, statistical methods.

Prerequisite: Knowledge of linear algebra and a scientific language.

**CSE 535 Programming Languages (4)**

Language processors; data storage structures; operations in programming languages; sequence control structures; data control structures; storage management; operating environment and block structures; syntax and translation.

**CSE 538 Formal Methods in Software Development (4)**

A project-oriented course, whose purpose is to introduce students to formal methods in software design. Formal techniques are introduced gradually, with particular emphasis on practical applications in the software development cycle. Topics include: a variant of the Vienna Development Method (VDM), with functional specifications; top-down design; operation and data refinement; specification and verification of abstract programs; abstract data types, their specification, refinement, verification and testing.

**CSE 539 Software Engineering (4)**

The course will study, in a realistic environment, the techniques and methodology of developing programs for user applications. Topics include specifications, top-down modular design, structured programming, documentation, testing, and verification.

**CSE 540 Software Quality (4)**

A first course in software quality, intended for students who have mastered fundamental design and programming skills. The impact of software design techniques on structural quality for both object-oriented and traditional decomposition techniques. Assessment of software quality via scientific experimentation and software metrics with emphasis given to software understandability and maintainability. Prerequisite: Knowledge of data structures.

**CSE 542 Data Structures (4)**

Theory and advanced applications of data structures. Trees; general and binary; threaded trees; tree traversal; trees and grammar; trees and sorting. Graphs: paths and cycles in diagraphs; graphs of programs. File organization: relations; indexed files, hashed files. Prerequisite: CSE 262, and APM 263 or equivalent.

**CSE 545 Database Systems (4)**

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

**CSE 547 Computer Communications (4)**

Emphasis is placed on functional characteristics of digital components related to computer communication and the design of computer communication software. Telecommunication transmission facilities, signal and conversion devices, terminals, controllers, interfaces, error detection and correction, multiplexing and concentration, line control procedures and protocols, and control software. Case studies include point-to-point connection between computers and terminals, local area networks and private networks, value added networks, and digital support in telephone system. Prerequisite: CSE 450, or permission of the instructor.

**CSE 550 Operating Systems (4)**

Introduction to the concepts and design of multi-programmed operating systems. Typical topics include: historical perspectives; sequential processes; concurrent processes; processor management; store management; scheduling; file management; resource protection; a case study.

**CSE 555 Introduction to Computer Graphics (4)**

An introduction to the software and hardware aspects of computer graphics systems. Vector and raster displays. Typical data structures and programming language requirements. Emphasis on real time interactive graphics systems.

**CSE 556 Advanced Computer Graphics (4)**

A study of the mathematics, algorithms, and data structures used for the computer storage, manipulation, and rendering of geometric objects. Topics covered will be chosen from curve and surface representation, including Bezier and B-Spline techniques; solid modeling, including Constructive Solid Geometry and Boundary Representation Schemes; surface and solid intersection techniques; hidden line and surface removal; and realistic shading and rendering techniques. Prerequisite: CSE 555.

**CSE 564 Computer Organization and Architecture (4)**

Stored program computers, organization of arithmetic-logic unit, central processing unit, main and auxiliary memory, input/output units and exercises in microprogramming. Central and distributed processing computer networks, architecture of some main frame computers and some microprocessors, parallel and pipeline processing. Prerequisite: CSE 508 or permission of instructor.

**CSE 565 Compiler Design (4)**

The theory and methodology of compiler construction. Topics include: introduction to formal language; automatic and manual methods of scanner construction; introduction to top-down and bottom-up parsing, including recursive descent and LR parsing; concrete and abstract syntax trees; internal forms; semantic analysis and symbol-table design; code-generation for stack machines. This is a project course; each student builds a compiler for a block-structured language. Prerequisite: Knowledge of data structures and programming languages.

**CSE 568 Fault-Tolerant Computing (4)**

General introduction; fault-models; test generation techniques; logic simulation; redundancy techniques; error correcting codes; software reliability; testing tools and measurement; proving program correctness; case study of fault-tolerant computer architectures.

**CSE 570 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.

Prerequisite: CSE 502 or equivalent.

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

The use of threaded interpretive languages in the design of board-level computer systems. Embedded software drivers for parallel and serial communications. A/D converters and other peripheral interface devices. Prerequisite: CSE 570 or EE 570.

**CSE 578 Switching Theory and Digital Logic (4)**

Combinational switching functions, minimization and analysis, implementation using relay circuits, TTL, CMOS and other popular logic families. Symmetric functions, threshold logic, and iterative circuits. Analysis and synthesis of clock mode, level mode, and pulse mode sequential circuits. Design and implementation of digital systems. Turing machines and finite automata. Prerequisite: APM 263, and CSE 388 or EE 378.

**CSE 650 Theory of Operating Systems (4)**

Formal models of operating systems. Typical topics include: scheduling anomalies, control of concurrent processes, scheduling algorithms, deadlocks, memory management, resource protection, distributed processing. Prerequisite: CSE 550 or equivalent.

**CSE 664 Advanced Compiler Design (4)**

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

**CSE 665 Parallel and Distributed Processing (4)**

Classes of computer systems, SIMD parallel and MIMD computers, interconnection networks and parallel memories, parallel algorithms; performance evaluation of parallel system; parallel computers — Illiac IV, PEPE, STARAN, pipe-lined computers, multiprocessing by tight coupling and loose coupling, distributed systems, data flow machines, architecture and software considerations. Prerequisite: CSE 564.

**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. 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.

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.

Prerequisite: A course in probability.

**EE 535 Information Theory and Coding in Digital and Computer Communication (4)**

Information theory concepts; source coding and data compression; channel capacity; introduction to error correcting codes; linear block codes; cyclic codes; convolutional codes; application of coding to reliable data communication and fault tolerant computing.

Prerequisite: EE 533 or permission of instructor.

**EE 545 Electromagnetic Engineering (4)**

Electromagnetic theory with applications. Diffraction, radiation, propagation, guided waves, optical transmission and resonant cavities.

Prerequisite: Background in vector calculus and basic electromagnetic theory.

**EE 567 Computer Networks (4)**

Resource-sharing principles; communications and networks; packet switching; the ARPANET; network performance using principles of queueing theory; network design principles, capacity assignment; flow assignment; topological design. Other related topics.

**EE 570 Microprocessors and Microcomputers (4)**

Introduction to microprocessors and microcomputers; the CPU on a chip; interfacing microprocessors with external systems; programming considerations; hands-on laboratory experience. Credit may not be earned for both CSE 570 and EE 570.

**EE 572 Microcomputer-Based Control Systems (4)**

Microcomputer-aided control design techniques combined with single-chip and single-board microcomputer technology. Digital controller design and implementation; digital filtering/state estimator design and implementation; multiple processor systems and real-time applications.

Prerequisite: EE 570 or CSE 570.

**EE 581 Integrated Circuits and Devices (4)**

Fundamentals of semiconductor electronics. Theory and operation of PN junctions and junction devices. MOS devices. Integrated circuits functional blocks, fabrication techniques, processing steps and equivalent circuits. Device modeling and simulation techniques used.

**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.

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 637 Digital Signal Processing (4)**

Analysis of discrete signals and systems. Introduction to digital filters including finite and infinite impulse response filter. Discrete and Fast Fourier Transformations. Application of digital signal processing.

Prerequisite: Basic knowledge of linear systems.

**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 Introduction to MOS Very Large Scale Integration (4)**

Metal-Oxide-Semiconductor devices, circuits, and future trends. MOS processing and design rules. MOS transistor theory; analog and digital VLSI MOS circuits, design techniques and performance evaluation. Integrated System Fabrication and the Large Scale Integration (LSI) design route. Data and control flow in systematic structures. Implementing integrated system designs: From circuit topology to patterning geometry to wafer fabrication.

Prerequisite: EE 581.

**EE 725 Theory of Networks (4)**

Network models of linear dynamic systems; network graphs and topological constraints, generalized equilibrium equations, time-frequency duality, energy and stability constraints, network passivity or activity, input-output representations, and state-transition matrices.

Prerequisite: SYS 520.

**EE 726 High-Frequency Electronics (4)**

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.

**MECHANICAL ENGINEERING****ME 521 Dynamics (4)**

Generalized coordinates and matrix methods of analysis of the motion of particles and rigid bodies. Energy and momentum methods applied to mechanical systems. Euler and Lagrange methods applied to forces and motion. An introduction to mechanical vibrating systems. Keplerian motion and kinematics.

**ME 524 Vibration Analysis (4)**

Analysis of lumped mechanical systems by application of D'Alembert's principle, Lagrange's equations, Hamilton's principle, and integral transforms. Matrix formulation of general n-degree-of-freedom systems with and without damping. Methods of approximation for continuous systems.

**ME 538 Fluid Transport (4)**

Continued study of the fundamentals of fluid mechanics and their applications; angular momentum, generalized study of various turbomachines, potential flow of inviscid fluids; laminar and turbulent boundary layer theory; dimensional analysis and similitude; compressible flow. With laboratory.



**ME 548 Thermal Energy Transport (4)**

Continued study of basic concepts, properties, and descriptions of conduction, convection, and thermal radiation heat transfer; thermal boundary layer theory; convective heat transfer correlations, combined conduction convection, radiation intensity, shape factors, and appropriate engineering applications. With laboratory.

**ME 549 Numerical Techniques in Heat Transfer and Fluid Flow (4)**

Overview of practical numerical solution techniques. Major emphasis is on concepts, methodology and physics associated with the formulation of the discretization equations appropriate for the representation and solution of linear and nonlinear partial differential equations governing heat transfer and fluid flow. Personal and main frame computers will be used for the solution of a variety of problems.

**ME 554 Solar and Alternate Energy Systems (4)**

The analysis and design of energy conversion systems. Principles of optimum power transfer and efficiency. Availability analysis of systems for heating, chemical conversion and electrical generation. Emphasis on solar applications and alternative energy technology.

**ME 555 Combustion Processes (4)**

Thermodynamics of state, mixtures, Gibbs free energy; chemical equilibrium, stoichiometry; chemical reaction kinetics, reaction rate, mixing, catalyst action; fluid vaporization, condensation, atomization; applications, spark and compression ignition, continuous combustion.

Prerequisite: ME 456 or equivalent.

**ME 561 Analysis and Design of Mechanical Structures (4)**

Use and methods of advanced mechanics of materials to design mechanical structures to meet elastic strength criteria. Topics include plates and shells, torsion of noncircular cross-sections, curved and composite beams, energy methods, mechanical stability, and beams on elastic foundations.

**ME 565 Experimental Stress Analysis I (Traditional Methods) (4)**

Experimental determination of stress and strain in loaded members. Use of brittle coatings, strain gages, two-dimensional photoelasticity, and photoelastic coatings. Emphasis on optimal designs. With laboratory.

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

Topics include the state-of-the-art optical methods such as holography, shearography, moiré, 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.

**ME 569 Finite Elements (4)**

Structural analysis through matrix formulation using direct and variational methods; stiffness and flexibility matrices for triangular, quadrilateral and isoparametric elements in two- and three-dimensions. Finite element programs and available graphics hardware for data preparation.

**ME 572 Materials Properties and Processes (4)**

Mechanical behavior of materials. True stress-strain properties of materials, plastic deformation and fracture of materials, failure theories, fatigue damage under cyclic loading, creep and high temperature application, destructive and nondestructive evaluation of material properties such as composites, ceramics and metals, behavior of materials during manufacturing processes such as stamping, drawing, extrusion, spinning, forging and others.

**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.

**ME 610 Continuum Mechanics (4)**

Foundations in vector and tensor fields, kinematics of deformation, measures of strain and analysis of stress, equations of motion, compatibility conditions, constitutive equations, thermodynamics of deformation. Study of infinitesimal elasticity, ideal fluids, ideal elastoplasticity, processing, and material capabilities are studied in a systems context.

**ME 638 Convective Transport Phenomena (4)**

Development of the fundamental equations expressing conservation of mass and momentum principle. Navier-Stokes equations. Approximation techniques. Boundary layer theory. Introduction to turbulent transport processes. Hydrodynamics of two-phase flows.

**ME 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.

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.

**ME 663 Applied Elasticity (4)**

Fundamentals of solid mechanics, stress-strain and equilibrium and compatibility equations, generalized Hooke's law, boundary conditions. Plane strain and generalized plane stress, plane elasticity. Airy stress function, torsion and bending, St. Venant principle, and introduction to thermoelasticity, and numerical methods.

**ME 664 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.

Prerequisite: ME 663.

**ME 665 Experimental Stress Analysis II (Contemporary Methods) (4)**

Modern contemporary optical methods in experimental stress analysis, including three-dimensional photoelasticity, speckle methods, correlation methods, x-ray and optical diffraction methods, holography and other coherent optical methods. With laboratory.

**SYSTEMS ENGINEERING**

For related courses students should refer to course offerings in electrical engineering (EE) and computer science and engineering (CSE).

**SYS 510 Systems Optimization and Design (4)**

Introductory convexity theory, necessary and sufficient optimality conditions. Computer techniques for systems optimization and design. Direct and indirect search techniques including line search, linear programming, unconstrained and constrained optimization. The course emphasizes a capstone design experience involving systems modeling, simulation and optimal design.

**SYS 517 Probability and Its 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 queueing systems using birth and death processes and Markov chains, reliability, decision trees, etc.

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.

**SYS 523 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.

Prerequisite: SYS 520.

**SYS 532 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.  
Prerequisite: SYS 520.

**SYS 557 Energy Conservation Systems (4)**

Techniques for improving energy use in industrial and commercial applications. Topics include: energy accounting; energy auditing; energy conservation management; net energy analysis; second law methods of analysis; combined use energy systems; new technology for energy conservation; assessment of alternative technology.

**SYS 558 Electrical Energy Systems (4)**

Generation and transmission of electrical energy. Analytical methods for solution of planning and operation problems with effective computer utilization. Analysis of synchronous machines, transformer excitation, prime mover governing, transmission networks and loads. System dynamic performance under disturbance conditions, line switching, and parameter variations with attention to frequency and voltage control strategies.

**SYS 563 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.

**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 574 Digital Control Systems (4)**

Theoretical foundation needed to implement the microprocessor in control applications. Effects of sampling, data conversion, quantization, finite word length and time delays on system response and stability are examined. Actual construction of a microprocessor based controller culminates the course.  
Prerequisite: SYS 520. Corequisite: EE 570 or CSE 570.

**SYS 583 Production Systems (4)**

Design of computer systems to control the flow of material in manufacturing systems from forecast to finished product. Topics include aggregate planning, parts explosion, bill-of-materials, material requirements planning (MRP) and its extensions, inventory control, Pareto analysis, shop floor control, line balancing, etc. Computer programs are used to show how these system components react and interact to realistic inputs.  
Prerequisite: Course in probability.

**SYS 585 Statistical Quality Control (4)**

Fundamentals of statistical quality control with emphasis on applications. 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.  
Prerequisite: Course in probability.

**SYS 630 Optimal Control Theory (4)**

Modern control theory applied to linear dynamical systems. Differential and difference equations; controllability, reachability, observability and constructibility of linear systems; stability of optimal control systems; dynamic programming; calculus of variation and Pontryagin's minimum principle; optimally switched control systems, linear regulator problem application of theory to practical control system design methodology; simulation and laboratory demonstration of optimal control systems.  
Prerequisite: SYS 520.

**SYS 631 Estimation and Control Theory (4)**

Stochastic differential and difference equations; Luenberger observer theory; Kalman-Bucy filtering theory; design of stochastic optimal and microprocessor-based control systems; duality between optimal estimation and control problems; the separation principle; simulation and laboratory implementation of observers and filters in stochastic control system.  
Prerequisite: SYS 630, EE 533.

**SYS 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 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 680 Engineering Decision Analysis (4)**

Consideration of risk and uncertainty in decision criteria for resource allocation. Mathematical programming in engineering applications for multi-attribute utility analysis.  
Prerequisite: SYS 517.

**SYS 684 Computer-Integrated Manufacturing Systems (4)**

The integration of the computer in the manufacturing process from concept, through engineering design, production planning, materials handling and process quality control and inventory management. The course will utilize simulation to study parts and information flow in a computer-integrated manufacturing facility with fixed and flexible automation.

**SYS 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 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.

# SCHOOL OF HEALTH SCIENCES

**Dean:** Ronald E. Olson

**Office of the dean:**

**Associate dean for community health:** Alfred W. Stransky

## Exercise Science Program

**Interim director:**

Alfred W. Stransky

**Associate professors:**

Brian R. Goslin, Ph.D., Rhodes University

Robert W. Jarski, Ph.D., University of Iowa

Alfred W. Stransky, Ph.D., Florida State University

**Assistant professor:**

Charles R.C. Marks, Ph.D., University of Michigan

**Clinical professor:**

Murray B. Levin, M.D., Wayne State University

**Clinical associate professors:**

William R. Back, D.O., Kirksville College

Barry A. Franklin, Ph.D., Pennsylvania State University

John J. Karazim, M.D., Wayne State University

John F. Kazmierski, D.O., College of Osteopathic Medicine and Surgery, Des Moines, Iowa

Creagh E. Milford, D.O., Chicago College of Osteopathic Medicine

Rajendra Prasad, M.D., Prince of Wales Medical College (India)

**Clinical assistant professors:**

Joseph A. Arends, M.D., Wayne State University

Albert A. DePolo, Jr., D.O., Philadelphia College of Osteopathic Medicine

Timothy J. Ismond, D.O., Michigan State University

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

## The Master of Science in Exercise Science

This 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 Admissions and Scholarships 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.

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.

## Requirements for the degree

The average candidate entering the fall or winter semester will spend two full-time academic years to successfully complete this graduate program, which requires:

1. Completion of a minimum of 36 approved credits with a grade point average of 3.00 or better. Credit toward the degree will not be given for courses with grades under 2.5.
2. Completion of the core courses: EXS 500, 520, 525, 530, 540, 601 and 602. Students will select six hours of elective course work, approved by their advisers, either from department offerings or from advanced course work (300 level or above) in such areas as biology, chemistry, computer science, engineering, health science or psychology.
3. Completion of a master's thesis or comprehensive examination. The master's thesis option requires the completion of a minimum of 6 credits in EXS 690. The comprehensive examination option requires the completion of a minimum of 6 credits in EXS 650.

## Physical Therapy Program

**Director:** Jane M. Walter

### Associate professors:

Osa Jackson-Wyatt, Ph.D., University of Michigan  
Jane M. Walter, Ed.D., University of Vermont

### Assistant professor:

Kornelia Kulig, Ph.D., Academy of Physical Education (Wroclaw, Poland)

### Special instructors:

Faye Cobb, M.A., Wayne State University  
Christine Pillow, M.A., Wayne State University  
Kristine Thompson, M.P.H., University of Michigan

### Clinical professors:

A. Charles Dorando, B.S., Aldelphi College  
Freddie M. Kaltenborn, D.O., London College of Osteopathy  
Clarence B. Vaughn, M.D., Howard University

### Clinical associate professor:

Allen Silbergleit, M.D., Wayne State University

### Clinical assistant professors:

Allen L. Babcock, M.D., Loyola University  
Jack E. Belen, D.O., Chicago College of Osteopathic Medicine  
Peter M. Boruta, M.D., Wayne State University  
Dale Hoekstra, M.D., Wayne State University  
Frank C. Kava, M.S., University of Kentucky  
Kristie S. Kava, M.S., University of Kentucky  
Michael R. Lubetsky, M.D., Wayne State University  
Frederick P. Maibauer, M.D., Wayne State University  
Ricky E. Olson, M.D., Wayne State University  
Kanamarlupudi V. Rao, M.D., Guntur Medical College (India)

### Senior clinical instructor:

Cathy Larson, M.S., University of Alabama in Birmingham

### Clinical instructors:

Michael R. Beauvais, B.S., Wayne State University  
Henry D. Boutros, M.Ed., Wayne State University  
Reyna T. de Blumentritt, M.A., Central Michigan University  
David K. Gilboe, B.S., Wayne State University

## 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 Oakland University Physical Therapy Program is accredited by the Commission on Accreditation of Physical Therapy Education, an agency which is given its accreditation authority by the American Physical Therapy Association (APTA) Council on Post-secondary Accreditation (COPA) and the United States Department of Education (USDE).

## Admission

The Master of Physical Therapy degree 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, 331, 391, 401; PHY 325; PT 300, 311, 330, 331, 332, 333, 334, 340, 351, 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 five semesters later, following completion of the spring semester of the second year. A minimum of 49 semester hours of credit are required for the degree, as follows:

1. Completion of the following required courses: HS 534; PT 512, 513, 521, 522, 533, 541, 553, 554, 555, 560, 561, 571, 572, 592, 599.
2. Completion of a Special Topics requirement (1-4 semester hours) by enrolling in PT 577.
3. Completion of a Specialty Seminar requirement (2 semester hours minimum) by enrolling in one of the following courses: PT 593, 594, 595, 596, 597, 598; EXS 520, 530, 540, 615, 625.

## 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 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 22 of this catalog for appeal procedures concerning academic dismissals.



## Code of ethics

Since ethical conduct is critical to a health profession, students are required to abide by the Physical Therapy Code of Ethics and Guide of 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.

## 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 every other year.

Prerequisite: BIO 200 and 207, or instructor's permission.

#### EXS 510 Stress Management (2)

This course examines the causes of stress and the physiological changes that occur as a result. The physiological results of stress are measured and practical solutions to improving stress management and job performances are discussed. Offered every other year.

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 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 examines the effects of aging on physical work capacity, body composition, cardiovascular and pulmonary function and neuromuscular and musculoskeletal function. Retardation of the aging process through the use of physical conditioning programs is presented and principles for prescribing and conducting exercise programs are included. Offered in the winter semester.

Prerequisite: EXS 304, 350 and 505.

#### EXS 601/602 Clinical Internship I/II (4 each)

Supervised clinical experience in a wide variety of educational settings, including hospitals, clinics, physicians' offices, or the Oakland University Health Maintenance/Health Improvement or Cardiac Rehabilitation programs. 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 every semester.

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 in odd-numbered years.

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. Offered winter semester in even-numbered years.

Prerequisite: EXS 304, 520 or instructor's permission.

#### EXS 625 Advanced Concepts in Human Performance (2)

This course involves advanced concepts and their applications to the improvement of human performance, particularly athletic performance. Recent research in topics from biomechanics, exercise physiology, motor learning, psychological aspects and sports medicine will be presented and discussed using a seminar approach. Offered fall semester in odd-numbered years.

Prerequisite: Completion of required core courses in EXS.

#### 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 650 Independent Study (2-6)

Prerequisite: 24 credits of graduate study, including completion of the clinical internships, EXS 601 and 602. Offered every semester.

#### EXS 690 Thesis Research (2-6)

Prerequisite: 20 credits of graduate study at the 500 level or above. Offered every semester.

## 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.



## PHYSICAL THERAPY

### 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 (3)

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 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 Special Problems of the Neuromuscular System (2)

Application of neurophysiological techniques to patients with specialized problems. Patient diagnoses will include oral motor dysfunction, upper extremity dysfunction, communication disorders, joint deformities and perceptual motor planning problems.

### PT 533 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 541 Personal Movement Analysis II (1)

Introduction to the study of therapist movements/postures assumed during patient interaction and the implication on patient outcomes. Movement laboratory, analysis of client cases and group demonstration will be included.

### 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 Clinical Education V (2)

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 560 Computer Applications in Physical Therapy (1)

Specialized applications of computer techniques to physical therapy including basic knowledge to understand instruction manuals for computerized instrumentation.

### 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 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)

A lecture/laboratory course which is comprised of four modules: spinal cord injuries, prosthetics, orthotics and CHI. Focus is on evaluation and comprehensive therapeutic program planning. Skill development in clinical problem solving is emphasized.

### PT 577 Special Topics (1-4)

Seminar(s) to allow orientation to the latest innovations in physical therapy care and/or to allow the student to pursue a clinical treatment issue in greater depth than is used for entry-level physical therapy education.

### PT 592 Research II (3)

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 (2)

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 three-week, full-time supervised clinical experience in an outpatient orthopedic clinic.

Prerequisite: PT 511.

# SCHOOL OF HUMAN AND EDUCATIONAL SERVICES

**Dean:** Gerald J. Pine

**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  
Sidney W. Graber, Ed.D., Wayne State University  
Harry T. Hahn, Ed.D., Temple University  
Patrick J. Johnson, Ed.D., Wayne State University  
William F. Moorhouse, Ed.D., University of Wyoming

**Professors:**

Jane M. Bingham, Ph.D., Michigan State University  
George E. Coon, Ed.D., Wayne 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  
Gerald J. Pine, Ed.D., Boston University  
Roderic E. Righter, Ed.D., Wayne State University  
Howard Splete, Ph.D., Michigan State University  
Keith E. Stanovich, Ph.D., University of Michigan  
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  
David N. Cooper, Ed.D., Rutgers University  
Anne Cairns Federlein, Ph.D., University of Michigan  
William C. Fish, Ed.D., Columbia University  
Beverly B. Gelmer, Ph.D., University of Michigan  
William H. Jones, Ph.D., University of Michigan  
David P. Meyer, Ph.D., Arizona State University  
Billy Joe Minor, Ph.D., Indiana University  
Mary L. Otto, Ed.D., Indiana University  
Robert G. Payne, Ph.D., University of Michigan  
Anne E. Porter, Ph.D., Wayne State University  
Luellen Ramey, Ph.D., University of Florida

James C. Schmidt, Ph.D., Wayne State University  
Robert M. Schwartz, Ph.D., University of Illinois  
Carol A. Swift, Ph.D., University of Arizona  
Toni S. Walters, Ph.D., Oakland University

**Assistant professors:**

Ann H. Atkinson, Ph.D., Florida State University  
Julia J. Dorminey, Ph.D., Florida State University  
Joyce A. Eckart, Ed.D., University of Rochester  
Andrew Gunsberg, Ph.D., University of Illinois  
Richard Pipan, Ed.D., University of North Carolina  
Renate Rohde, Ph.D., Indiana University  
Dyanne M. Tracy, Ph.D., Indiana University

**Adjunct professor:**

Asa G. Hilliard, III, Ed.D., University of Denver

**Adjunct associate professor:**

Elinor B. Waters, Ed.D., Wayne State University

**Special instructor**

Carrie Owens-Petty

The School of Human and Educational Services offers programs leading to:

- Doctor of Philosophy in reading
- Education Specialist in school administration
- Master of Arts in Teaching in four areas:
  - early childhood
  - curriculum, instruction and leadership
  - reading and language arts
  - special education
- Master of Arts in counseling
- Continuing certification
- School administration certification

In addition, the College of Arts and Sciences and the School of Human and Educational Services jointly sponsor candidates for the Master of Arts in Teaching in English. Description of the program is in the English section of this catalog.

In order to remain in good standing, students must earn a grade point average of 3.00. No grade below 2.0 can be applied toward a graduate degree, and two course grades below 3.0 or one below 2.0 automatically lead to an evaluation of progress and possible dismissal.

Students will be allowed to take no more than 12 credits before admission to a program.

## Michigan Certification Requirements

### General information

To meet the continuing certificate requirements of the State of Michigan, candidates must complete the following: 1) three years of experience within their certificate level; 2) 18 semester hours of course work in an approved planned program; and 3) both elementary and secondary candidates must show evidence of completing 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 M.A.T. in reading and language arts only, RDG 632 and RDG 633 may be used. This reading requirement applies to students seeking a continuing certificate after July 1, 1983.

Candidates for the continuing certificate are urged to complete their 18 semester hours as part of a master's degree. This choice offers maximum flexibility. As an alternative, students may choose non-degree planned programs. 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 147

Early Childhood page 153

Guidance and Counseling page 142

Microcomputer Applications in Education page 167

Reading and Language Arts page 163

Upon successful completion of course work (3.00 for graduate courses, 2.00 for undergraduate), students must apply for certificate renewal or continuing 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.

### Continuing Teacher Certification Renewal

Beginning July 1, 1992, persons receiving a continuing certificate will be required to renew that certificate every five years on the basis of six semester hours of academic credit 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 SHES Advising Office (370-4182) for an information brochure and admissions information.

### Initial Certification in Secondary Education

Initial certification in secondary education is not available for students who already hold a bachelor's degree except for those students seeking certification in music. Please contact the Department of Music, Theatre and Dance for further information.

### 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. Endorsements which require the completion of a master's degree at Oakland University are:

Reading

Special Education (first endorsement)

Students who wish to pursue these programs should apply to the master's program in the appropriate department.

2. The following endorsements do not require completion of a master's degree:

**Major/minor subject area endorsements** may be added in any of the areas approved by the State of Michigan for Oakland University. They are as follows: mathematics, science, biology, chemistry, physics, language arts, history, political science, psychology, sociology, speech, social studies, 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 continuing certification. After successful completion of course work (3.00 for graduate courses, 2.00 for undergraduate), students must apply for endorsement and continuing certification through the Office of Academic Records, 102 O'Dowd Hall.

### Administrator Certification

A 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.

### Admission

**Initial Certification:** Apply for admission through the Office of Admissions and Scholarships for the second undergraduate status (U2).

**Major/Minor Subject Area Endorsement:** Apply through the Office of Admissions and Scholarships for post baccalaureate status (PB).

**Departmental Planned Program:** Students who wish to complete requirements for continuing certification in a non-degree departmental planned program apply through the Office of Admissions and Scholarships as a Continuing Certification student (CC).

**Master's Program:** Students completing their continuing certification requirements while obtaining a master's degree apply through the Office of Admissions and Scholarships as a master's student (M1).

To be admitted, all students must complete an application, pay a \$25 application fee and arrange to have official transcripts from all schools previously attended sent to the Office of Admissions and Scholarships, 205 Wilson 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 (370-3077).

All other students must contact the SHES Advising Office (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:** Gerald J. Pine, Howard Splete

**Associate professors:** Robert W. Brown, William H. Jones, Mary L. Otto, Luellen Ramey, James C. Schmidt

**Assistant professor:** Renate Rohde

## The Master of Arts in Counseling

The Department of Counseling offers a Master of Arts degree in counseling for individuals who wish to work in professional counseling roles with children, youth, adults and families in school and community settings. The program can accommodate both full- and part-time students.

### Admission to program

The department will consider applicants who hold a bachelor's degree from an accredited institution and whose credentials, including transcripts and letters of recommendation, provide clear evidence of academic distinction. Admission is selective.

A grade point average of 3.00 in all undergraduate course work is ordinarily considered the minimum standard for admission. Applicants must have completed a minimum of 24 semester hours of undergraduate or graduate credits in the behavioral sciences such as psychology and sociology before admission to the program (this requirement is evaluated by the admissions committee). Persons should not apply until they have completed these credits. Transcripts of previous work can be evaluated by the counseling department faculty before formal application.

All applicants must submit a 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. Please see page 8 for application dates.

### 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 maximum of 12 credits earned in special graduate status at Oakland University may be accepted toward the degree.

A valid teaching certificate is required of applicants who seek recommendation for a school counselor endorsement upon graduation. Students who complete the degree and who have followed the counseling emphasis in the school setting may be recommended for counselor endorsement at the K-9, 7-12 or K-12 level, depending on completion of the specific course requirements for each endorsement level. Students must consult with their advisers regarding endorsement.

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 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 full-time program

The full-time program is designed for students who wish an intensive and concentrated program in counseling. This program option is most appropriate for students with strong undergraduate preparation in areas such as psychology, sociology, social work, human resource development or other related helping fields. Full-time employment is not recommended for students who enroll in the full-time program option.

The full-time program allows completion of the degree in two academic years. Students receive intensive practicum and internship experiences and attend both day and evening classes.

Admission to the full-time program, which begins only in the fall semester, is highly selective. A completed application for fall admission should be received by the date specified on page 8.

### A typical full-time program

|        | Year 1                                   | Year 2                        |
|--------|------------------------------------------|-------------------------------|
| Fall   | CNS 500<br>CNS 510<br>CNS 520<br>CNS 530 | CNS 664<br>CNS 660<br>CNS 663 |
| Winter | CNS 661<br>CNS 540<br>CNS 640            | CNS 666<br>Elective           |
| Spring | CNS 564/574<br>or                        |                               |
| Summer | CNS 561/571                              |                               |



### Part-time program

The part-time program is designed for students who are employed and/or have other responsibilities prohibiting full-time study and wish a more flexible schedule. Although the part-time program offers students a high degree of flexibility, they are expected to meet all regular admission requirements.

Students in the part-time program may take one or more courses each semester and must complete degree requirements within six calendar years. Students are admitted to the part-time program for the fall, winter and spring semesters. Deadline dates for receipt of completed applications are listed on page 8.

### A typical part-time program

|        | Year 1          | Year 2            | Year 3  | Year 4  |
|--------|-----------------|-------------------|---------|---------|
| Fall   | CNS 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<br>CNS 561/571 |         |         |

### Planned program in counseling

Candidates for the planned program in counseling must meet all program 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. (Formerly CNS 575.)

Corequisite: CNS 510.

#### CNS 510 Multicultural Counseling (2)

A study of methods and techniques in 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. (Formerly CNS 565.)

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. (Formerly CNS 576.)

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. (Formerly CNS 562.)

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. (Formerly CNS 677.)

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. (Formerly CNS 665.)

#### 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. (Formerly CNS 563.)

**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. (Formerly CNS 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:** Sharon P. Muir

**Professors:** James W. Hughes, Jacqueline I. Loughheed, Sharon P. Muir, Roderic E. Righter

**Associate professors:** Beverley B. Geltner, Steven W. Gilbert

**Assistant professors:** Julia J. Dorminey, Joyce A. Eckart, Dawn M. Pickard, Dyanne M. Tracy

The Department of Curriculum, Instruction and Leadership offers a Master of Arts in Teaching (M.A.T.) degree with concentrations in either leadership or in curriculum and instruction for both elementary and secondary educators. The department also offers Michigan certification planned programs for continuing teacher certification, the administrator certificate with endorsements for principals and central office personnel, and professional development opportunities for practicing teachers and administrators.

The M.A.T. in Curriculum, Instruction and Leadership is designed to enrich the expertise and competence of teachers and other professional staff in the research and theory of teaching, learning and administration. The leadership concentration prepares educators for entry into a career in educational administration in both elementary and secondary schools 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.

## Admission

Applicants for the M.A.T. apply to Oakland University and the Department of Curriculum, Instruction and Leadership through the Office of Admissions and Scholarships. Application forms for the university and for the department are available from that office. Completed applications are processed three times each year: July 1 for the fall semester, November 1 for the winter semester and March 1 for the spring term; there is no summer admission. Admission is a selective process; meeting minimum criteria does not guarantee acceptance into the program. Students normally are notified of their admission status by the graduate dean one month before the beginning of the term.

Admission requirements: 1) an undergraduate GPA of at least 3.00, or a GPA of at least 3.00 in a minimum of 12 graduate credits, or a combination of an undergraduate GPA of at least a 2.80 and a Miller Analogies Test score of at least 50; 2) two letters of recommendation from individuals in a supervisory relationship to the applicant; and 3) a goals statement. The Miller Analogies Test is administered monthly by the Office of Special Advising at Oakland University.

Students seeking up to 12 hours of non-degree course work for personal or professional development may be assigned special graduate or post-master's status; applications for special graduate and post-master's status are available from and processed through the Office of Admissions and Scholarships. Special graduates and post-master's degree students may take additional course work upon completing an Exception to Post-master's Registration Policy form and obtaining signed approval from the department chair and the dean of Graduate Study. Applications for special graduate status are available from and processed through the Office of Admissions and Scholarships: the Exception to Post-master's Registration Policy form is available from and processed through the Office of Graduate Study.

## 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. Only one Oakland University course may be applied from outside the department; changes 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 & Leadership (must be taken as first course in M.A.T. 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 concentration, 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:

- 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 593 Evaluation and Accountability in Education
- 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 581 Teaching about Black Africa in the Schools
- CIL 585 Law for Teachers and Administrators
- CIL 587 Social 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 597 Oakland University/Greenfield Village Practicum in the Social Studies
- 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 practicum is to be taken within the last calendar year of program with M.A.T. 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

**Continuing Teacher Certification:** Teachers may be recommended for continuing 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 140 for general information on Michigan Continuing Certificate requirements.

**Administrator Certification:** The department offers planned programs leading to administrator certification. Admission requirements to the programs are: 1) a current teaching certificate; 2) an undergraduate GPA of at least 3.00, or a GPA of at least 3.00 in a minimum of 12 graduate credits, or a combination of an undergraduate GPA of at least 2.80 and a Miller Analogies Test score of at least 50; 3) complying with regulations established by the Michigan Department of Education regarding criminal convictions; 4) a master's degree or admission to a master's degree program at Oakland University.

A minimum of 3 years teaching experience and a master's degree is required by the Michigan Department of Education before granting administrative certification.

### Program requirements are:

Elementary/Middle School Principal (20 credits)

CIL 580 or 677; CIL 585, CIL 658, CIL 658a, CIL 661, CIL 685.

Secondary/Middle School Principal (20 credits)

CIL 580 or 677; CIL 585, CIL 658, CIL 658b, CIL 661, CIL 685.

Central Office (30 credits)

1) CIL 509 or 689; CIL 580 or 677; CIL 585, CIL 588 (2), CIL 612, CIL 661, CIL 685, and 2) a choice of a) CIL 658 and either CIL 658a or CIL 658b, or b) CIL 588.

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 verbal skills, methods of teaching special children, the gifted and culturally different, outdoor education, integration of science with other subjects and aerospace education. Field trips are included.

### CIL 506 Outdoor Education (4)

Studies methods, materials and sites for education in, for and about the outdoors. Topics include backpacking, family camping, ecological systems, bringing outdoors indoors, adventure education 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 educational research, technology and instructional techniques and methods of implementing them in effective teaching and leadership practices. *Must be taken as first course in M.A.T. 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 Interaction Laboratory for Teacher Development (4)**

Acquaints teachers with the importance of human relations skills in teaching and provides exposure to interpersonal problems among pupils, parents and fellow teachers within a school setting. Teachers participate in role-playing, simulations and action-oriented problem solving.

**CIL 561 Gender Socialization in the Schools (4)**

Provides an understanding of the role that gender plays in teaching and learning, with emphasis on the socialization of girls and women in schools. 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 into 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 581 Teaching about Black Africa in the Schools (4)**

Studies contemporary and historical topics of Black Africa applicable to elementary and secondary schools, including materials evaluation and selection of Black African topics for classroom instruction.

**CIL 583 The Middle School (2 or 4)**

Studies all aspects of the emerging middle school, including organizational patterns, curriculum, psychological factors, philosophical bases and methodologies. Provides in-depth analysis of the relationship to contemporary educational, social and student needs.

Prerequisite: CIL 512.

**CIL 585 Law for Teachers and Administrators (4)**

Introduces school law, with a unique opportunity to study crucial areas in public/private education that affect all educators. Investigates landmark cases and legislative statutes concerning the rights and responsibilities of teachers, students and parents.

**CIL 587 Social Studies in the Elementary School (4)**

Studies methods, current trends and content of effective social studies programs, with emphasis on the relationships among social science discipline areas in a multicultural society.

**CIL 588 Supervisory Skills for 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 the 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 593 Evaluation and Accountability in Education (4)**

Examines educational accountability and evaluation from historical, sociological and philosophical perspectives. Studies approaches to accountability and evaluation, national evaluation standards and issues of validity and reliability in accountability.

**CIL 597 Oakland University/Greenfield Village Practicum in the Social Studies (4)**

Utilizes facilities of Henry Ford Museum and Greenfield Village to assist teachers in developing and using primary resources in their social studies and science programs. Includes hands-on activities and discussions of cause-effect relationships of inventions and technology as they relate to teaching. Two consecutive semester enrollments of 4 credits each are required.

**CIL 611 Issues in Education (4)**

Studies current issues impacting on the organization, administration and environment of schools.

**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.

**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 Practicum in Curriculum, Instruction and Leadership (4)**

Synthesizes and applies knowledge and skills gained in M.A.T. 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.A.T. 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.A.T. program, adviser and supervising instructor permission.

**Professional Development (does not apply to M.A.T. 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.)

# DEPARTMENT OF HUMAN DEVELOPMENT AND CHILD STUDIES

**Chair:** Donald M. Miller

**Professors:** Gerald G. Freeman, Donald M. Miller, Ronald M. Swartz

**Associate professors:** Marc E. Briod, Anne Cairns Federlein, Carol A. Swift

**Assistant professors:** Ann H. Atkinson, Andrew Gunsberg, Richard C. Pipan

**Special instructor:** Carrie Owens-Petty

The Department of Human Development and Child Studies offers programs leading to teaching endorsements, continuing certification and to degrees of Master of Arts in Teaching (M.A.T.) in early childhood and in special education. The M.A.T. in early childhood education can include the continuing 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.A.T. 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.A.T. programs fulfill continuing 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 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 Admissions and Scholarships. Completed applications (this includes receipt of letters of recommendation and all transcripts, which the candidate should verify) 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. Applicants are normally notified of their admission status one month before the beginning of each term.

Criteria for admission are divided into two categories: one set determines acceptance into the department's programs; the second set, which may be subdivided if special program requirements are involved, determines acceptance into specific endorsement and/or degree programs.

Minimum criteria for acceptance into the department are: 1) an undergraduate degree with a GPA of 3.00 (applicants who do not meet this standard may be conditionally admitted, but must receive a grade of 3.0 or above for the first 12 credit hours); 2) completion of a minimum of 24 semester credit hours at the undergraduate or graduate level in education, humanities, social sciences, health or an appropriate related field (this requirement is carefully weighed by the department's faculty admissions 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 (b) with varied and sustained experiences with young children.

**Special Education.** Admission for the M.A.T. 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's 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); 2) have completed a minimum of one year's teaching experience or the equivalent; 3) have an undergraduate GPA of 2.80 or above or a graduate GPA of 3.00 or above; 4) have completed prerequisite courses or the equivalent. Prerequisite courses may be taken as a Special Graduate (SG) and admission to an endorsement program will be delayed until prerequisites are completed.

Courses taken before official admission to a program offered by the department 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 with special 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 Admissions and Scholarships.

## The Master of Arts in Teaching: Early Childhood Education

The graduate program in early childhood education leads to the Master of Arts in Teaching (M.A.T.) 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.A.T.: this is a field-based project and includes preparation of a project report.

### Requirements for the M.A.T. 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 543 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

- FE 593 Action Research Techniques in Education (4)  
This course focuses on planning for the required project and its reporting in EC 650.
- EC 645 Assessment of the Young Exceptional Child (4)
- Elective (4 credits). Approval by the faculty adviser is required.

**Level III** 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.

### Continuing certification and endorsement programs

Persons seeking provisional or continuing 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 continuing certification and/or the early childhood endorsement (Code ZA)

This program of study consists of the five courses in Level II of the M.A.T. listed above.

Advising assistance for non-M.A.T. students can be obtained in the SHES Advising Center, 472 O'Dowd Hall.

See page 140 for general information on Michigan Continuing Certificate requirements.

### Admission

Criteria and procedures for admission are the same as those stated for the department.

## The Master of Arts in Teaching: Special Education

The master's program in special education is a non-categorical 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.A.T. in special education. Twelve 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.A.T. 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)

#### Limited Electives: (8 credits)

Foundations of Education (4)

and

Early Childhood (4)

or

- RDG 632 Diagnosis of Reading Disabilities (4)
- RDG 633 Correction of Reading Disabilities (4)

**Electives (16 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 continuing 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      The Exceptional Student (2)  
or  
SE 355      Identifying Learning and Behavior Problems in Students (4)  
FE 506      Child Development, Variability and Learning

**Learning Disabilities: (28-32 credits)**

- SE 502      Legal Issues in Special Education (4)  
SE 517      Language and Learning Disabilities (4)  
SE 523      Educational Procedures for Children with Learning Disabilities (4)  
SE 524a      Introduction to Special Education Assessment (2)  
SE 524b      Practicum in Special Education Assessment (2)  
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, 6, 8)

**Emotionally Impaired: K-8 (24-28 credits)**

- SE 502      Legal Issues in Special Education (4)  
SE 510      Behavioral and Emotional Disorders in Students (4)  
SE 518      Behavior Management (4)  
SE 520      Educational Procedures for Emotionally Impaired Children (4)  
SE 524a      Introduction to Special Education Assessment (2)  
SE 524b      Practicum in Special Education Assessment (2)  
SE 582      Student Teaching in Elementary Special Education:  
Emotionally Impaired (4, 6, 8)

**Autistically Impaired: K-8 (18 credits)**

- SE 559      Autistic Children and Youth (4)  
SE 527a      Educational Procedures for Elementary Autistic Students (2)  
SE 578a      Language Problems in the Young Autistic Child (2)  
SE 579a      Behavior Management in the Elementary Autistic Classroom (2)  
SE 596      Consultation Skills for Teachers of Autistic Students (4)  
SE 584      Student Teaching in Elementary Special Education:  
Autistically Impaired (4)

**Autistically Impaired: 7-12 (18 credits)**

- SE 559      Autistic Children and Youth (4)  
SE 527b      Educational Procedures for Secondary Autistic Students (2)  
SE 578b      Language Problems in the Secondary Autistic Student (2)  
SE 579b      Behavior Management in the Secondary Autistic Classroom (2)  
SE 596      Consultation Skills for Teachers of Autistic Students (4)  
SE 585      Student Teaching in Secondary Education:  
Autistically Impaired (4)

NOTE: Each endorsement must contain a minimum of 18 unduplicated credits

**M.A.T. in reading and language arts and certificate endorsement in learning disabilities**

The reading and language arts department and the special education department offer a combined program leading to the M.A.T. in reading and language arts and a Michigan teaching certificate endorsement in learning disabilities and reading. The dual program consists of a block of 24-30 credits from Reading/Language Arts and 24-28 credits from Special Education, not including prerequisites.

Courses are:

**Block I — Reading foundations:** RDG 536, 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 kindergartners as seen from pediatric, developmental and educational perspectives. EC 542a is an overview of all age levels and topics. EC 542b focuses on a developmental topic.

Prerequisite: Permission of instructor.

**EC 543      Teacher as Child Advocate and Adult Educator — Early Childhood (4)**

Exploration of parental and community forces in meeting needs of young children and of teachers in child advocacy issues. Includes methods for working with parents, para-professionals, volunteers in the classroom, home, diverse community team members and referral resources.

Prerequisite: EC 540, 542, or permission of instructor.

**EC 544      Play as a Learning Medium (4)**

Role of play in development of logical and creative thought processes and in socio-emotional development, past and present theories of play and games and methods for using play in the early childhood curriculum.

**EC 545      Administration and Direction of Early Childhood Programs (4)**

Administrative aspects such as budgeting, legislation, rules and employee concerns. Includes procedures for developing programs, writing proposals and identifying funding sources. Examination of agencies involved in early childhood programs, child-care trends in the community and problems in direction of centers.

Prerequisite: EC 540, 542, or permission of instructor.

**EC 546      Workshop in Early Childhood Curriculum (4 or 8)**

Special areas of curriculum — mathematics, science, language, music, art and sensory-motor — are emphasized, and methods for development of workshops and learning centers in these areas are stressed. Includes special uses of audiovisual and programmed materials in the learning center and in workshop presentations.

**EC 547 Infants: Normal and Exceptional Development and Programming (4)**  
Research on infants to 15 months, including exceptional infants; analysis of appropriate play environments and learning experiences. Students work with infants in small groups and interact with infants and parents 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 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: Permission of instructor.

**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 Exceptional Student (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.

**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, IEPs, related services, free and appropriate education, placement options, adequate referral and evaluation, investigation and due process hearings highlighted.

Prerequisite: Admission to program.

**SE 510      Behavioral and Emotional Disorders in Children (4)**

Addresses the characteristics of emotionally impaired students, 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 is considered, preschool through adult.

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 Emotionally Impaired Children (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: Admission to the M.A.T. or permission of instructor.

**SE 523      Educational Procedures for Children with Learning Disabilities (4)**

Addresses the seven legally defined areas of learning disability in terms of informal assessment, appropriate instructional materials and curricular modification for the K-8 student. Remedial techniques and their application are reviewed.

Prerequisite: Admission to program.

**SE 524a      Introduction to Special Education Assessment (2)**

Introduces assessment terminology. Standardized tests typically used to identify exceptional students 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 (2)**

Students learn how to administer, score and interpret selected educational tests used in the identification of exceptional students.

Prerequisites: 524a, admission to program and permission of instructor.

**SE 527a      Educational Procedures for Elementary Autistic Students (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 Autistic Students (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      Autistic Children and Youth (4)**

Addresses the characteristics of autistic children and youth through a review of historical perspectives, theories of autism and current research. Emphasis is placed on the effects of autism on communication, cognition and learning 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 Autistic Child (2)**

Provides an overview of normal language acquisition as the foundation for understanding language problems of the young autistic child. Differential diagnosis and techniques for facilitating communicating are emphasized.

Prerequisite: Admission to A.I. endorsement program or permission of S.E. coordinator.

**SE 578b      Language Problems in the Secondary Autistic Student (2)**

Provides an overview of normal language development as the foundation for understanding the communicative difficulties of the autistic adolescent and young adult. 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      Behavior Management in the Elementary Autistic Classroom (2)**

Focuses on constructive management plans with young autistic children. 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      Behavior Management in the Secondary Autistic Classroom (2)**

Focuses on constructive management plans for the secondary autistic student. 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 instructor.

**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 instructor.

**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 instructor.

**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 instructor.

**SE 596 Consultation Skills for Teachers of Autistic Students (4)**  
Designed to develop consultation skills of teachers who work with autistic students. Includes home-school interactions, family and community support services.  
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.A.T. 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.A.T. 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.A.T. 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.A.T. or permission of instructor.

**SE 624 Advanced Diagnostics (4)**  
Focus is on the assessment process in the school setting: the use and interpretation of standardized tests with handicapped students, informal assessment procedures, differential diagnosis, and implications for instruction and placement.  
Prerequisite: Admission to M.A.T., 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.  
Prerequisite: FE 593 and permission of instructor.

## DEPARTMENT OF READING AND LANGUAGE ARTS

**Chair:** George E. Coon

**Professors:** Jane M. Bingham, George E. Coon, Ronald L. Cramer, W. Dorsey Hammond, Keith E. Stanovich

**Associate professors:** Richard F. Barron, Gloria T. Blatt, Robert J. Christina, Anne E. Porter, Robert M. Schwartz, Toni S. Walters

The Department of Reading and Language Arts offers a program leading to a Doctor of Philosophy (Ph.D.) degree, a Master of Arts in Teaching (M.A.T.) degree and a combined program leading to an M.A.T. with endorsement in learning disabilities. The department also offers a Michigan certification planned program in reading and language arts, a certificate program in microcomputer applications and professional development opportunities for practicing teachers.

### The Doctor of Philosophy in Reading

**Coordinators:** Ronald L. Cramer and W. Dorsey Hammond

Reading education draws its theoretical underpinnings from diverse domains of knowledge including linguistics, psychology and statistics. Knowledge is also required in literature and composition, as well as classroom and clinical instruction practices for children and adults. Reading is a specialized field, but its successful application in schools, universities, governmental agencies and private business requires a knowledge of related disciplines, an understanding of theoretical applications and the ability to conduct research.

### Admission

Admission to the Ph.D. program is a two-step process. First, the screening committee evaluates candidates in four areas: letters of recommendation, prior course work at the undergraduate and graduate levels, writing ability as revealed through two personal statements and scores on the Miller Analogies Test.

Second, applicants who successfully pass the screening step meet with the interview committee which makes recommendations in conjunction with the department.

### Residence

Students benefit from, and make significant contributions to, the program when engaged in the concentrated effort demanded by full-time study. Although students may begin doctoral study on a part-time basis, all students must complete two full-time semesters in residence, earning at least 8 credits in each of the two semesters. The combined spring/summer sessions can constitute one semester toward residency. During this period of time, students will be assigned additional experiences not ordinarily available through course work. Examples of these activities include, but are not limited to, tutoring children and adults in the reading clinic, assisting faculty in the conduct of research and other scholarly undertakings and teaching undergraduate or graduate level courses under departmental supervision. Graduate assistantships, which include a stipend and tuition and fee grants, are available to students pursuing full-time study. Assistantships will not be granted to students who are employed full time.

## Advisory committees

### Initial advising

Upon acceptance into the program, students will be advised by the Ph.D. program coordinators, who assist them in the development of an interim program plan. This plan, subject to departmental approval, tentatively specifies the course work to be undertaken in partial fulfillment of degree requirements.

### Academic advising

Following approval of the interim program plan, students will be assigned an academic adviser who serves as their primary program contact person and continues to provide academic counseling. After completing one year (24-36 credits), students, in consultation with their academic advisers or, if selected as described below, the dissertation chairperson, must submit a final program plan to the department for approval. The final program plan is an agreement between the student and faculty which specifies transfer credits accepted and the course work that the student must complete. After the completion of 48 credits toward the degree, students may request that their advisers form a committee to conduct the qualifying examination. This committee will consist of a minimum of three Oakland University faculty members, including the student's adviser, one member from the department and one member from the student's area of minor concentration.

### Dissertation committee

At the point a student begins to engage in the development of a dissertation proposal, he or she should nominate a dissertation committee chairperson. The dissertation committee will then be formed in consultation with the student's dissertation adviser. This committee will consist of five Oakland University faculty members, including at least three members from the Department of Reading and Language Arts, one member from the student's area of minor specialization and one member-at-large. Students' nominees are always considered subject to availability, number of doctoral advisees a faculty member may be directing, and other constraints. The coordinators of the doctoral program, the dean of the School of Human and Educational Services and the dean of Graduate Study must approve the selection of the dissertation committee.

## Course of study

The Ph.D. program has three components. The reading core component provides a background of educational experiences and course work for developmental reading instruction, literature and composition, as well as diagnosis and correction of reading disabilities. In addition, cognate courses in linguistics and psychology may be required as part of the core component. The minor specialization component consists of 28 semester hours of study in a discipline related to reading either in terms of its theoretical contributions to the field (e.g., linguistics, psychology) or in terms of its potential for practical application (e.g., English, learning disabilities, counseling, school administration, business/industrial training and development). In the investigative processes component students receive education in statistics, research design and applied research culminating in a dissertation. Emphasis is placed on investigation of theoretical and practical problems in reading acquisition.

## Course credits

At least 76 credits must be earned beyond the master's degree, including the dissertation. Graduate credits earned in a master's degree program at Oakland University or another accredited university may be applied toward the Ph.D. degree upon recommendation of the reading department faculty. However, program requirements are such that transfer credit is seldom granted.

## Qualifying examination

Before admission to candidacy, each student must pass a written and oral qualifying examination to certify the student's ability to apply theoretical and practical information obtained in areas of study.

The examination will be administered at least once per academic year. The qualifying examination committee, in conjunction with the student, decides when the student is prepared to take the examination. However, it must be completed successfully before the student engages in the dissertation defense.

The written examination will be administered over three days. It will test three areas: reading and language arts content, special interest content and minor specialization content. The committee assembles the examination questions and evaluates the student's work. The oral examination, administered by the qualifying committee, can be taken only after successfully completing the written test.

Students may elect to write a position paper on a topic agreed upon in advance by the student and the committee faculty members. Election of this option will result in the waiver of special interest questions. The position paper must be submitted to the committee prior to administration of the written examination.

The committee may permit a student to repeat the qualifying examination. Passing evaluations on either the written or oral portions of the examination do not preclude specification for additional courses or learning experiences if the committee deems such action is warranted.

## Dissertation

Each candidate must complete a dissertation that makes a worthwhile contribution to the major field of study. The dissertation committee chairperson will direct the candidate through the stages of dissertation preparation.

### Dissertation proposal review

When the proposed dissertation committee chairperson and the candidate have agreed on a dissertation topic, the candidate must submit a written dissertation proposal containing a description of the topic problem, justification for selection of the problem and a description of the procedures to be used in the investigation. The candidate must orally defend the proposal before the dissertation committee and any other interested faculty and doctoral students, insuring that all questions relevant to the selected topic, justification and procedures are considered ahead of time. Once the dissertation committee approves the proposal, the candidate may initiate the study.

A draft of the dissertation must be submitted to the committee for modification and approval before the final copy is prepared and approved by the dissertation committee.

### Dissertation research credits

Students with approved dissertation proposals who are conducting dissertation research should register for RDG 799. At least 24 credits in RDG 799 are required of all doctoral students and no more than 12 credits can be taken prior to the approval of the proposal. However, merely amassing credits does not indicate satisfactory progress toward or completion of the dissertation. The dissertation is deemed completed only after successful oral defense and after final approval of the document by the dissertation committee.

## Oral examination

Each candidate must orally defend the dissertation before the dissertation committee. The examination is scheduled after the dissertation committee has approved the dissertation. While interested faculty and outside observers may be involved in the defense, only the dissertation committee certifies approval of the dissertation.

The dissertation committee may permit re-examination 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. If four consecutive semesters elapse without a student accumulating credits toward the degree, the student will be dropped from the program. Students may petition the reading department faculty and the dean of Graduate Study to waive this requirement or to seek readmission.

### 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: Reading and Language Arts

The reading and language arts Master of Arts in Teaching program prepares teachers with the knowledge and skills required to serve as reading consultants, reading specialists or remedial reading teachers, either in these specialized roles or in their own classrooms. Although most graduates continue as classroom teachers, many apply the reading and language arts theory and research they have learned in the program to qualify for positions as college teachers of reading, supervisors, principals, curriculum directors or reading resource center teachers.

### Admission

Applicants to the Reading M.A.T. degree apply to the department through the Office of Admissions and Scholarships. Admissions are selective, and meeting the minimum criteria does not guarantee acceptance into the program. Completed applications are accepted at any time and, generally, applicants are notified of their status within two weeks.

**Minimum Criteria:** The department considers only those applicants who hold baccalaureate degrees from accredited institutions. An undergraduate GPA of 2.80 is usually the minimum standard for admission. The applicant should hold an initial teaching certificate. Two letters of recommendation from persons in a supervisory capacity to the applicant must be submitted to the Office of Admissions and Scholarships before the application will be considered by the department.

### Requirements

The requirement for the M.A.T. is 36 credits. This includes 24 credits in the core program and 12 elective credits.

#### Core program (24 credits)

|          |                                                          |
|----------|----------------------------------------------------------|
| RDG 500  | Foundations of Reading Instruction                       |
| RDG 571  | Foundations of Literature for Young People               |
| RDG 575  | Teaching Writing in the Elementary and Secondary Schools |
| RDG 632  | Diagnosis of Reading Disabilities                        |
| RDG 633  | Correction of Reading Disabilities                       |
| *RDG 699 | Terminal Project                                         |

\*Students may elect a two-course option in lieu of RDG 699. This option necessitates 40 credits for graduation. Recommended courses are:

|         |                                                                |
|---------|----------------------------------------------------------------|
| RDG 534 | Reading and Language Arts Instruction in the Elementary School |
| RDG 570 | The Author's and Illustrator's Art and Craft                   |

Other course(s) may be substituted only with adviser approval.

### Elective program (12 credits)

The student must select a minimum of eight credits from the following: RDG 530, 532, 534, 538, 570, 572, 573, 574, 590, 630, 631; IST 590, 592, 594, 595 or 679.

Four credits may be elected in any course numbered 500 or above and for which the student meets the prerequisite requirements. The selection must be approved in advance by the student's adviser.

Candidates for the Michigan Elementary Continuing Certificate must elect RDG 534 if they have not previously met this requirement. Candidates for the Michigan Secondary Continuing 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's advising office or a reading adviser whether or not prior course work fulfills state requirements for the continuing certificate.

## M.A.T. in Reading and Language Arts and Certificate Endorsement in Learning Disabilities

**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 M.A.T. in Reading and Language Arts and a Michigan Teaching Certificate Endorsement in Elementary Learning Disabilities. The dual program consists of 12-15 courses (46-62 credits).

Courses are selected from two blocks:

**Block I — Reading and Language Arts:** RDG 536, 571, 575, 632, 633, 699 (candidates may substitute a two-course option, with adviser approval, in lieu of RDG 699.)

**Block II — Learning Disabilities:** Prerequisite courses include SE 501 or SE 355, and FE 506. Required courses are SE 502, 517, 523, 524a, 524b, 580 and CIL 615.

This program requires a dual advising process. Following admission to the M.A.T. program in reading and language arts, students should immediately schedule an advising interview with the program coordinator who will assist them 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 and/or suspension from the program.

## Certificate Program in Microcomputer Applications in Education

The School of Human and Educational Services offers a 16-credit certificate indicating focused training in educational applications of microcomputers and related technologies, such as multimedia, for teachers, administrators and professional staff representing a variety of educational and training levels. The certificate is designed to be responsive to the emerging needs of educational professionals in the challenging and rapidly changing field of technology in education.

Students enrolled in the M.A.T. 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 M.A.T. by enrolling in IST 594, 595, 679. IST 699 will be substituted for RDG 699. Students with no experience using microcomputers should complete IST 592 before enrolling in the certificate program.

Students who do not wish to be enrolled in the M.A.T. will be admitted to the university in continuing certification (CC) status. They will receive the certificate upon the successful completion of the four courses listed above.

## Certificate Endorsement in Reading

The Department of Reading and Language Arts offers a 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. 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.

## Planned Program in Reading and Language Arts

Required courses are: RDG 500, 534 or 538, 571, 575 and one elective. The elective course and application of transfer credits, if any, require approval from an adviser.

## Planned Program in Microcomputer Applications in Education

Required courses are IST 594, 595, 679, 699 (or equivalents with approval of faculty adviser) and one elective.

## Course Offerings

### RDG 500 Foundations of Reading Instruction (4)

Provides an overview of the reading process including reading readiness, comprehension, word recognition, diagnosis, methods of instruction, and related language acquisition processes.

### RDG 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 skills and emphasizes the developmental skills of pupils, 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 learn to 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 570 The Author's and Illustrator's Art and Craft (4)

Selected authors' and illustrators' work will be read and criticized in light of psychological, sociological, historical, literary and curricular factors. Examines ways to use literature with young people in elementary and secondary schools.

### RDG 571 Foundations of Literature for Children and Young Adults (4)

Presents criteria for selecting and evaluating literature for children and young adults. Examines specific ways of incorporating worthwhile literature into the school curriculum.

### RDG 572 Storytelling and Creative Dramatics (4)

Focuses on methods of encouraging children to use imaginative and dramatic skills to interpret literature, and to create plays and other drama. Provides opportunities to select, learn and tell stories and to develop a storytelling program.

### RDG 573 Adolescent Literature in Middle Schools, Junior and Senior High Schools (4)

Introduces literature and other relevant materials suitable for adolescent youth. Topics include: trends in literature and publishing, methods of presenting books, stimulating reluctant readers and the use of trade books in content areas.

### RDG 574 Literature for the Young Child (4)

Preparation for the selection and use of appropriate books, rhymes, stories, records and filmstrips with preschool and early elementary school children.

### RDG 575 Teaching Writing in the Elementary and Secondary Schools (4)

Emphasizes the teaching of both functional and creative writing. Topics include: poetry, story writing, evaluation, revision, report writing, basic writing skills and other related writing activities.

### RDG 590 Special Problems in Reading (2, 4, 6, or 8)

Depending on clientele and staff needs, specific topics may differ each semester. This course may be taken more than once, but for no more than a total of 8 credits, or may be elected for independent study.

### RDG 630 Seminar in Reading (4)

The validity, reliability, results and conclusions of research and other literature in selected areas of reading and language arts are analyzed.

Prerequisite: Two courses in reading instruction.

### RDG 631 Problems in Reading Instruction (4 or 8)

Analyzes diagnostic, methodological, organizational and administrative issues in reading instruction.

Prerequisite: One course in reading instruction.

### RDG 632 Diagnosis of Reading Disabilities (4)

A laboratory course to analyze factors which contribute to or cause reading disabilities in elementary and secondary school pupils. Selection and administration of formal and informal tests are included as well as preparation and evaluation of case reports.

Prerequisite: Admission to the M.A.T. program, RDG 500 and permission of instructor. Must sign up for this course with the reading area one semester prior to registration and have completed 20-24 credits in Reading or LD program.

### RDG 633 Correction of Reading Disabilities (4)

A laboratory course focusing on methods, materials and practice of reading instruction. Provides opportunities to plan, organize and conduct developmental, remedial and corrective instruction for children under supervision of the instructor.

Prerequisite: Admission to the M.A.T. program, RDG 632 and permission of instructor.

### RDG 699 Terminal Project in Reading and Language Arts (4)

Planning and execution of significant research or project in accordance with student's advisory committee. Prerequisite: Admission to the graduate program in reading instruction and written approval of the student's adviser. Students should request such approval from their advisers early in the fall semester for registration in the winter semester and early in the winter semester for registration in spring, summer or fall. Students must present the completed project at least two weeks before the end of classes in the semester of graduation.

### RDG 700 Introduction to Educational Statistics and Research Design in Reading and Language Arts (8)

Two-semester sequence (700 A and B) focusing on the design and analysis of educational research in reading and language arts. Topics include: scientific reasoning, descriptive and inferential statistics, experimental design, research methods, measurement concepts and an introduction to computer analysis and multivariate procedures.

Prerequisite: Admission to Ph.D. program or instructor permission.

### RDG 701 Doctoral Seminar in Reading (4 to 8)

Advanced topics in reading selected by the instructor in consideration of the needs and interests of doctoral students. Research and other significant writing relevant to the topic will be analyzed and interpreted. Research designs, procedures and findings will be discussed.



**RDG 702 Applied Research in Reading and Language Arts (4)**

Designed to assist students in the process of successfully completing a thesis for the doctoral degree. The major focus will be on preparation and defense of a proposal leading to a thesis project which will be discussed and valued by a doctoral committee.

Prerequisite: Admission to the Ph.D. program and instructor permission.

**RDG 703 Advanced Diagnostic and Corrective Reading (4)**

Diagnosis and remediation of reading difficulties of diverse learners. The student's work in the Reading Language Arts Center will be determined by both the center's needs and student interest.

Prerequisite: Admission to Ph.D. program, successful completion of RDG 632 and 633 or instructor permission.

**RDG 704 Perspectives in Literature (4)**

Examines selected perspectives of literature for young readers in terms of literature as an art, trends in today's literature and responses of readers to the stories and poems they read. Implications for teaching and research are also studied.

Prerequisite: Admission to the Ph.D. program and/or the instructor's permission.

**RDG 705 Perspectives in Writing (4)**

Examines significant topics in writing. Research in writing theory and philosophy of writing, the teaching of composition, relationship of composition and reading, and other pertinent topics will be studied.

Prerequisite: Admission to the Ph.D. program and/or the instructor's permission.

**RDG 775 Learning Models: Applications in Computer-Assisted Learning (4)**

An overview of theories of learning including stimulus response, cognitive, cybernetic and integrative approaches as they relate to learning in the classroom. The student will examine applications of these theories in terms of variations of physical and social aspects of various learning environments. Capabilities of the computer and its use with respect to the various learning theories will be examined.

Prerequisite: RDG 595.

**RDG 780 Independent Investigations in Reading/Language Arts (2, 4, 6, or 8)**

This course is designed to allow doctoral students to investigate a topic under the direction of an appropriate faculty member. Student needs will determine the topics, but diagnostic, methodological, organizational and administrative issues in reading will be encouraged.

Prerequisite: Admission to the Ph.D. program and instructor permission.

**RDG 790 Independent Study (2, 4, or 8)**

Directed readings for doctoral degree students on any appropriate subject that is not available through regular course offerings. May be taken more than once for a total of 8 credits.

Prerequisite: Permission of the program director.

**RDG 799 Dissertation Research (4 to 24)**

Preparation of a research project culminating in the doctoral dissertation.

**INSTRUCTIONAL SYSTEMS TECHNOLOGY****IST 590 Special Problems in Instructional Systems Technology (2, 4, 6, 8)**

Depending on clientele and staff needs, specific topics may differ each semester. This course may be elected for independent study. It may be taken more than once, but for no more than a total of 8 credits.

Prerequisite: Instructor permission.

**IST 592 Computer Literacy and Personal Computing (4)**

An evaluation of the use of computers and their roles in education at the elementary and secondary school levels. Includes personal computing, computer-aided instruction and computer-managed instruction.

**IST 594 Introduction to Instructional Systems Technology (4)**

An introduction to the integration of audio, video, computing and telecommunications technologies in teaching a theoretical and practical foundation for the instructional use of integrated technologies.

Prerequisite: IST 592 or permission of instructor.

**IST 595 Instructional Systems Technology Applications (4)**

An in-depth examination of the characteristics of the instructional applications of a variety of audio, video, computing and telecommunications technologies. Students will acquire a proficiency in the use of instructional and presentation software.

**IST 679 Instructional Design (4)**

An introduction to instructional design applied through a variety of integrated technologies. The student will become familiar with the procedures in analysis, development and management of learning. The student will apply design skills to the development of a technology assisted learning experience.

Prerequisite: IST 595.

**IST 699 Terminal Project — Instructional Design Applications (4)**

Planning and execution of an application of instructional design principles covered in IST 679. The student will design, carry out and evaluate a comprehensive instructional sequence which incorporates computer related technologies.

Prerequisite: IST 679.

# EDUCATION SPECIALIST

**Coordinator:** Beverley Geltner

**Faculty council:** James Clatworthy, Robert Docking, Marion Ginopolis, William Keene, Gerald J. Pine, Ronald Rohlman, Jacqueline Scherer, John Schultz, Donald Warren, Sylvia Whitmer, Richard Wilson

**Committee of visitors:** Frank P. Cardimen, Jr., University Extension and Public Service, School of Human and Educational Services; Isaac Eliezar, College of Arts and Sciences; Suzanne O. Frankie, Kresge Library; Karl Gregory, School of Business Administration; Monifa Jumanai, Office of Special Services; Joan Rosen, College of Arts and Sciences; Carol Wilson, Birmingham Public Schools

The Education Specialist in school administration program is designed for teachers interested in school leadership and 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.

## Admission

The faculty council for the school administration program will screen candidates in five areas after the following have been received by the Office of Admissions and Scholarships: 1) official transcripts of undergraduate and graduate work with a master's degree from an accredited institution; 2) two letters of recommendation from professional colleagues or supervisors familiar with the candidate's current position; 3) one letter of recommendation from a faculty member associated with the candidate's graduate level work; 4) a personal goals and evaluation statement indicating willingness to make a two-year commitment, personal goals after completing the school administration program and an assessment of personal strengths and weaknesses for roles in educational leadership; 5) score results on the Miller Analogies Test.

Candidates may be interviewed by members of the faculty council, which will make admission recommendations to the dean of Graduate Study. Admission to the program will be made only for the fall semester. Therefore, all application materials must be received by the Office of Admissions and Scholarships no later than May 1.

## Degree Requirements

Forty credits over a period of seven semesters 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 second spring session.

## Field Experiences and Mentoring

All program participants will be paired with an individual mentor who shall be a practicing administrator. The purpose of the mentorship will be to provide opportunities for field experiences in schools; and for 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.

### First year core program:

- EA 740 School as a Formal Organization
- EA 741 Educational Finance
- EA 742 Educational Law
- EA 743 Administrative Leadership Skills
- EA 744 Long-Range Planning
- EA 754 Educational Personnel and School Labor Relations

Completion of first-year core program is a prerequisite, except with permission of the program director, for the second-year program.

- EA 746 Curriculum Development I-12
- EA 747 Program Evaluation
- EA 748 Seminar on School-Community Development
- EA 756 Supervision and Staff Development
- or
- EA 749 Seminar on Quality of Learning Life
- EA 750 Action Research Project

## 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

### 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. Prerequisite: Admission to Ed.S. program.

### EA 741 Educational Finance (4)

In-depth analysis of financial and business operations of school, including external and local funding sources, resource allocation issues, school budget accounting and auditing systems. Prerequisite: Admission to Ed.S. program.

### EA 742 Educational 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. Prerequisite: Admission to Ed.S. program.

### EA 743 Administrative Leadership Skills (4)

Examination of critical components of effective educational leadership with emphasis on instructional leadership, development of a collaborative learning community, site-based management and strategies for school improvement. Prerequisite: Admission to Ed.S. program.

### 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. Prerequisite: Admission to Ed.S. program.

### EA 746 Curriculum Development (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. Prerequisite: Admission to Ed.S. program.

**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. Prerequisite: Admission to the Ed.S. program.

**EA 748 Seminar on School/Community Development (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. Prerequisite: Admission to Ed.S. program.

**EA 749 Seminar on Quality of Learning Life (2)**

Topics will be identified relating to the major factors impacting the quality of learning life in schools. Contemporary issues of restructuring will be examined with an emphasis on changing roles, rules and relationships of administrators and teachers within the school environment. Prerequisite: Admission to Ed.S. program.

**EA 750 Action Research Project (2, 4, 6 or 8)**

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. Prerequisite: Admission to Ed.S. program. ED 748 or ED 749.

**EA 754 Educational Personnel and School Labor Relations (2)**

Analysis of successful human resource management and labor relations practices for school improvement. Prerequisite: Admission to Ed.S. program.

**EA 756 Supervision and Staff Development (4)**

Examination of administrative role and responsibilities for supervision of staff, in-class simulations of clinical supervision, issues of effective staff development for school improvement. Prerequisite: Admission to Ed.S. program.

# SPECIAL COURSES

The School of Human and Educational Services offers interdepartmental courses, staffed by faculty from the various departments. Occasionally, with the approval of the Graduate Dean 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 Vocational Courses (2 or 4)**

Covers instructional design models, needs analysis, occupational task analysis, development of learning objectives, determination of appropriate training approach, organization of modules and lessons, development or selection and evaluation of instructional materials and media for vocational-technical education.

**VTE 511 Vocational Laboratory Planning (2)**

Construction, design to comply with program standards of quality, learning stations, equipment, planning for access of materials and tools, safety considerations, storage of student projects and computer access as pertaining to occupational specialization of each student in consultation with appropriate experts.

**VTE 520 Instructional Methods and Media (4)**

Methods of instruction in vocational education in conjunction with the use of instructional materials and media. Application of learning theory in classroom management approaches. Evaluation of student learning based upon performance objectives. Includes teacher-student interaction, laboratory experience and use of audio-visual equipment.

**VTE 530 Vocational Guidance and Placement (2)**

A study of educational/vocational development processes, pre-employment skills, experiential influences and life-work planning leading to employment. Covers assessment of learner abilities; interests and vocational skills; career awareness and decision-making process; and job placement systems.

**VTE 540 Issues and Trends in Vocational Education (2 or 4)**

Topics on research studies and current trends and issues in vocational education, study of related laws and regulations. Research methodology is studied by example. The instructor provides direction in scope and content. Class members conduct research on selected topics and present and discuss findings and applications in practice.

**PSYCHOLOGY****PSY 510 Developmental Psychology (4)**

Description and evaluation of principles and theories of development from birth to maturity. Maturation processes, learning and emotional disturbances are considered.

Prerequisite: Permission of instructor or acceptance into the M.A.T. program.

**PSY 552 Sensation and Perception (4)**

Approaches to the basic sensory systems and perceptual processes.

Prerequisite: Permission of instructor.

**PSY 553 Cognitive Psychology (4)**

The information processing approach to problems in pattern recognition, selective attention, mental operations, short- and long-term memory, the psychology of reading, problem solving and probabilistic reasoning.

Prerequisite: Permission of instructor.

**PSY 590 Seminar: The Psychology of Reading (4)**

Cognitive models of reading and reading-related information processing tasks. Empirical studies of the adult reading process.

Prerequisite: Admission to Ph.D. program in reading.

**PSY 591 Seminar: The Development of Reading Ability, Individual Differences, and Learning Disabilities (4)**

Empirical and theoretical studies of the causes and correlates of differences in reading skill. Developmental models of reading acquisition and individual differences. Analysis of the concept of learning disability.

Prerequisite: Admission to the Ph.D. program in reading; PSY 590 or permission of instructor.

**RHETORIC, COMMUNICATIONS AND JOURNALISM****RCJ 515 Summer 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

**Interim dean:** Penny S. Cass

**Graduate program director:** Carol S. Zenas

**Visiting professor:**

Ann M. Douglas, Ph.D., R.N., Catholic University of America

**Associate professors:**

Penny S. Cass, Ph.D., R.N., University of Michigan

Gary Moore, Ph.D., R.N., Wayne State University

Carol S. Zenas, Ph.D., R.N., University of Michigan

**Assistant professors:**

Rita Mumley Gallagher, Ph.D., M.S.N., R.N., Wayne State University

Frances Jackson, Ph.D., R.N., University of Michigan

Mary A. Johnson, Ed.D., M.P.H., R.N., University of Michigan

Norman Kloosterman, M.S.N., R.N., Wayne State University

Anahid Kulwicki, D.N.Sc., R.N., Indiana University

Nancy A. O'Connor, M.S.N., R.N., Wayne State University

Darlene F. Schott-Baer, Ph.D., R.N., Wayne State University

Diane R. Wilson, Ph.D., R.N., Michigan State University

**Visiting assistant professor:**

Joann Richards, M.S.N., R.N., Wayne State University

**Adjunct professors:**

Clara Adams-Ender, M.S., R.N., University of Minnesota

Cyril Akpom, M.D., Case Western Reserve

Karen S. Ehrat, Ph.D., R.N., University of Arizona

Shahrokh Mansoori, M.D., Pahlav University (Iran)

**Adjunct associate professor:**

Joanne K. Napiewocki, J.D., M.S.N., R.N., Wayne State University

**Adjunct assistant professor:**

Alice J. Schmidt, Ph.D., R.N., Wayne State University

## The Master of Science in Nursing

The Master of Science in Nursing program prepares professional nurses for advanced practice in nursing administration or adult health nursing. The purposes of the program are to prepare nurses for advanced nursing practice, prepare graduates for leadership in the nursing profession, and prepare graduates for application to 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 economics and management concurrently in cognate courses. Students 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 choose electives from a variety of disciplines relative to their specific goals.

### Admission

An applicant for admission to the Master of Science in Nursing program must have a Bachelor of Science degree in nursing from an institution accredited by the National League for Nursing, with an undergraduate cumulative grade point average of 3.00 or above. Applicants should show satisfactory achievement on the Graduate Record Examination general test. Individuals must have a current license to practice as a registered nurse in the state of Michigan and carry minimum malpractice insurance of \$1 million. It is preferred that the applicant have at least one year prior clinical experience.

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 coordinator of the School of Nursing Advising Office (313 370-4482) to review M.S.N. requirements and options for progression through the program. 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.

### Academic advising

Every student admitted to the M.S.N. program is assigned a faculty adviser with teaching responsibilities in the graduate program. Faculty advisers are available to discuss concerns regarding progression in the program and student's goals. Advisers may also act as mentors in areas other than academics.

### 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 for completion of a course will be given for grades of 2.5 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, or who have failed to demonstrate an ability to succeed in a plan of study, 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 is 36 semester hours beyond the bachelor's degree. Prior graduate course work (both nursing and non-nursing) will be evaluated by the faculty and courses equivalent to the School of Nursing master's requirements may be transferred up to a maximum of nine semester hours. The program of study allows full-time students to complete the requirements in two academic years. Part-time students can complete the program with three to four academic years. A maximum of six years is allowed for completion of all degree requirements according to graduate school policy.

The 36 credits of graduate course work 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 610 Economics in Nursing Administration (3)
- NRS 630 Management Process in Nursing Administration (3)
- NRS 640 Practicum in Nursing Administration (4)
- ACC 511 Financial Accounting (3)
- ACC 512 Managerial Accounting (3)

#### Adult health nursing track

- NRS 611 Pathophysiologic Dimensions of Adult Health (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

Remaining credits may be selected from within the School of Nursing or other departments to meet the student's individual needs and interests.

### Course Offerings

#### NRS 500 Theoretical Foundations in Nursing (2)

Introduction to graduate education in nursing with emphasis on philosophy and conceptual framework of Oakland University's master's program in nursing; analysis of selected nursing theories and conceptual frameworks.

Corequisite: NRS 600.

#### NRS 520 Issues in Nursing (3)

Exploration of current issues impacting the discipline of nursing with emphasis on the development of effective strategies for dealing with them.

#### NRS 530 Nursing Research I (3)

Focus on the research process with applications to problems significant to the nursing discipline.

#### NRS 550 Nursing Research II (3)

Focus on data analysis, statistical methods, computer usage and presentation of research findings. Prerequisite: NRS 530.

#### NRS 600 Concepts of Advanced Nursing Practice (2)

Application of a selected nursing theory or conceptual framework to advanced nursing practice in a clinical setting.

Corequisite: NRS 500.

**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 decisions.

Prerequisite: ACC 512.

**NRS 611 Pathophysiologic Dimensions of Adult Health (3)**

Examination of advanced physiologic concepts as they relate to alterations in adult health.

Prerequisite: NRS 500, 600.

**NRS 612 Advanced Nursing in Adult Health I (3)**

Integration of multidimensional health assessment and clinical decision-making skills in the advanced nursing care of adults.

Prerequisite: NRS 611.

**NRS 614 Advanced Nursing in Adult Health II (3)**

Nursing care of clients using the theory and practice of advanced nursing interventions; includes comprehensive evaluation of care.

Prerequisite: NRS 612.

**NRS 630 Management Process in Nursing Administration (3)**

Examination of systems theory, role 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.

**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 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 managers roles.

Prerequisite: All core and 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 track courses except NRS 690.

**NRS 650 Independent Study in Nursing (1 to 4)**

Advanced independent study in a specialty area.

Prerequisite: Permission of instructor.

**NRS 690 Master's Thesis (2)**

Application of research process to a nursing problem.

Prerequisite: All core and track courses.

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