

OAKLAND UNIVERSITY

Graduate Study Catalog 1983-1985

Rochester, Michigan



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Graduate Study Catalog 1983-1985

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Oakland University, as an equal opportunity and affirmative action institution, is committed to compliance with federal and state laws prohibiting discrimination, including Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. It is the policy of Oakland University that there shall be no discrimination on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, veteran status or other prohibited factors in employment, admissions, educational programs or activities. Inquiries or complaints may be addressed to the Director, Office of Equal Opportunity, 152 North Foundation Hall, Oakland University, Rochester, Michigan 48063.

TABLE OF CONTENTS

Academic Calendar	4
University Officers	6
Graduate Council	7
General Information	8
Policies and Procedures	15
College of Arts and Sciences	
Department of Biological Sciences	24
Department of Chemistry	30
Department of English	35
Department of History	40
Department of Linguistics	45
Department of Mathematical Sciences	50
Department of Music	58
Department of Physics	64
Department of Political Science	69
Department of Psychology	73
Department of Sociology	77
School of Economics and Management	81
School of Engineering and Computer Science	95
School of Human and Educational Services	116
School of Nursing	147
Center for Health Sciences	149
Index	152
Campus Map	156

Academic Calendars

Fall 1983

Registration T, W, Th,
Labor Day Holiday M
Classes Begin 8 a.m. T
Fall Commencement Sunday
Thanksgiving Recess Begins 10 p.m. W
Classes Resume 8 a.m. M
Classes End 5:30 p.m. M
Exams Begin 6 p.m. M
Exams End 12 noon S

August 30, 31, Sept. 1
September 5
September 6
September 18
November 23
November 28
December 12
December 12
December 17

Winter 1984

Registration T
Classes Begin 8 a.m. W
Winter Recess Begins 10 p.m. S
Classes Resume 8 a.m. M
Classes End 3:30 p.m. M
Exams Begin 4 p.m. M.
Exams End 12 noon S

January 3
January 4
February 25
March 5
April 16
April 16
April 21

Spring 1984

Registration M
Classes Begin 8 a.m. T
Memorial Day Holiday M
Spring Commencement Sunday
Classes End 10 p.m. T
Final Exams W, Th

April 30
May 1
May 28
June 3
June 19
June 20, 21

Summer 1984

Registration M
Classes Begin 8 a.m. T
Independence Day Recess 10 p.m. T
Classes Resume 8 a.m. Th
Classes End 10 p.m. T
Final Exams W, Th

June 25
June 26
July 3
July 5
August 14
August 15, 16

Fall 1984

Registration T, W, Th
Labor Day Holiday M
Classes Begin 8 a.m. T
Fall Commencement Sunday
Thanksgiving Recess Begins 10 p.m. W
Classes Resume 8 a.m. M
Classes End 5:30 p.m. M
Exams Begin 6 p.m. M
Exams End 12 noon S

August 28, 29, 30
September 3
September 4
September 16
November 21
November 26
December 10
December 10
December 15

Winter 1985

Registration W
Classes Begin 8 a.m. Th
Winter Recess Begins 10 p.m. S
Classes Resume 8 a.m. M
Classes End 3:30 p.m. M
Exams Begin 4 p.m. M
Exams End 12 noon S

January 2
January 3
February 23
March 4
April 15
April 15
April 20

Spring 1985

Registration M
Classes Begin 8 a.m. T
Memorial Day Holiday M
Spring Commencement Sunday
Classes End 10 p.m. T
Final Exams W, Th

April 29
April 30
May 27
June 2
June 18
June 19, 20

Summer 1985

Registration M
Classes Begin 8 a.m. T
Independence Day Recess 10 p.m. W
Classes Resume 8 a.m. M
Classes End 10 p.m. W
Final Exams Th, F

June 24
June 25
July 3
July 8
August 14
August 15, 16

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Kresge Library Mildred Merz

GENERAL INFORMATION

OAKLAND UNIVERSITY

Oakland University is a medium-sized state institution with a diverse set of academic offerings at the undergraduate and graduate levels. Anchored by a strong liberal arts program, the university is organized into a College of Arts and Sciences, and Schools of Economics and Management, Human and Educational Services, Engineering and Computer Science, and Nursing, and a Center for Health Sciences.

All academic programs of the university are accredited by the North Central Association of Colleges and Schools.

The university faculty, whose number now exceeds 400, has a distinguished record of research and scholarship. One of the focal points of the research is the Institute of Biological Sciences, a nationally recognized center for research of the eye. The university has also established national reputations in several undergraduate and graduate degree programs.

Complementing its academic program, Oakland has a major public service program emphasizing the professional performing arts. Meadow Brook Theatre, a regional theatre, is located on the campus, and the university's Meadow Brook Music Festival is the summer home of the Detroit Symphony Orchestra. Meadow Brook Hall, home of the university's benefactors, now serves as a major conference and cultural center for the community and university.

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

Located between the cities of Pontiac and Rochester, Oakland is easily accessible to millions of residents in the metropolitan Detroit area because of its proximity to major freeways. The natural beauty of the campus, much of it still wooded and undeveloped, is enhanced by a comprehensive set of recreational facilities and a modern physical plant that houses the university's academic and public service programs.

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 further to 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 cellular biology of aging, in medical physics, and in health and environmental chemistry; Master of Arts in English, history, linguistics and sociology; Master of Science in biology, chemistry, applied mathematics, applied statistics and physics; and Master of Public Administration and Master of Music. The Center for Health Sciences and the College of Arts and Sciences jointly offer a Master of Science degree in medical physics. The School of Human and Educational Services offers programs leading to the Doctor of Philosophy degree in reading, the Education Specialist degree, the Master of Arts in counseling, the Master of Arts in Teaching degree in early childhood, elementary education, reading, and special education. The College of Arts and Sciences and the School of Human and Educational Services jointly offer programs leading to the degree of Master of Arts in Teaching in English and in mathematics. The School of Engineering and Computer Science offers the Doctor of Philosophy degree in systems engineering and the Master of Science degree in computer and information science, engineering management, electrical and computer engineering, mechanical engineering, and systems and industrial engineering. The School of Nursing offers a Master of Science degree and the School of Economics and Management offers the degree of Master of Business Administration.

Graduate programs exist within the framework of the university's role and mission statement and have their philosophical underpinning in it. They are linked closely to the research, scholarship, and public service activities of the university. The programs and activities reinforce each other. Through the graduate programs

the intellectual and educational needs of students are served in relation to specific careers, cultural heritage is preserved and extended, and new knowledge is produced which is directed toward the extension of frontiers and/or the solution of technological, social, economic and political problems and issues. Programmatic balance is sought to assist in the achievement of these varied outcomes. Students are assumed to be full partners in the implementation of the programs. In the process they are educated in the methods of intellectual inquiry and critical analysis and trained in the skills needed for their chosen fields. Through this partnership the goals and purposes of graduate education are fulfilled.

DEVELOPMENT AND REVIEW OF GRADUATE PROGRAMS

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

EQUALITY OF OPPORTUNITY

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

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT, 1974

The federal Family Educational Rights and Privacy Act, 1974, pertains to confidential student educational records. This legislation allows students the right to view upon request their own confidential educational records and restricts the use of these records by others. Copies of the Family Educational Rights and Privacy Act, 1974, may be obtained from the dean of students, 144 Oakland Center (377-3352), or from the U.S. Department of Health, Education, and Welfare.

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

ACCREDITATION AND AFFILIATIONS

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

The university is an institutional member of the following associations: American Anthropological Association; American Assembly of Collegiate Schools of Busi-

ness; American Association of Colleges for Teacher Education; American Chemical Society; American Council on Education; American Institute of Physics; American Mathematical Society; American Society for Engineering Education; American Sociological Association; Association of Departments of English; Council of Graduate Schools in the United States; Engineering Society of Detroit; Institute of International Education, Incorporated; International City Managers Association; Midwestern Association of Graduate Schools; Municipal Finance Officers Association; Society for Public Administration; and The Society of the Sigma Xi.

MICHIGAN INTERCOLLEGIATE GRADUATE STUDIES (MIGS)

The MIGS program is a cooperative inter-institutional arrangement which permits graduate students to take advantage of educational offerings available at another participating institution but not available at their own. It is open to any student in good standing in a graduate program at a member institution. Courses must be approved in advance by the student's graduate adviser and the MIGS liaison officer at both the home institution and the host institution. Admission by the host university is contingent on the availability of space and resources. The member institutions are Central Michigan University, Eastern Michigan University, Michigan State University, Michigan Technological University, Northern Michigan University, Oakland University, University of Michigan, Wayne State University, and Western Michigan University. Additional information is available in the Graduate School and from program directors.

CENTRALIZED AND SPECIALIZED RESEARCH FACILITIES

Office of Computer Services

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

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

Institute of Biological Sciences

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

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

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

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

The faculty and staff of the Institute of Biological Sciences include the following. Office of Director: Venkat N. Reddy, Director; Hitoshi Shichi, Assistant Director; Paulette Realy, Executive Secretary; and Bhargavan Chakrapani, Research Assistant. Professors: Venkat N. Reddy, Michael V. Riley, and Hitoshi Shichi. Associate Professor: Barry S. Winkler. Assistant Professors: Frank J. Giblin, and Kenneth R. Hightower. Research Associates: Rekha Garadi, Toshio Kodama, and Katsuhiko Yamamoto. Adjunct Professors: Nalin J. Unakar, and John R. Reddan.

Library Facilities

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

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

Library Collections

The university's Kresge Library holds 1,015,861 pieces of library material, plus unprocessed materials, manuscripts, memorabilia, and museum pieces. Included are 540,453 microforms, 9,549 records and phonotapes, 43,399 periodical volumes, approximately 159,895 government documents, and 262,565 cataloged circulating and reference books.

A \$100,000 fund was established by Oakland University students in memory of Matilda R. Wilson to develop the reference collection. Approximately 25,000 volumes form the collection, which includes atlases, bibliographies, dictionaries, encyclopedias, indexes, and yearbooks.

The library receives some 2,133 journals and newspapers. Journals are generally uncataloged and shelved alphabetically by title on the third floor of the library. Newspapers are shelved separately in the newspaper section of the same floor. Science journals include publications in biology, chemistry, computer science, engineering, mathematics, nursing, and physics. Current issues are displayed near the mini-lounge area.

Since 1964 the library has been a U.S. Government depository and receives about 80 percent of the depository items published each year. The library is also a depository for Michigan documents. These collections are indexed, respectively, by the *Monthly Catalog of U.S. Government Publications* and *Michigan Documents*.

Library Services

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

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

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

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

Office of Institutional Research

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

SHES Resource Center

The Resource Center of the School of Human and Educational Services (SHES) contains a variety of printed materials, such as pamphlets, curriculum guides, and manuals for research and instructional purposes. Multi-media instructional devices are also concentrated here. In addition to the simpler equipment, such as film strips, tapes, and overhead projectors, the center has facilities to produce and make available video tapes and educational television materials. Students have the opportunity to acquaint themselves with new developments in the instructional techniques, and educational researchers have at their disposal the technological and recording facilities needed for their investigations.

Psychology Clinic

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

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

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

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

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 recommendation sent directly by their originators to the admissions office. Detailed instructions are included in the "Application for Admission to Graduate Study," available from this office. Additional admission information may be found in the sections of this catalog describing the programs offered by the various schools and departments. Admission will be granted by the dean of the Graduate School 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. 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 the Graduate School. A planned course of study to satisfy the requirements for both degrees is necessary, and a copy of the plan will be included in the student's official graduate file.

Conditional Admission

If an applicant's grade point average is below program requirements a conditional admission may be authorized by the department or school involved with the concurrence of the dean of the Graduate School. Occasionally students are admitted who are judged insufficiently prepared to undertake course work for graduate credit. Such students are required to complete additional course work, specified by the program area involved, without credit toward a degree. Students who do not meet the conditional requirements stipulated on admission are subject to dismissal. While in a conditional status students will not be eligible to receive their degree or transfer credits 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 teacher certification after having received their bachelor's degrees, 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 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 a student who wishes to take graduate courses but not to work toward a degree. A student in special graduate status is not assigned an adviser. Credit earned at Oakland University under special graduate status—but none that has been earned at another institution—will be officially recorded. This credit may be applied toward degree requirements if a student later is admitted to a degree program and if the credit is

appropriate to the degree objective. However, admission as a special graduate student in no way assures subsequent admission to a degree program. If students in this status wish to apply for admission to a program, they must apply at the admissions office, pay an application fee, and provide official transcripts and letters of recommendation. A decision on the admission is then made by the academic department or school with concurrence of the dean of the Graduate School. Requirements and regulations prevailing for the semester of formal admission to a graduate program will govern the student's program.

Post-Master's Status

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

Post-Baccalaureate Status

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

Application for Admission by Foreign Students

Foreign students should write to the admissions office at least one year before the date they hope to enter the university. They will be sent instructions and application forms which they should complete and return promptly. If their applications are approved, they will receive a certificate of admission to the university. Foreign students are normally 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. Scores from the Test of English as a Foreign Language (TOEFL) or a comparable examination are also required as is a statement attesting to the applicant's financial standing. The Graduate Management Admission Test (GMAT) is required for admission to the M.B.A. program in lieu of the GRE.

Special Needs Groups

The Special Advising Office provides support services for students who need special help for a successful academic experience at Oakland. It assists students with disabilities or physical handicaps and should be consulted about available services either before or at the time the application for admission is sent to the admissions office. Please address requests for information to the Special Advising Office, Oakland University, Rochester, MI 48063.

ACADEMIC PROCEDURES

Inactive Status

A student who has been admitted to a program but has not registered for an Oakland University graduate course for one to five years is considered inactive. In order to return to degree-seeking status, the student must apply for readmission, and the application reviewed by the appropriate admissions committee.

All application material and correspondence in the graduate folder is destroyed five years after the last enrollment. A student who wishes to take classes subsequently must follow the regular admission procedures. This does not affect Oakland transcripts which remain available as described below.

Transcripts

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

Petition of Exception

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

Restriction of Student Records

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

Time Limit

Credit earned more than six calendar years before a master's degree is to be granted may not be used to fulfill the degree requirements. Time limits for doctoral programs will be found within the program descriptions.

Academic Advising

Every student admitted to a graduate program is assigned an adviser or an advising committee upon admission. The advisers will be faculty members, usually in the school or department in which the student is enrolled. Graduate students not in a degree program do not have access to formal advising arrangements; they should contact the appropriate academic department if course selection advice is needed.

Transfer Credit

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

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

Courses Taken as an Undergraduate

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

Course Competency Credit

Competency examinations are offered by some departments. Students should consult with 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 who is simply dropping a course will need only the instructor's signature; a student adding a course will also need the signature of the instructor of the new course. The add/drop form is then presented to the registrar for processing. If a refund is involved it will be mailed to the student. The first two weeks of a semester (one week in spring or summer sessions) are a no-grade period for dropping courses.

Withdrawal

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

Academic Probation

Students who are making unsatisfactory 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.

Dismissal from the University

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

Appeal Procedures for Dismissals and Denial of Admission

A student seeking reconsideration of a dismissal or denial of admission should begin at the program level and proceed to the dean of the Graduate School, if necessary.

If at any time the student is dissatisfied with the results of reconsideration, an appeal may be made in writing to the Graduate Council Executive Committee.

Based on the student's statement and information from the dean, the committee will vote either to dismiss the appeal or to proceed with it. In the latter case, the committee will appoint an ad hoc appeal committee consisting of three faculty members, at least one of whom is a Graduate Council member. The appeal committee is charged to judge whether the proceedings leading to the decision have been fair and

whether the basis for decision is sound, and to report the decision to the Graduate Council Executive Committee. The committee will vote either to uphold the denial/dismissal or to admit/reinstate the student. The Graduate School will abide by the decision.

Credit System

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

Course Numbering System

Courses numbered 100 to 299 are introductory or intermediate undergraduate courses. Courses numbered 300 to 499 are advanced courses primarily for undergraduates. A department or school may authorize or refuse to authorize graduate credit for any course numbered 300 to 499. Courses numbered 500 and above are primarily for graduate students. Qualified undergraduates may enroll in a class numbered 500 to 599 provided they have obtained written permission to do so from the department or school offering the class.

Grading

To qualify for a master's degree a student must have an average of at least 3.0 in all courses taken at Oakland University as a graduate student. No grade below 2.0 may be applied toward a graduate degree. In programs offered by the School of Human and Educational Services, and in the English, music, and psychology programs, two courses below 3.0 automatically render a student subject to evaluation and possible dismissal, as does one grade below 2.5 in music or psychology, and one below 2.0 in a program in the School of Human and Educational Services. The graduate grading system, starting fall 1981, 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, N, 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. Numerical and "N" grades only can be removed from a transcript through course repetition.
4. The meanings of nonnumeric 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 a date specified in the Schedule of Classes each semester.
 - b. After the end of the refund period the instructor will assign a numerical grade or a grade of "I." The "I" grade indicates that there are reasonable grounds for believing the student can complete the course and is entitled to extra time for completion.
A grade of "I" will remain on a transcript permanently unless replaced by a numerical or "S" grade during the appropriate period. "I" grades must be changed during the first four weeks of the next semester in which a student registers and before three semesters have intervened. Extensions are permitted on request of the instructor to the dean of the Graduate School.
 - c. The grade of "P" (progress) is a temporary grade that may be given only in a course that could not be completed in one semester. Prior approval must be obtained from the appropriate committee on instruction for each course in which "P" grades are to be assigned. The "P" grade is given only for satis-

factory work. "P" grades must be removed within two calendar years of the date of assignment; otherwise the "P" converts to an "I" which remains on the transcript. This rule does not apply to doctoral thesis work.

- d. The grade of "S" is given in certain selected courses and is meant to imply 3.0 or better. Courses in which S/N 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 "N" is given to graduate students only when a course is graded S/N.
 - 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.
5. All grades and marks assigned will appear on a student's transcript. However, only numerical grades are used in the determination of student's grade point average.

Master's and Doctoral Theses, Terminal Projects

Copies of theses and final reports describing the results of terminal projects will be sent to the Graduate School after the reports have been approved by the project director. They will be available to students and other interested members of the university community. "A Guide to the Preparation of Graduate Theses and Project Reports" is available in the University Bookcenter.

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 \$10 processing fee either when registering for the last semester or by the dates listed below. A candidate who does not graduate in that semester must reapply.

Expected Graduation Date	Last Date for Applying for Degree
Spring 1983	May 16, 1983
Summer 1983	July 11, 1983
Fall 1983	October 7, 1983
Winter 1984	February 6, 1984
Spring 1984	May 15, 1984
Summer 1984	July 10, 1984
Fall 1984	October 8, 1984
Winter 1985	February 5, 1985
Spring 1985	May 14, 1985
Summer 1985	July 9, 1985
Fall 1985	October 7, 1985

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

FEES

General Policy

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

Application Fee

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

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 \$71.00 per credit while nonresidents are assessed \$142.00 per credit. The fee for off-campus courses is \$75.50 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.

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.

Program Transfer Fee

Students who wish to transfer from one graduate program to another must submit a transfer request and a \$20 transfer fee. Their files will then be forwarded for consideration by the admissions committee of the new program.

Enrollment Fee

All students are charged a \$20 enrollment fee each semester or session in which they are registered.

Late Registration Fee

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

Special Fees

Graduate students who register for 8 or more credits are charged an additional \$35 (\$6 health service allocation, \$23 Oakland Center fee, and \$6 transportation use allocation). Those who register for less than 8 credits are assessed \$18 (\$3.50 health service allocation, \$11.50 Oakland Center fee, and \$3 transportation use fee).

Resident Housing: Reservations, Deposit, 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 1982-83 rate for room and board is \$2,345 for the academic year. Special options such as room only and single rooms are available to graduate students. If a student signs a housing contract before or during fall semester, that contract is binding for both the fall and winter semesters. If the contract is signed during the winter semester or spring or summer session, it is binding for the single semester or session. The room and board fee is due at registration or may be paid in four install-

22/Policies and Procedures

ments, the first of which is due at registration. The second, third, and fourth installments are due on the first day of the three months following registration. If a student withdraws from the university, housing fees are refunded on a prorated basis.

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

Refund of Fees

A student who withdraws from the university or drops a course that reduces his/her credit load may receive a refund of fees upon application to the appropriate office. Failure to drop or withdraw formally will result in forfeiture of any refund. Graduate students withdrawing from the university apply to the Graduate School. Changes in enrollment are processed in the Office of the Registrar. The amount of refund is specified in each schedule of classes. If a student living in the residence halls withdraws from the university, room and board fees are refunded on a prorated basis less an early withdrawal assessment. Formal notice of withdrawal must be given to the residence halls office.

Out-of-State Tuition Regulations

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

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

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

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

1. Continuous presence in Michigan when not enrolled as a student.
2. Reliance upon Michigan sources for financial support.
3. Domicile in Michigan of family, guardian, or other relative or persons legally responsible for the student.
4. Former domicile in the state and maintenance of significant connections therein while absent.
5. Ownership of a home.
6. Long-term military commitments in Michigan.

Policies and Procedures/23

7. Acceptance of offer of permanent employment in Michigan.
8. Other factors indicating an intent to make Michigan the student's permanent domicile will be considered by the university in reclassifying a student.

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

1. Voting or registering for voting.
2. Employment in any position normally filled by a student.
3. The lease of living quarters.
4. A statement of intention to acquire a domicile in Michigan.
5. Domicile in Michigan of student's spouse.
6. Automobile registration.
7. Other public records such as birth and marriage records.

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

FINANCIAL AID, ASSISTANTSHIPS, AND SCHOLARSHIPS

Student Loans

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

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

Part-Time Employment

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

Graduate Assistantships and Scholarships

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

Extremely well-qualified students are invited to apply to the Graduate School for consideration for the Bennett Scholarship in Chemistry, and for the Deans' Scholarship. 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.

COLLEGE OF ARTS AND SCIENCES

Office of the Dean:

Brian P. Copenhaver, Dean
Isaac Eliezer, Associate Dean
Sheldon Appleton, Associate Dean for Advising

DEPARTMENT OF BIOLOGICAL SCIENCES

Chairperson: Nalin J. Unakar

Professors:

Frank M. Butterworth, Ph.D., Northwestern University
William C. Forbes, Ed.D., Columbia University; Ph.D., University of Connecticut
John R. Reddan, Ph.D., University of Vermont
Arun K. Roy, Ph.D., Wayne State University
Nalin J. Unakar, Ph.D., Brown University
Walter L. Wilson, Ph.D., University of Pennsylvania

Associate Professors:

John D. Cowlshaw, Ph.D., Pennsylvania State University
Esther M. Goudsmit, Ph.D., University of Michigan
Egbert W. Henry, Ph.D., The City University of New York
Robert D. Hunter, Ph.D., Syracuse University
Paul A. Ketchum, Ph.D., University of Massachusetts
Charles B. Lindemann, Ph.D., State University of New York at Albany
Virinder K. Moudgil, Ph.D., Banaras Hindu University
Asish C. Nag, Ph.D., University of Alberta
Moon J. Pak, M.D., Yonsei University; Ph.D., University of Minnesota

Assistant Professors:

George J. Gamboa, Ph.D., University of Kansas
Martins Linauts, Ph.D., Ohio State University
Daphna R. Oliver, Ph.D., University of California, Los Angeles
Ann K. Sakai, Ph.D., University of Michigan

Adjunct Professors:

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

Instructor:

Robert Baran, B.S., Wayne State University

THE DOCTOR OF PHILOSOPHY IN CELLULAR BIOLOGY OF AGING

A doctoral program in the Biomedical Sciences has been developed with three degree majors in Cellular Biology of Aging, Health and Environmental Chemistry, and Medical Physics.

It is in the process of approval at the time of printing of this catalog. Full implementation of one or more of the degree majors may occur during the life of this catalog. Details of the doctoral degree major in Cellular Biology of Aging are included here for information. Announcement of the start of the program will be made in timely fashion.

Graduates of this program will be capable of investigating research problems in the broad area of cellular biology of aging using modern techniques of cellular and molecular biology. Scientists who graduate from this program will have training to conduct research on the causes and mechanisms of the aging process, and diseases and other problems of the aged. No other doctoral program in the state of Michigan specifically focuses on these areas of the aging process. Training of doctoral-level biologists to conduct research on the problems associated with aging, and the process of aging, is critical, since in the near future a large proportion of the American population will consist of individuals in their seventies and eighties. The program, although based in the Department of Biological Sciences, is interdisciplinary and will involve the other science departments and psychology department in both course work and research.

Admission

Admission to the program requires a bachelor's degree or its equivalent from an accredited institution with an undergraduate grade point average of 3.00 or higher on a 4.00 scale. The applicant should have a strong record in science with at least 20 credits in biology, 16 credits in chemistry, 10 credits in physics, and 8 credits in mathematics. The student with deficiencies in any of these areas may be admitted if exceptional potential in research is provided. The applicant must have sent to the Graduate School all academic records, results from the Graduate Record Examination including the subject portion taken in biology, and letters of recommendation from three scientists indicating scholarly achievements and promise of the candidate.

Requirements for the Degree

The basic requirements for the Ph.D. are completion of a unified program of formal course work and independent research directed and approved by the candidate's thesis committee and the Program Administration Committee.

Proficiency examinations and course work: A background in physiology, biochemistry, genetics, development, and statistics will be needed before the student can enter into the core program. Upon acceptance to the program the proficiency of the student in particular areas will be determined from the applicant's academic record and proficiency exams. Deficiencies will be made up from preliminary courses: physiology (BIO 321), developmental biology (BIO 323), genetics (BIO 341), cellular biochemistry (BIO 407), biochemistry (BIO 453 or 454), statistics (STA 321), and computer programming (CIS 120, 121) or other suitable courses listed in the catalog during the first year. If there are no deficiencies in the view of the Program Administration Committee, the student may enter directly into the core program. Up to 12 credits of preliminary courses may be applied toward the total of 90 credits.

Program Administration Committee (PAC): The Program Administration Committee will consist of seven of the participating faculty appointed by the dean of the Graduate School on the recommendation of the chairperson of the Department of Biological Sciences. In addition the coordinator of the graduate programs in the College of Arts and Sciences will serve in an *ex officio* and nonvoting capacity. The PAC will be charged with the general administration of the program plus admissions, determination of student proficiency, approval of student thesis committees, and final approval of all requirements including the thesis. The PAC will appoint specific faculty members to advise each incoming student until the student's thesis committee is established.

Student Thesis Committee (STC): The Student Thesis Committee will be a three-member committee mutually chosen by the PAC and the student in question and approved by the thesis adviser and by the dean of the Graduate School. The STC is charged with the guidance, preliminary approval of requirements, and course selection with the student in question, in addition to counseling on scientific matters and ultimately, giving preliminary approval of the thesis itself. The student's thesis adviser will be the chairperson of the STC.

Preliminary examination: Within two years after admission into the program the student must pass a comprehensive, written and oral preliminary 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 PAC. If the student does not pass the examination, the STC and PAC will determine whether the exam can be retaken. A record of the results will be forwarded to the dean of the Graduate School.

Research and thesis: The major component of the program is the successful completion of an original laboratory research project written in the form of a thesis but publishable in a national journal. Prior to beginning the thesis the student should present to the STC a research 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 STC evaluation and recommendation will be forwarded with the proposal to the PAC. Also the student must successfully complete at least 30 credits of BIO 799 Doctoral Research. Following the writing of the thesis the student will defend the thesis in front of the STC and any interested members of the academic community. The results of the defense will be sent to the PAC. The doctoral candidate will subsequently present the results in a seminar open to the public.

Residence: All students are required to fulfill a residency requirement for this program. Although students are encouraged to complete the program by continuous full-time enrollment, the candidate must satisfy a minimum residency requirement of full-time study for the final three semesters (12 credits per semester).

Credit requirement: A minimum of 90 credits beyond the baccalaureate degree is required, which would include preliminary, core, elective, and graduate research credits. Some of the courses (BIO 511, 513, 515, and 517) can be used for both the M.S. and Ph.D. programs. Transfer credits must meet graduate level requirements and receive approval by the PAC and the Graduate School.

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 prepare 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 3.0 or better (on a 4.0 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 should have transcripts of all college-level work, two letters of reference, and scores on the Graduate Record Examination (including the subject test in biology) sent to the admission office.

Requirements for the Degree

The candidate for the cellular/molecular biology track must complete 36 credits in biology (16 of which must be in courses numbered 500 and above) including at least 4 credits in each of the four areas (developmental biology-morphology, bio-

chemistry-biophysics, cell physiology, and genetics). At least 8 credits must be a combination of credits received in graduate laboratory courses and credits received in graduate research (BIO 690). One credit in the biology seminar course and an acceptable thesis are also required. Students are expected to attend the seminar during each semester.

The candidate for the ecology, evolution, and behavior track must complete the following requirements (36 hours): 8 credits of BIO 690—graduate research, four 2-credit topics courses (BIO 581, 582, 583, 584) or their equivalents as approved by the student's committee, 4 credits of a 500-level biology course (not BIO 581-584) or its equivalent as determined by the student's committee, and 16 credits of biology courses and cognates. Students, with the advice and consent of their committees, will select cognate courses in the following areas: statistics, computer science, chemistry, and environmental science.

The completed thesis for both the cellular/molecular biology track and the ecology, evolution, and behavior track must be approved by a thesis committee appointed by the departmental graduate committee in consultation with the student's thesis adviser. Undergraduate biology courses which may be used to satisfy the overall credit requirements are listed below.

Research Areas and Facilities

The 22-member department, housed in Dodge Hall, is engaged in a variety of research projects including cellular aging, sperm motility, aquatic biology, hormone action, microbiology, insect behavior, neuroanatomy, plant ecology, physiology of the eye, cell physiology, and gene regulation. Available facilities include a largely natural 1,500-acre campus, electron microscopy laboratory, isotope laboratory, dark rooms, x-ray facilities, herbarium collection, greenhouse, animal facilities, cold rooms, tissue culture rooms, environmental growth chambers, and gene cloning facilities. Available equipment includes scintillation counters, field sampling and testing equipment, recording spectrophotometers, amino acid analyser, clinical and ultracentrifuges, high speed cine camera and motion analyser, Honeywell multics time-sharing computer, marine aquaria, telethermometers, autoclaves, and electrophoresis apparatus. In addition, facilities at the Cranbrook Institute of Science may be utilized by OU 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.

UPPER LEVEL AND GRADUATE COURSES

BIO 407 Cellular Biochemistry (4)

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

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

BIO 408 Cellular Biochemistry Laboratory (1)

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

Corequisite: BIO 407.

BIO 421 Medical Microbiology (4)

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

Prerequisite: BIO 319.

BIO 422 Medical Microbiology Laboratory (2)

To accompany BIO 421.

BIO 423 Immunology (3)

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

BIO 425 Biophysics (4)

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

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

BIO 426 Biophysics Laboratory (1)

To accompany BIO 425.

BIO 427 Human Genetics (4)

Key aspects of classical and molecular genetics of humans will be considered. Topics are inborn errors of metabolism, cytogenetics, somatic cell genetics, biochemical genetics, immunogenetics, and the genetics of cancer.

Prerequisite: BIO 341 and permission of instructor.

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 431 Cellular Motility (4)

A survey of the role and mechanism of cell movement in living systems, with an introduction to applicable principles of physics and chemistry. Special consideration will be given to developmental movements (cell migration), cell division (mitosis), and the movement of microorganisms.

Prerequisite: BIO 200, BIO 321, PHY 101, and CHM 144.

BIO 433 Advanced Microbiology (4)

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

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

BIO 434 Advanced Microbiology Laboratory (2)

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

Corequisite: BIO 433.

BIO 435 Developmental Genetics (4)

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

Prerequisite: BIO 325 and 341 or equivalent.

BIO 436 Developmental Genetics Laboratory (1)

To accompany BIO 435.

BIO 437 Virology (4)

Molecular biology of viruses, predominantly bacterial.

Prerequisite: BIO 325, 341, or 433.

BIO 438 Virology Laboratory (1)

To accompany BIO 437.

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 450 Visual Physiology (2)

A course primarily on the structure and function of the vertebrate visual system. Topics in-

clude optical properties of the eye: absorption of light energy by photo-pigments, transduction processes in photoreceptor cells, transmission and encoding of visual information through the retina, and color vision.

Prerequisite: BIO 321 and permission of instructor.

BIO 460 Neuroanatomy (4)

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

Prerequisite: BIO 205 or 381 or permission of instructor.

BIO 463 Cell Biology (4)

Prerequisite: BIO 305 and permission of instructor.

BIO 464 Cell Biology Laboratory (1)

To accompany BIO 463.

BIO 480 Biochemical Pharmacology (2)

Classification of drugs and a survey of their use, abuse, and side effects. Structure-activity relationship and biochemical basis of drug action on biological systems will be emphasized.

Prerequisite: BIO 321 and 325 or equivalents. CHM 303.

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

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

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

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

Corequisite: BIO 511.

BIO 513 Advanced Topics In Cell Physiology (4)

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

BIO 514 Graduate Tutorial Lab In Cell Physiology (2)

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

Corequisite: BIO 513.

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

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

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

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

Corequisite: BIO 515.

BIO 517 Advanced Topics In Genetics (4)

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

BIO 518 Graduate Tutorial Lab In Genetics (2)

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

Corequisite: BIO 517.

BIO 581 Topics In Physiological Ecology (2)

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 (2)

Advanced topics in evolutionary biology including the coevolution of plants and animals, rates of evolution, life history strategies, and sexual selection. Part of the course will consist of student presentations of current, published research.

BIO 583 Topics In Community and Population Biology (2)

Factors affecting the distribution and growth of plants, predator/prey interactions, structure in marine intertidal zones, growth and regulation of animal populations, local plant communities and practical field techniques for sampling plant composition.

BIO 584 Topics In Applied Biology (2)

Biological applications to agriculture, pest control, maintenance of natural resources, disease control, and the impact of humans on the environment.

BIO 611**Graduate Biology Seminar (1)**

Graduate student presentation of scientific data dealing with biological problems.

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 781**Seminar on Aging (2)**

Discussion of recent developments in the field of aging research.

Prerequisite: Permission of the instructor.

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

DEPARTMENT OF CHEMISTRY

Chairperson: Paul Tombouliau

Professors:

Gottfried Brieger, Ph.D., University of Wisconsin
 Isaac Eliezer, Ph.D., Hebrew University (Jerusalem)
 Kenneth M. Harmon, Ph.D., University of Washington
 Lewis N. Pino, Ph.D., University of Buffalo
 Joel W. Russell, Ph.D., University of California (Berkeley)
 Parbury P. Schmidt, Ph.D., University of Michigan
 R. Craig Taylor, Ph.D., Princeton University
 Paul Tombouliau, Ph.D., University of Illinois

Associate Professors:

Denis M. Callewaert, Ph.D., Wayne State University
 Julien Gendell, Ph.D., Cornell University
 Steven R. Miller, Ph.D., Massachusetts Institute of Technology
 Michael D. Sevilla, Ph.D., University of Washington
 Robert L. Stern, Ph.D., Johns Hopkins University

Assistant Professors:

Bandana Chatterjee, Ph.D., University of Nebraska (Lincoln)
 Tadeusz Malinski, Ph.D., University of Poznan (Poland)
 Kathleen Moore, Ph.D., Wayne State University
 Willard St. John, Ph.D., Johns Hopkins University

Adjunct Professor:

Philip Weiss, Ph.D., New York University

THE DOCTOR OF PHILOSOPHY IN HEALTH AND ENVIRONMENTAL CHEMISTRY

A doctoral program in the biomedical sciences has been developed with three degree majors: cellular biology of aging, health and environmental chemistry, and medical physics. It is in the process of approval at the time of printing of this catalog. Full implementation of one or more of the degree majors may occur during the life of this catalog. Details of the doctoral degree major in health and environmental chemistry are included here for information. An announcement regarding the start of the program will be made in a timely fashion.

Graduates of this doctoral program will have the theoretical background and practical skills necessary for successful contribution to the solution of environmental and health-related chemical problems. Scientists who graduate from this program 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 doctoral program

in Michigan focuses on these particular areas of chemistry; yet the contribution of highly trained doctoral-level chemists is essential to the resolution of major problems facing the nation in these areas. The program, although based in the Department of Chemistry, is interdisciplinary and will involve the other science and mathematics departments in course work and research.

Admission

This Ph.D. program is intended for students with academic backgrounds in the physical sciences. A bachelor's degree in chemistry, biology or physics from an accredited institution with a strong academic record in the science area is the minimum entrance requirement. Students with a master's degree in one of the natural sciences are also acceptable for admission. Admission is highly selective; the prospective student should submit transcripts of all previous academic work and letters of recommendation from three faculty members capable of evaluating scholarly achievements and promise, and results of the Graduate Record Examination (subject test in chemistry).

Requirements for the Degree

The basic requirement for the Ph.D. is completion of a unified program of formal course work and independent research, directed and approved by an individual advisory committee. The following specific requirements apply to all students in this program.

Proficiency examinations and course work: Within 12 months after acceptance into the program each student shall have demonstrated proficiency in the following areas: analytical chemistry, organic chemistry, physical chemistry, inorganic chemistry, and biochemistry. Proficiency examinations shall be the preferred method for demonstrating proficiency, although students whose backgrounds are deficient in one or more of these areas may satisfy the proficiency requirement by successful completion (a grade of 3.0 or higher) of the following courses: analytical chemistry (CHM 225), organic chemistry (CHM 335), physical chemistry (CHM 441 or 442), inorganic chemistry (CHM 452, 453), computer programming (CS 377), and biochemistry (CHM 453).

Since most chemistry majors will not have taken all these courses as undergraduates we anticipate that very few students will have proficiency at this advanced level in all subject areas. Thus up to 12 credits of course work in these subject areas will normally be taken during the first semester in residence at Oakland.

Program Committee: The program committee will consist of one faculty appointed by the dean of the Graduate School on recommendation from the chair of the chemistry department, from each of the option areas as well as the coordinator of the graduate program in the College of Arts and Sciences. The latter will be *ex officio* and nonvoting. The program committee will oversee the operation of the program and will approve each graduate student's choice of option, elective course work, and thesis adviser.

Thesis Committee: The thesis committee shall consist of the thesis adviser and two other faculty appointed by the dean of the Graduate School on recommendation of the program committee. The thesis committee shall review thesis proposals before initiation of a project as well as later review of the thesis itself.

Preliminary examination: Within two years after admission into the program, the student shall take a preliminary examination administered by the program committee that shall cover basic chemical and biochemical concepts and provide an assessment of the candidate's ability to use analytical reasoning. If the candidate fails to pass the examination which shall consist of both written and oral parts the committee may allow him/her to retake the examination in the next semester. Failure to pass the examination within two attempts shall constitute failure in the Ph.D. program.

Research and thesis: An integral and major component of the program is the successful completion of an original laboratory research project utilizing state-of-the-art analytical methods to study a problem of current interest. Each student shall, in consultation with his/her adviser, prepare a thesis proposal for review by the thesis committee prior to initiation of the research project. The student shall, at the request of the committee, orally defend the proposal or elaborate on the methods for data collection and analysis. Approval of the thesis proposal by the thesis committee is required prior to thesis research. The student shall complete at least 32 credits of CHM 799 (doctoral research in chemistry). However, merely amassing credits shall not be sufficient for completion of the research project. The project shall be deemed completed and ready for the preparation of a thesis at such time as the student's advisory committee agrees that the student has completed a significant original 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 thesis for submission to the thesis committee, and shall defend the thesis in a public oral examination conducted by the thesis committee. Acceptance of the thesis by the Graduate School requires favorable recommendation by the thesis and program 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. Minimal residency requirement shall be full-time residency (12 credits per semester) for at least three consecutive terms, with at least two of these devoted primarily to the student's research project.

Credit requirement: Including proficiency credits, core curriculum credits, option credits, and thesis research credits, a minimum of 90 total credits will be required.

THE MASTER OF SCIENCE IN CHEMISTRY

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

Admission

An applicant for admission to regular status in the Master of Science program should have received a bachelor's degree within the past five years from an accredited institution. Students should have completed at least 36 credits in chemistry (including all major areas), 12 credits in mathematics (calculus and above), and 8 credits in physics. Students with deficiencies in these areas may be asked to correct those deficiencies, and their graduation may thus be delayed. A grade point average of at least 2.85 (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 ordinarily must complete the following requirements: 32 credits in courses carrying graduate credit, of which 26 credits must be in chemistry. Of these 26 credits, 16 to 18 must be from

four of the following areas: biochemistry, inorganic chemistry, organic chemistry, physical chemistry, and analytical chemistry. At least 8 credits must be in CHM 690. Participation in departmental seminars is expected. The candidate must have demonstrated accomplishment in research and must complete a thesis approved by a departmental 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 and Facilities

Because graduate work in chemistry involves research and presentation of a master's thesis, the programs, facilities, and staff available are important. The various current research activities of the staff include high-resolution infrared spectroscopy, photochemistry of natural products, insect biochemistry, electron spin resonance of solid-state and biological systems, microwave spectroscopy, quantum mechanical models, organoboranes, ionic aromatic polymers, atmospheric chemistry, gas reaction kinetics, molecular structure and dynamics, Fourier spectroscopy, limnological chemistry, instrumentation design, theoretical quantum mechanics, non-equilibrium statistical mechanics, lanthanide shift reagents, organophosphorus chemistry, coordination chemistry, kinetics and thermodynamics of rearrangement processes in solution, electrochemistry, and relaxation techniques for slow proton transfers.

Among research facilities available to chemistry students are electronic computers, high- and low-resolution infrared spectrophotometers, analytical and preparative gas-liquid chromatographs including fraction collectors, catalytic hydrogenation equipment, continuous wave and Fourier Transform nuclear magnetic resonance spectrometers, radio-chemical counting equipment, a scintillation counter, polarographic and automatic titration equipment, electron spin resonance spectrometers, spinning-band fractionating columns, variety of high- and low-resolution visible and ultraviolet spectrophotometers, laser raman spectrophotometer, an ultracentrifuge, fluorometric and nephelometric equipment, and a large amount of electronic and vacuum instrumentation.

Course Offerings

(400-level courses may carry graduate credit only with permission of program adviser.)

CHM 428 Analog Electronics for Chemistry (2)

Introduction to basic circuit theory, with emphasis on practical electronic understanding of instrumentation and simple electronic techniques. Construction of modern circuitry for chemical measurement. Lecture and lab.

Prerequisite: CHM 225; Corequisite: MTH 154.

CHM 429 Digital Electronics for Chemistry (2)

Laboratory course emphasizing basic understanding of logic theory, digital devices, A/D and D/A conversion, logic programming, microprocessor operation, and interfacing.

Prerequisite: CHM 428; Corequisite: CIS 327.

CHM 444 Physical Chemistry III (3)

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

Prerequisites: CHM 343 and an approved APM course.

CHM 453-454 Biochemistry (3 each)

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

Prerequisite: CHM 204 or 235.

CHM 457 Biochemistry Laboratory (1 or 2)

Techniques of extraction, separation, identification, and quantification of biomolecules, includ-

ing 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)

Overview of the chemistry of the elements, with emphasis on ionic and covalent bonding, acid-base chemistry, nonaqueous solvent systems, descriptive chemistry of the main group, transition metal, and lanthanide elements. Introduction to ligand field theory, organometallic, and bioinorganic chemistry.
Prerequisite: CHM 342.

CHM 466 Inorganic Synthesis Laboratory (2)

Synthesis, analysis and characterization of inorganic and organometallic compounds.
Prerequisite: CHM 238; Corequisite: CHM 462.

CHM 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 234.

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 225 and 342.

CHM 522 Topics in Analytical Chemistry (3)

Selected subjects chosen from current analytical chemical areas, such as separation methods, instrumentation, and electrochemistry.
Prerequisite: CHM 225 and 342.

CHM 534 Advanced Organic Chemistry (3)

Detailed discussion of aspects of modern synthetic methods, stereochemistry, and reaction mechanisms.
Prerequisite: CHM 235.

CHM 535 Topics in Organic Chemistry (3)

Selected subjects drawn from modern research fields.
Prerequisite: CHM 235.

CHM 540 Symmetry in Chemistry (3)

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

CHM 541 Advanced Physical Chemistry (3)

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

CHM 542 Topics in Physical Chemistry (3)

Selected topics drawn from current areas of interest, such as quantum mechanics, statistical mechanics, thermodynamics, kinetics, and group theory.
Prerequisite: CHM 444.

CHM 553 Advanced Biochemistry (3)

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

CHM 554 Topics in Biochemistry (3)

Selected subjects drawn from the current fields of interest.
Prerequisite: CHM 454.

CHM 563 Advanced Inorganic Chemistry (3)

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

CHM 564 Topics in Inorganic Chemistry (3)

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

CHM 570 Industrial Chemistry (3)

A survey of the major sources and uses of chemicals, industrial chemical processes, and the chemistry of the fundamental raw materials for organic chemicals. Among the important features of the chemical industry to be examined are economics, organization, communication, patents, and government regulation.
Prerequisite: CHM 235.

CHM 581 Mammalian Toxicology (3)

General principles of toxicology: exposure, toxokinetic, and toxodynamic phases; dose-effect relationships; toxicological testing methods; factors influencing toxicity. Emphasis is on systemic mammalian toxicology.

CHM 584 Environmental Toxicology (3)

Applications of toxicology to broad environmental issue of air, water, and land resource pollution: sources, dispersion, and fate of toxic substances; effects on biological systems; risk assessment methods; toxic substance control, and toxic substance rating systems.

CHM 685 Seminar in Health and Environmental Chemistry (1)

Weekly student and faculty seminars dealing with current problems in health and environmental areas. Applications of chemical technology to the management and solution of problems will be stressed. In addition several guest lectures each year will be given by experts in the area of environmental and public policy issues. Each student will be required to present one seminar per semester. May be repeated for credit.

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

Prerequisite: Permission of department.

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

Prerequisite: Permission of department.

DEPARTMENT OF ENGLISH

Chairperson: Robert T. Eberwein

Professor Emerita: Gertrude M. White, Ph.D., University of Chicago

Professors:

Maurice F. Brown, Ph.D., Harvard University

John P. Cutts, Ph.D., University of Birmingham

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

Peter G. Evarts, Ph.D., Wayne State University
 Thomas Fitzsimmons, M.A., Columbia University
 James F. Hoyle, Ph.D., Princeton University

Associate Professors:

Herbert Appleman, M.A., Columbia University
 Robert L. Donald, M.A., University of Detroit
 Jane D. Eberwein, Ph.D., Brown University
 Robert T. Eberwein, Ph.D., Wayne State University
 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
 Helen J. Schwartz, Ph.D., University of Washington

Assistant Professors:

Melodie Monahan, Ph.D., University of Rochester
 Mark E. Workman, Ph.D., University of Pennsylvania

Associated Faculty:

Professor Donald E. Morse (Rhetoric and English), Professor William Schwab (Linguistics and English), Associate Professor Daniel H. Fullmer (Linguistics and English)

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.

THE MASTER OF ARTS IN ENGLISH

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

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

Requirements for the Degree

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

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

The English Language Concentration

This is not a separate degree program but a concentration within the Master of Arts in English program and is provided for students who wish to study linguistic theory and the structure and history of the English language on the graduate level. A prerequisite for this program is any one of the following three courses: ENG 376, History of the English Language; ENG 377, Modern English Grammar; or ENG 354, British Medieval Literature. The equivalent of any one of these will be accepted.

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

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

THE MASTER OF ARTS IN TEACHING IN ENGLISH

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

Requirements for the Degree

Nine courses (36 credits) are required, distributed as follows. *The Teaching Core* (12 credits): ENG 510; one course chosen from among these six alternatives: ED 538, 601, 602, 603, 604, or 605; and either PSY 510 or 512. *The Literary Studies Core* (12 credits): ENG 533, a course in the methods of literary history (ENG 543, 544, 545, or 546); and a course in literary kinds (ENG 563, 564, 565, or 566). Three additional courses in English (12 credits) are to be chosen in consultation with the student's program adviser; two of these must be at the 600 level.

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

Admission

Admission to the department's advanced degree programs is selective. Chief qualifications are a Bachelor of Arts degree from an accredited institution, academic ability as indicated by past record, and interest in continued 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. See the section on grading under policies and procedures section of this catalog. The Master of Arts 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 will be evaluated until a student is admitted to degree candidacy.

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

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

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

CLASSIFICATION OF COURSE OFFERINGS

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

1. Undergraduate Courses (300 and 400 levels)

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

2. Core Courses (500 level)

500-level courses are designed to familiarize the student with the principal approaches to literature and language and with methods and tools appropriate to those approaches. These courses (ENG 533, 543, 544, 545, 546, 563, 564, 565, 566) are central to the graduate program and help prepare the student for the more specialized work of the seminars. (ENG 500, 510, 534 and 597 are not core courses.)

3. Seminars and The Master's Project (600 level)

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

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

4. Summer Institutes

Concentrated four-week institutes on literature, language, writing, and other topics of interest to high school teachers and post-baccalaureate students are offered in summer session. They are designed as refresher courses or as intro-

ductions to topics of particular contemporary concern. Institutes grant four hours of graduate credit and are usually graded S/U. Students may not offer more than 4 credits of work in institutes toward fulfillment of requirements for advanced degrees except by permission of the graduate committee of the department. Candidates for degrees must consult with their advisers before electing summer institutes.

Cognate Courses (M.A. Program)

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

Course Offerings

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

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

ENG 510 Literature and Composition (4)

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

ENG 515 Summer Institute (1 to 4)

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

ENG 533 Practical Criticism (4)

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

ENG 534 Language History (4)

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

LITERARY HISTORY

ENG 543 Early British (4)

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

ENG 544 Later British (4)

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

ENG 545 American (4)

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

ENG 546 Special Topics (4)

As designated by instructor.

LITERARY KINDS

ENG 563 Fiction (4)

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

ENG 564 Drama (4)

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

ENG 565 Poetry (4)

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

ENG 566 Modes or Special Forms (4)

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

ENG 597 Apprentice College Teaching (4)

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

SEMINARS (Prerequisite: two 500-level courses)

ENG 600 Studies in Language and Literature (4)

Special topics and problems as selected by instructor.

ENG 640 Studies in American Literature: Focus Pre-Civil War (4)**ENG 641 Studies in American Literature: Focus Post-Civil War (4)****ENG 642 Studies in Old and Middle English Literature (4)****ENG 643 Studies in Renaissance Literature (4)****ENG 644 Studies in Eighteenth Century Literature (4)****ENG 645 Studies in Nineteenth Century Literature (4)****ENG 646 Studies in Modern Literature (4)****ENG 647 Studies in the Structure of English (4)****ENG 648 Studies in Literary Theory (4)****ENG 690 The Master's Project (4)**

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

Prerequisite: Permission of the Committee on Graduate Programs.

Related Courses

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

ED 538 Guiding Reading-Learning in Content Subjects (4)**ED 601 History in Education (4)****ED 602 Philosophy in Education (4)****ED 603 Cross-Cultural Studies in Education (4)****ED 604 Sociology in Education (4)****ED 605 Politics in Education (4)****PSY 510 Developmental Psychology (4)****PSY 512 Test and Measurements (4)**

DEPARTMENT OF HISTORY

Chairperson: John Barnard

Professors:

Charles W. Akers, Ph.D., Boston University
John Barnard, Ph.D., University of Chicago
Brian P. Copenhaver, Ph.D., University of Kansas
Robert C. Howes, Ph.D., Cornell University
George T. Matthews, Ph.D., Columbia University
W. Patrick Strauss, Ph.D., Columbia University
S. Bernard Thomas, Ph.D., Columbia University
Richard P. Tucker, Ph.D., Harvard University

Associate Professors:

De Witt S. Dykes, Jr., M.A., University of Michigan
Leonardas V. Gerulaitis, Ph.D., University of Michigan
James D. Graham, Ph.D., Northwestern University
Gerald C. Heberle, Ph.D., Ohio State University
Mary C. Karasch, Ph.D., University of Wisconsin
Joseph A. Klaitis, Ph.D., University of Minnesota
Roy A. Kotynek, Ph.D., Northwestern University
Paul M. Michaud, Ph.D., University of Chicago
Lawrence D. Orton, Ph.D., Indiana University
Carl R. Osthaus, Ph.D., University of Chicago
Anne H. Tripp, Ph.D., University of Michigan

THE MASTER OF ARTS IN HISTORY

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

Admission

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

A grade point average of 3.0 (on a 4.0 scale) in undergraduate history courses and a GPA of 2.8 in all undergraduate work will ordinarily be considered the minimum standards for admission. These minima may be waived in individual cases; at its discretion, the department may admit students of superior promise but with deficient preparation if such students correct their deficiencies before commencing graduate work.

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

Requirements for the Degree

Candidates for the degree of Master of Arts in history must complete 38 graduate-level credits in history (in special cases the Department of History graduate committee may permit a candidate to substitute up to 12 graduate credits in related fields for history credits). All candidates must complete at least two colloquia (HST 601-606), two research seminars (HST 691-696), and the comprehensive examination (HST 600). Students may not enroll for graduate courses (HST 500-590) corresponding in title and/or coverage with undergraduate history courses (HST 300-390) for which they have previously gained credit at Oakland University.

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

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

Candidates who do not elect to offer a thesis will fulfill all the requirements listed above; they must take at least one colloquium and one seminar in the major

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

Candidates who do not elect to offer a thesis will fulfill all the requirements listed above; they must take at least one colloquium and one seminar in the major

field, and their comprehensive examination will be devoted to the history of the major field, as described below under HST 600.

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

Course Offerings

HST 502 American Labor History (4)

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

HST 503 American Constitutional History (4)

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

HST 506 Colonial and Revolutionary America (4)

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

HST 507 American Religious History (4)

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

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

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

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

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

HST 513 American History, 1876-1900 (4)

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

HST 514 American History, 1900-1928 (4)

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

HST 515 American History since 1928 (4)

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

HST 516 The American Mind to 1860 (4)

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

HST 517 The American Mind since 1860 (4)

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

HST 518 Topics in American Social History (4)

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

HST 519 History of the American South (4)

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

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

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

HST 523 Topics in Afro-American History (4)

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

HST 525 Medieval Europe (4)

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

HST 526 The Italian Renaissance (4)

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

HST 527 The Northern Renaissance (4)

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

HST 529 Europe in the Seventeenth Century (4)

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

HST 534 Victorian and Edwardian England (4)

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

HST 535 Twentieth Century Britain (4)

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

HST 541 Europe since 1914 (4)

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

HST 543 Germany since 1848 (4)

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

HST 545 France since 1789 (4)

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

HST 546 European Witchcraft (4)

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

HST 547 Tools of Historical Research (4)

A course to acquaint students of history with the auxiliary sciences of that discipline, with emphasis on historical bibliography and the use of the library.

HST 548 Europe in the Eighteenth Century (4)

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

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

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

HST 550 The European Mind to 1700 (4)

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

HST 551 The European Mind since 1700 (4)

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

HST 552 Kiev and Muscovy (4)

Russian history from the ninth to the seventeenth century with emphasis on the origins of the Kievan state and society, the struggle against the steppes, and the formation of a centralized

44/History (Arts and Sciences)

Russia under the leadership of Moscow.

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 559 Russian Intellectual History to Peter the Great (4)

Main intellectual and cultural developments in Russia prior to Peter the Great. The Russian Church and religious thought, literature, and the development of political ideology will be emphasized.

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

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

HST 563 History of Southern South America (4)

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

HST 565 The Response to European Colonialism (4)

A comparative examination of the responses of the peoples of Africa and Latin America to European expansion, with emphasis on such themes as acculturation, resistance movements, nationalism, and modernization.

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

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

HST 567 History of Mexico (4)

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

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

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

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

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

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

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

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

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

HST 575 Topics in Chinese Intellectual History (4)

A historical investigation of selected periods and problems in the intellectual history of China. Content will vary each semester.

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 583 British Imperialism and Hindu Nationalism in India, 1740-1947 (4)

India's successful struggle for independence from British imperialism, and its continuing struggle for social and economic justice.

Linguistics (Arts and Sciences)/45

HST 585 Environment and Politics in Modern Asia (4)

Western imperialism and Asian nationalisms centering on the struggle for the control of natural resources in the principal ecosystems, nation states, and economies of Asia.

HST 586 Contemporary African History (4)

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

HST 591 Directed Readings for Graduate Students (4)

Directed individual readings on specific topics.

HST 592 Summer Institute in History (4)

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

HST 600 Comprehensive Examination (2)

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

Prerequisite: Permission of faculty adviser.

Graduate Colloquia

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.

HST 601 Colloquium in American History (4)

HST 602 Colloquium in Latin American History (4)

HST 603 Colloquium in European History (4)

HST 604 Colloquium in African History (4)

HST 605 Colloquium in East Asian History (4)

HST 606 Colloquium in South Asian History (4)

Research Seminars

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

HST 691 Seminar in American History (4)

HST 692 Seminar in Latin American History (4)

HST 693 Seminar in European History (4)

HST 694 Seminar in African History (4)

HST 695 Seminar in East Asian History (4)

HST 696 Seminar in South Asian History (4)

DEPARTMENT OF LINGUISTICS

Chairperson: William Schwab

Professors:

Donald C. Hildum (*Communication Arts and Linguistics*), Ph.D., Harvard

University

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

Associate Professors:

John W. Barthel (*German and Linguistics*), Ph.D., University of Illinois

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

Carlo Coppola (*Hindi-Urdu and Linguistics*), Ph.D., University of Chicago

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

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

Assistant Professor:

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

THE MASTER OF ARTS IN LINGUISTICS

The Master of Arts degree in linguistics provides post-baccalaureate instruction to students interested in improving their knowledge and understanding of current linguistic theory and its application to language learning, particularly the teaching of English to both native and non-native speakers and the acquisition of language in children. 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 3.0 (on a 4.0 scale) in undergraduate work is ordinarily the minimum standard for admission. At its discretion, the department may admit students of superior promise but deficient preparation provided that such students correct their deficiencies before commencing graduate work.

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

Upon completion of 12 credits, including LIN 501, students will be evaluated for admission to candidacy and will choose an area of specialization. Students intending to specialize in curricula 1 and 2 (below) must demonstrate knowledge of a foreign language normally equivalent to completion of the 214-215 sequence at Oakland University (second-year proficiency).

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

Requirements for the Degree

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

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

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

General Requirements

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

Core Program (12 credits)

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

Specializations (typical curricula)

1. **Linguistic Theory (24 credits)**
 - LIN 502 Historical Linguistics
 - LIN 403 Phonological Theory
 - or LIN 603 Advanced Phonology
 - LIN 404 Syntactic Theory
 - or LIN 604 Advanced Syntax
 - LIN 601 The History of Linguistic Theory
 - Two (2) electives
 - (Foreign language competency)
2. **Teaching English to Speakers of Other Languages (26 credits)**
 - LIN 401 Phonetics
 - or LIN 503 Sound Patterns of American English
 - ALS 428 The Teaching of English as a Second Language
 - ALS 429 Practicum (2 credits)
 - ALS 574 Cross-Cultural Communication
 - or ALS 576 Sociolinguistics
 - LIN 610 Contrastive Analysis
 - Two (2) electives
 - (Foreign language competency)
3. **Teaching Language Arts (24 credits)**
 - ALS 420 Linguistics and Reading
 - 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 equivalent.

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 equivalent.

ALS 429 Practicum (2 or 4)

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

ALS 534 Language Development in Children (4)

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

ALS 535 Psycholinguistics (4)

A study of the psychology of language, the accommodation between the cognitive and physical structure of human beings and the structure of language, the nature of the language learning process, and the consequences of language use.
Prerequisite: One course in ALS or LIN and one course in PSY.

ALS 540 The Biology of Language (4)

Animal communication and the evolution of man's capacity for language, development of language in normal and abnormal children, disorders of speech, hearing and language, language and the brain, and genetic aspects of language.
Prerequisite: One course in ALS or LIN.

ALS 560 Neurolinguistics (4)

The neurology of language: essentials of neuroanatomy; neurological mechanisms underlying language; aphasia and kindred disorders of speech; the relationship of language to memory, intelligence, and cognition; language and mental retardation and psychological disorders.
Prerequisite: One course in ALS or LIN.

ALS 573 Ethnography of Communication (4)

The systematic description of the interaction of linguistic form, participants, setting, and modes of interaction. Comparison of similar communicative events in simple and complex societies. Readings and guided student research.
Prerequisite: One course in ALS or LIN.

ALS 574 Cross-Cultural Communication (4)

A theoretical and practical examination of the role of language and nonverbal modes in cross-cultural communication. Problems and strategies for developing awareness of and operational skills in cross-cultural processes.
Prerequisite: One course in ALS or LIN.

ALS 575 Language in Culture (4)

Language viewed as cultural behavior, its system, acquisition, and use; its relation to history, attitudes, and behavior; standard languages; social dialects; pidgins; and creoles.
Prerequisite: One course in ALS, LIN, or AN 102.

ALS 576 Sociolinguistics (4)

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

Linguistics**LIN 401 Phonetics (4)**

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

LIN 403 Phonological Theory (4)

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

LIN 404 Syntactic Theory (4)

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

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 equivalent.

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 equivalent.

LIN 480 Seminar in Linguistics (4)

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

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 or equivalent.

LIN 503 Sound Patterns of American English (4)

The fundamentals of articulatory phonetics with studies in American social and geographic dialects.
Prerequisite: LIN 501 or equivalent.

LIN 580 Proseminar in Linguistics (4)

Overview of current major issues and research in theoretical and applied linguistics.
Prerequisite: LIN 501 or equivalent.

LIN 590 Directed Readings (4)

Directed individual research on specific topics.

LIN 600 Special Topics in Linguistics (4)

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

LIN 601 The History of Linguistic Theory (4)

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

LIN 603 Advanced Phonology (4)

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

LIN 604 Advanced Syntax (4)

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

LIN 610 Contrastive Analysis (4)

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

LIN 680 Seminar in Linguistics (4)

A research seminar designed to develop a student's skill in linguistic investigation and exposition. Students must complete a research paper.
Prerequisite: LIN 580.

LIN 690 The Master's Thesis (4)

Completion of a project proposed by a degree candidate in consultation with his/her adviser.
Prerequisite: LIN 580.

DEPARTMENT OF MATHEMATICAL SCIENCES

Chairperson: Donald G. Malm

Professors:

Harvey J. Arnold, Ph.D., Princeton University
Louis R. Bragg, Ph.D., University of Wisconsin
John W. Dettman, Ph.D., Carnegie Institute of Technology
George F. Feeman, Ph.D., Lehigh University
William C. Hoffman, Ph.D., University of California (Los Angeles)
G. Philip Johnson, Ph.D., University of Minnesota
Donald G. Malm, Ph.D., Brown University
James H. McKay, Ph.D., University of Washington
Yel-Chiang Wu, Ph.D., Cornell University

Associate Professors:

Baruch Cahlon, Ph.D., Tel Aviv University
Charles Ching-an Cheng, Ph.D., Rutgers University
J. Curtis Chipman, Ph.D., Dartmouth College
Jerrold W. Grossman, Ph.D., Massachusetts Institute of Technology
Jon Froemke, Ph.D., University of California (Berkeley)
Louis J. Nachman, Ph.D., Ohio State University
Subbaiah Perla, Ph.D., University of Rochester
Darrell P. Schmidt, Ph.D., Montana State University
Irwin Schochetman, Ph.D., University of Maryland
Sze-kai Tsui, Ph.D., University of Pennsylvania
J. Barry Turett, Ph.D., University of Illinois
Stuart Wang, Ph.D., Cornell University

Assistant Professors:

Beth Barron, Ph.D., Michigan State University
David J. Downing, Ph.D., University of Iowa
Marcia Feingold, Ph.D., University of Michigan
Kon Fung, Ph.D., Carnegie-Mellon University
Stephen J. Wright, Ph.D., Indiana University

Adjunct Professors:

Joseph R. Assenzo
Seth Bonder
Gary McDonald
Edward F. Moylan

Adjunct Assistant Professor:

Wanda Mourant, Ph.D., Indiana University

The Department of Mathematical Sciences offers programs leading to the degrees of Master of Arts in Teaching in mathematics, Master of Science in applied mathematics, and Master of Science in applied statistics. The department also offers a Graduate Certificate Program in Statistical Methods. The Master of Arts in Teaching program is jointly sponsored by the College of Arts and Sciences and the School of Human and Educational Services.

THE MASTER OF ARTS IN TEACHING IN MATHEMATICS— SECONDARY EDUCATION

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

Requirements for the Degree

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

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

Maximum flexibility is allowed in the choice of required courses in education and psychology. Normally a candidate will choose the education course from among ED 601, 602, 603, 604, or 605. However, a course in the teaching of reading (ED 538) would be appropriate. In general, a course in developmental psychology (PSY 510), tests and measurements (PSY 512), or behavior and learning (PSY 540) is selected to fulfill the psychology requirement.

A student's progress will be reviewed after each 12 credits attempted and after the special examination. If these reviews reveal unsatisfactory progress toward com-

pletion of the degree requirements, the student's dismissal will be recommended to the dean of the Graduate School.

THE MASTER OF SCIENCE IN APPLIED MATHEMATICS

By offering this program, the department seeks to increase the number of individuals with broad training in mathematics which is suitable for application in an industrial setting. The program's primary goal is to provide the basis for the skilled and competent application of existing mathematical techniques. All courses required for the program are offered in the late afternoon or evening to accommodate the part-time student who is engaged in professional development. Teaching and research assistantships are available to well qualified full-time students.

Admission

All applicants who have received a baccalaureate from an accredited institution with a cumulative grade point average of 3.0 or more will be considered. Preference will be given to those students with a major in mathematical science, computer science, engineering, physics, or chemistry. All students should have satisfactorily completed courses in single and multivariate calculus, linear algebra, differential equations, and vector calculus. They also should have received eight credits in computer science or have otherwise obtained comparable competence in computer usage.

Requirements for the Degree

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

1. have successfully completed, with at least 2.0 in each course and an overall average of 3.0 in all courses, the standard graduate program in applied mathematics or either of its approved alternatives:

Standard program (32 credits)

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

Alternative 1. (32 credits)

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

Alternative 2. (32 credits)

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

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

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

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. All courses required for the program are offered in the late afternoon or evening to accommodate the part-time student who is engaged in professional

development. Teaching and research assistantships are available to well qualified full-time students.

Admission

All applicants who have received a baccalaureate from an accredited institution with a cumulative grade point average of 3.0 or more will be considered. Previous mathematical training should include the satisfactory completion of courses in single and multivariate calculus and linear algebra, as well as at least one course in elementary statistics. Applicants must also be able to demonstrate competence in at least one scientific computer language.

Requirements for the Degree

To fulfill the degree requirements the student must:

1. have completed, with at least a 2.0 in each course and an overall average of 3.0 in all courses, a program of at least 36 credits.
2. have completed at least 24 credits in courses labeled STA as approved by an adviser. The set of elective courses not labeled STA must also be approved by the student's adviser.
3. have performed successfully in two statistical consulting courses which require written and oral presentations;
4. have not included more than six credits of STA 590.

THE GRADUATE CERTIFICATE PROGRAM IN STATISTICAL METHODS

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

Admission

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

Requirements for the Certificate

To fulfill the certificate requirements, the student must have completed an approved program of at least 20 credits with at least a 2.0 in each course and an overall average of 3.0 in all courses. The courses normally included are STA 501, 502, 503 and 8 additional credits chosen from STA courses numbered 425 or higher. The course selections for a particular student will be chosen to complement previous statistics study and to enhance the competency of the individual in his/her chosen field of application.

Relationship to Master of Science In Applied Statistics

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

Course Offerings

Courses are listed and grouped according to the following designations: MTH—mathematics; APM—applied mathematics (applicable analysis and mathematical

modeling); MOR—operations research; STA—statistics; MTS—mathematics for teachers (secondary education); MTE—mathematics for teachers (elementary education).

MATHEMATICS

MTH 405 Special Topics (2 or 4)

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

MTH 415 Foundations of Mathematics (4)

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

MTH 453 Multivariable Analysis (4)

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

MTH 461 General Topology (4)

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

MTH 465 Differential Geometry (4)

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

MTH 475-476 Abstract Algebra (4 each)

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

MTH 505 Special Topics (2 or 4)

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

MTH 531 Mathematical Methods in Engineering I (4)

Vector spaces and matrices, eigenvalue problems, applications to systems of differential equations, numerical methods in linear algebra. Infinite series, Taylor's series, power series methods in differential equations.

MTH 532 Mathematical Methods in Engineering II (4)

Functions of several variables, vector field theory, partial differential equations, boundary value problems, Fourier series, and Fourier integrals.

MTH 551-552 Real Analysis (4 each)

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

MTH 555-556 Complex Analysis (4 each)

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

MTH 561-562 Topology (4 each)

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

MTH 565 Topological Algebraic Structures (4)

A brief survey of topological groups, vector spaces, and algebras followed by detailed study of one or more special cases, such as locally compact groups, Lie groups, Lie algebras, Banach spaces, or Banach algebras.

MTH 566 Tensor Analysis on Manifolds (4)

Topology of differentiable manifolds, tensor algebra, vector analysis on manifolds, integration on manifolds, Riemannian manifolds, symplectic manifolds, and applications in science.

MTH 571-572 Algebra (4 each)

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

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

MATHEMATICS FOR TEACHERS (secondary)

MTS 505 Special Topics (2 or 4)

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

MTS 510 The Secondary Mathematics Curriculum (4)

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

MTS 514 Concepts in Abstract Algebra (4)

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

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

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

MTS 517 Concepts in Analysis (4)

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

MTS 519 Linear Mathematics and Mathematical Models (4)

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

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

MTS 614 History of Mathematics (4)

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

MTS 619 Foundations of Mathematics (4)

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

MTS 620 Concepts of Geometry (4)

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

MTS 627 Elements of Stochastic Processes (4)

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

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

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

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

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

MTS 663 Graph Theory and Combinatorial Mathematics (4)

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

MTS 672 Number Theory (4)

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

MATHEMATICS FOR TEACHERS (elementary)

Courses at the 500 level are open to undergraduates, while 600-level courses are restricted to graduate students only.

MTE 505 Special Topics (2 or 4)

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

MTE 511 Mathematics for the Elementary School Teacher I (4)

Study of the structure of the real number system, elementary number theory, and introduction to abstract mathematical structures.

MTE 512 Mathematics for the Elementary School Teacher II (4)

Study of set theory, logic, probability theory, statistics, and topics in geometry.

MTE 590 Directed Reading and Research (2, 4, 6, or 8)**MTE 610 Elementary School Mathematics and the Computer (4)**

Topics in mathematics useful to elementary school teachers in line with current curriculum developments. Computer-assisted programs will be emphasized. Designed for M.A.T. candidates in elementary education.

MTE 614 History of Mathematics (4)

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

MTE 615 Problem Solving and Heuristics (4)

Methods of approaching and solving problems in mathematics, with problems drawn from a variety of disciplines.

MTE 617 Vector Geometry (4)

Geometry of the plane and space studied by means of vectorial ideas, independence of a set of vectors, linear transformations, mathematics laboratory project.

MTE 618 Theory of Equations (4)

Solution of equations in one unknown, Descartes' rule of signs, intermediate value theorem, Euclidean algorithm for polynomials, basic numerical methods for finding roots using the computer, systems of equations.

MTE 621-622 Mathematics for the Social Sciences (4 each)

Elementary set theory, number systems, functions, linear systems, linear programming, and the basic concepts, theorems, and applications of calculus. Mathematics laboratory project.

MTE 625 Probability and Statistics (4)

Sample spaces, combinatorics, random variables, Chebyshev's inequality, Bernoulli trials, binomial and normal distributions, joint distributions, and introduction to statistics. Selected mathematics laboratory activities.

MTE 628 The Elementary Mathematics Curriculum (4)

This seminar examines problems of the elementary mathematics curriculum. Topics are determined by the instructor and students. Enrichment mathematics and materials of instruction.

APPLIED MATHEMATICS**APM 435 Introduction to Mathematical Science (4)**

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

APM 455 Intermediate Ordinary Differential Equations (4)

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

APM 463 Graph Theory and Combinatorial Mathematics (4)

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

APM 505 Special Topics (2 or 4)

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

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

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

APM 541-542 Advanced Mathematical Science (4 each)

Structure of dynamical systems; application to mechanics, wave motion, diffusion, and statistical mechanics; dynamical systems and control theory in economics and the life sciences; fundamental mathematical structures of the physical, life, and social sciences, and the role of probability and statistical inference.

APM 553 Advanced Ordinary Differential Equations (4)

Existence and uniqueness, dependence on initial point, asymptotic behavior of solutions,

periodic solutions, self-adjoint problems, stability theory, Liapunov functions, Poincare-Bendixson theory, and topological methods.

APM 554 Advanced Partial Differential Equations (4)

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

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

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

APM 590 Directed Reading and Research (2, 4, 6, or 8)**APM 595 Case Studies In Applied Mathematics (4)**

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

OPERATIONS RESEARCH**MOR 543 Advanced Operations Research I (4)**

Topics from convexity and optimization: mathematical programming, dynamic programming and the calculus of variations, graph theory and networks, game theory, and queueing theory.

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

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

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

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

STA 501 Statistical Methods In Research and Production (4)

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

STA 502 Applied Regression Analysis (4)

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

STA 503 Design and Analysis of Industrial Experiments (4)

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

STA 505 Special Topics (2 or 4)

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

STA 525 Multivariate Statistical Methods (4)

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

STA 526 Nonparametric Methods (4)

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

STA 527 Linear Statistical Models (4)

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

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

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

- STA 529 Statistical Methods in Sample Surveys (4 credits)**
Simple random sampling, stratified sampling, systematic sampling, cluster sampling, sub-sampling, probabilities proportional to size sampling; estimation of parameters; applications.
- STA 590 Directed Reading and Research (2 or 4)**
- STA 595 Statistical Consulting (2 or 4)**

RELATED COURSES

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

- ED 538 Guiding Reading-Learning in Content Subjects (4)**
- ED 601 History in Education (4)**
- ED 602 Philosophy in Education (4)**
- ED 603 Cross-Cultural Studies in Education (4)**
- ED 604 Sociology in Education (4)**
- ED 605 Politics in Education (4)**
- CIS 511 Design and Analysis of Algorithms (4)**
- CIS 542 Data Structures (4)**
- PSY 510 Developmental Psychology (4)**
- PSY 512 Test and Measurements (4)**
- PSY 540 Behavior Theory and Learning (4)**

DEPARTMENT OF MUSIC

Chairperson: David W. Daniels

Professor:

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

Associate Professors:

Raynold Allvin, D.M.A., Stanford University
David W. Daniels, Ph.D., University of Iowa
James E. Dawson, A.Mus.D., University of Michigan
Robert Facko, Ed.D., Columbia University
Lyle Nordstrom, D.M.A., Stanford University
Flavio Varani, M.M., Manhattan School of Music

Adjunct Professor:

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

Special Instructors:

John Doharas, M.M., Northwestern University
Alice Engram, M.M., University of Colorado
Marvin Holladay, M.A., Wesleyan University

Visiting Instructors: Ron DeRoo, Mary Rashid

Lecturers: Joyce Adelson, Nancy LeValley, Richard Thurston, Carolyn Tower

Applied Music Instructors: Joyce Adelson (*piano*), Janice Albright (*voice*), Mary Bartlett (*harp*), Christopher Birg (*classical guitar*), Charles Boles (*jazz piano*), Steven Carryer (*jazz guitar*), Douglas Cornelsen (*clarinet*), James Dawson (*saxophone*), Ron DeRoo (*jazz piano*), Pamela Dion (*bassoon*), Alice Engram (*voice*), Ray Ferguson (*harp*), Derek Francis (*violin*), Robert Gladstone (*string bass*), Marilyn Hedquist (*voice*), Elizabeth Ilku (*harp*), Mary Irvine (*voice*), Wesley Jacobs (*tuba*), Myron McDonald (*percussion*), Ervin Monroe (*flute*), Diann Moskal (*voice*), Lyle Nordstrom

(*recorder/lute*), Patricia Adams Nordstrom (*recorder/viola da gamba*), Robert Pangborn (*percussion*), Edward Pickens (*jazz string bass*), Sam Sanders (*jazz saxophone*), Joseph Skrzynski (*trombone/tuba*), John Snow (*oboe*), Danny Spencer (*jazz drums*), James Underwood (*trumpet*), Flavio Varani (*piano*), Charles Weaver (*French horn*), Herbert Williams (*jazz trumpet*), Ara Zerounian (*viola*)

THE MASTER OF MUSIC

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

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

Continuing Certification

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

Admission

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

1. Overall undergraduate grade point average and grade point average in music (normally expected to be 3.0 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	Orff Pedagogy
Piano Pedagogy	Music Education
Instrumental or Choral Conducting	Jazz Performance
Composition	Vocal Performance
Early Music	Instrumental Performance

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

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

Elective (4 credits)

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

Degree Study Plan

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

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

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

Thesis or Recital

Students offering a thesis or recital to culminate their programs should secure approval before the beginning of the semester in which the thesis work or recital 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

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

APPLIED MUSIC

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

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

MUSIC ENSEMBLES

MUE 502 Ensemble Performance (1 or 2)

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.

MUA 601 Master's Recital (2 or 4)

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

MUE 504 Chamber Music Performance (2)

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 or 2)

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

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

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

MUT 540 Composition (2 to 8)

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

MUSIC HISTORY, LITERATURE, AND APPRECIATION**MUSIC EDUCATION****MUS 510 Introduction to Music Bibliography (2)**

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

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

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

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

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

MUS 523 History of the Musical Theatre (4)

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

MUS 547 Seminar In the History of Jazz (2)

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

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

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

MUS 565 Advanced Studies In Performance Practice (2 to 6)

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

MUS 570 Independent Study In Jazz (2 to 6)

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

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

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

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

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

MUS 582 Orff Schulwerk (1 to 4)

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

MUS 583 Orff Schulwerk Ensemble Development (1 to 4)

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

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

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

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

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

MUS 595 Innovations In Music Education (1 to 4)

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

MUS 596 Supervision In Music Education (4)

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

MUS 599 Independent Study (2 to 12)

A program of independent study under the guidance of a faculty adviser. The study plan is subject to final approval by the department 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.

MUS 620 Conducting Apprenticeship (2 to 6)

An individual program under the supervision and in association with one of the major ensemble conductors of the music department. Prerequisite: Departmental graduate committee approval.

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

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

Prerequisite: Audition and permission of instructor.

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

Independent or group research in music education methods, measurement, and curriculum. Prerequisite: Approval of an adviser and the department 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 Thesis (2 to 6)

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

DEPARTMENT OF PHYSICS

Chairperson: Abraham R. Liboff

Professors:

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

Associate Professors:

Michael Chopp, Ph.D., New York University
Paul M. Doherty, Ph.D., Massachusetts Institute of Technology
W.D. Wallace, Ph.D., Wayne State University

Assistant Professors:

Beverly Berger, Ph.D., University of Maryland

Adjunct Professor:

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

Clinical Professors of Medical Physics:

Howard J. Dworkin, M.D., Albany Medical College
Terry Alan Fuller, Ph.D., Worcester Polytechnic Institute and
Clark University
Harold Portnoy, M.D., Wayne State University

Clinical Associate Professors of Medical Physics:

Frederick W. Hetzel, Ph.D., University of Waterloo
Norman H. Horwitz, Ph.D., Wayne State University

THE DOCTOR OF PHILOSOPHY IN MEDICAL PHYSICS

A doctoral program in the Biomedical Sciences has been developed with three degree majors in Cellular Biology of Aging, Health and Environmental Chemistry, and Medical Physics.

It is in the process of approval at the time of printing of this catalog. Full implementation of one or more of the degree majors may occur during the life of this catalog. Details of the doctoral degree major in medical physics are included here for information. Announcement of the start of the program will be made in timely fashion.

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 physicists. Oakland's Ph.D. program in medical physics 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. Committee—The medical physics Ph.D. program is administered by a committee normally consisting of three members of the physics faculty, and one member each from the Departments of Biological Sciences, Chemistry, and Mathematical Sciences.

Research Opportunities—Ph.D. candidates may elect to do their thesis research either with one of a number of Oakland University faculty currently involved in biomedical research or with one of the research groups in area hospitals which collaborate closely with the Department of Physics. Among these are Henry Ford Hospital, Detroit; Sinai Hospital, Detroit; William Beaumont Hospital, Royal Oak; and Crittenton Hospital, Rochester.

Admission

Students will be considered for admission to the doctoral program in medical physics if they hold baccalaureates in either biology, chemistry, mathematics, physics, or engineering. Third-year level courses in both modern physics and physical chemistry are required for admission, as well as at least three subjects from the following (undergraduate) courses: computer sciences, differential equations, electronics, electricity and magnetism, physiology, and statistics. Conditional admission may be granted to students who wish to correct any undergraduate deficiencies in their first year.

Student Support—A number of attractive graduate assistantships are available for qualified students. In addition, participating hospitals provide varied support for research students. Interested students should contact the Department of Physics for details.

Qualifying Examination—Each student will be required to take the Ph.D. Qualifying Examination during the first week of August after completion of two years of doctoral study. The examination will consist of three written examinations in the areas of theoretical physics, mathematical methods in scientific research, and biophysical sciences, as well as an oral examination. A student may be asked to repeat the examination during the next spring term if his or her performance is inadequate. No additional repeat examinations are permitted.

Thesis Adviser and Research Committee—Upon successful completion of the qualifying examination the candidate will identify a senior research adviser or advisers in the area of his or her research interest. The adviser may be a faculty member of the physics department, a researcher in one of the collaborating hospital laboratories, or, in special instances, a faculty member in another science department. The senior adviser will then recommend the names of at least three researchers (including himself) to serve as the student's research committee. At least one member of each research committee will be a regular physics department faculty member. The research committee will have the responsibility of recommending to the Graduate School the acceptance of the student's thesis research proposal, monitoring and assisting the student in his or her research, reading the thesis and conducting the final thesis defense examination, and recommending to the Graduate School the awarding of the Ph.D.

Requirements for the Degree

At least 60 credits must be earned for course work (exclusive of thesis) beyond the bachelor's degree. The Ph.D. committee will evaluate the student's prior work and recommend that the Graduate School allow credits for courses relevant to the medical physics Ph.D. In addition, at least 30 credits of Thesis Research (PHY 790)

and a completed thesis deemed acceptable by the candidate's research committee and approved by the Graduate School will be required of all doctoral candidates. In all cases a minimum of three full-time equivalent semesters (at least 12 credits per semester) in residence at Oakland will be required. Students have a seven-year time limit to complete all requirements for the Ph.D.

Graduation—Students expecting to graduate in a given semester must file an application for degree card at the Office of the Registrar and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

THE MASTER OF SCIENCE IN PHYSICS

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

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

Admission

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

Requirement for the Degree

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

RESEARCH FIELDS AND FACILITIES

The Department of Physics faculty is currently involved in research in a number of areas. The biophysics laboratory has been studying electrically mediated growth mechanisms in living systems and protein aggregation in lenses by means of laser light scattering as well as the biomedical topics of magnetocardiography, the fluid dynamics of cerebrospinal fluids and intracranial hemodynamics, radiation protection and dosimetry in diagnostic radiology, and image reconstruction in computerized tomography. The experimental nuclear physics group has been studying environmental radiation, particle scattering, gamma ray spectroscopy, and nuclear instrumentation development. The solid state and molecular physics group has been studying electronic and magnetic properties of metals and gyromagnetic properties of solids and gases as well as the mechanical properties of shale. The theoretical group has been concerned with nuclear structure studies, investigation of hyperfine interactions, isomer shifts in ordinary and muonic atoms, and general relativity and cosmology. A computer group has been developing computer graphics programs for solving physics problems. The planetary physics group is studying the Martian atmosphere.

Research facilities include a 2-megawatt-pulsed CO₂ laser, a megawatt-pulsed tunable dye laser, a 4-watt Argon-ion laser, probably the world's largest standard air ionization chamber, a superconducting (SQUID) magnetometer, a 450-kv Cockcroft-Walton nuclear particle accelerator, a 1,024-channel pulse-height analyzer, a time-of-flight analyzer and associated fast-pulse electronics, a visible and ultraviolet grating monochromator, a transient pulse analyzer, a high-field 9-inch Varian magnet, liquid helium cryostats, ultrasonic gear covering the frequency range from 100 kHz to 10GHz, and the Kettering Magnetics Laboratory (unique in the United States), which provides a nonmagnetic environment. A number of telescopes with apertures of up to 10 inches and some research capability are housed in a separate observatory. In addition, an environmental radiation laboratory is operated. Our planetary physics program is supported by our government film repository for all of the Viking Orbiter images of Mars, as well as a low pressure, low temperature, CO₂ chamber which simulates the Martian atmosphere. Among research facilities in neighboring hospitals available to medical physics students are 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, a Nova II minicomputer, two Tektronix 4051 graphics computers, and two Apple-2 microcomputers.

Course Offerings

Selected 400-level courses may carry graduate credit.

PHY 417 Advanced Laboratory (2)

Methods of experimental physics. Experiments and projects in all areas of classical and modern physics, with emphasis on research techniques and detailed analysis of experimental data. Prerequisite: PHY 317, 318, 341, and 347.

PHY 418 Modern Optics Laboratory (2)

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

PHY 421 Thermodynamics (4)

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

PHY 470 Relativity (4)

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

PHY 472 Quantum Mechanics I (4)

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

PHY 482 Electricity and Magnetism II (4)

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

GRADUATE COURSES

PHY 504 Advanced Astrophysics I (4)

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

PHY 505 Advanced Astrophysics II (4)

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

PHY 506 Projects in Astrophysics (2)

Individual or group projects in observation and data analysis.
Corequisite: PHY 504 or 505.

PHY 522 Statistical Thermodynamics (4)

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

Prerequisite: PHY 421 and 552.

PHY 525 Radiation Biophysics (4)

The study of molecular and cellular radiation biology, theories of biological effects of radiation, repair of radiation damage, effects of irradiation on human tissue and organs, and radio-sensitivity of human tumors.

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

PHY 542 Advanced Electronics (4)

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

PHY 548 Advanced Electronics Laboratory (2)

Prerequisite: PHY 347 or equivalent.

PHY 552 Theoretical Physics (4)

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

Prerequisite: PHY 361, 371, and 381.

PHY 562 Mechanics II (4)

Lagrange's and Hamilton's equations of motion, tensors, rotation of rigid bodies, coupled oscillations, canonical transformations.

Prerequisite: PHY 361 and APM 257, or equivalent.

PHY 565 Physics of Continuous Media (4)

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

Prerequisite: PHY 361.

PHY 573 Nuclear Physics (4)

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

PHY 574 Introduction to Solid-State Physics (4)

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

PHY 581 Amorphous Semiconductors (3)

The course will include the different types of properties expected and observed in elemental amorphous semiconductors and the multicomponent amorphous materials. The concepts used in crystalline semiconductors will be analyzed critically for their use in amorphous materials.

Prerequisite: PHY 472, or equivalent.

PHY 582 The Physics of Semiconductor Devices (4)

Begins with brief discussion of the physics of solids and transport phenomena; then presents detailed descriptions of such devices as p-n junction diodes, tunnel diodes, IMPATT diodes, junction transistors, field-effect devices, and various interface and thin-film devices.

Prerequisite: PHY 371.

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 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.

Prerequisites: 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 681 Plasma Physics I (3)

Motion of charged particles in electro-magnetic fields, adiabatic invariants, confinement from a single particle viewpoint, magneto-hydrodynamic equilibrium instabilities.

Prerequisite: PHY 482, or equivalent.

PHY 682 Plasma Physics II (3)

Kinetic theory, derivation of the Boltzmann equation, classical hydrodynamics, classical and neo-classical transport, collective modes, wave-plasma and plasma-plasma interactions.

Prerequisite: PHY 482, or equivalent.

PHY 690 Master of Science Research (2 to 12)**PHY 790 Doctoral Research (2 to 12)**

DEPARTMENT OF POLITICAL SCIENCE

Chairperson: E.J. Heubel

Director of Public Administration Program: E.J. Heubel

Professors:

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

Associate Professors:

Robert J. Goldstein, Ph.D., University of Chicago
Vincent B. Khapoya, Ph.D., University of Denver
William A. Macauley, Ph.D., University of Houston
James R. Ozinga, Ph.D., Michigan State University

Assistant Professors:

Karen L. Beckwith, Ph.D., Syracuse University

70/Political Science (Arts and Sciences)

Donald S. Schwerin, Ph.D., University of Minnesota
Sharon S. Tunstall, Ph.D., University of Houston

Visiting Assistant Professors:

Richard F. Kanost, Ph.D., University of Oklahoma
Richard J. Weissman, M.A., University of Miami

Adjunct Professor:

Paul H. Wileden, M.P.A., University of Michigan

THE MASTER OF PUBLIC ADMINISTRATION (M.P.A.)

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

Admission

Admission to the program is selective. Applicants must hold a baccalaureate or the equivalent from an accredited undergraduate institution, and must have a grade record that indicates superior work. The program is designed to accommodate students with a wide variety of undergraduate preparations, provided that certain courses have been taken and skills acquired as part of those programs. Applicants must meet the university's general requirements for admission to graduate studies. In addition to these requirements, the Department of Political Science will assess the writing ability of applicants and may interview the applicant.

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

Political Science (Arts and Sciences)/71

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

*The student showing a high level of attainment in mathematics and statistics may waive this course and substitute an additional elective.

Electives	12
Internship or Project	4

Total M.P.A. Credits 40

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

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

	Fall	Winter	Spring/Summer
Year I	PA 601 PA 620	Elective PA 621	Elective
Year II	PA 653 PA 654	PA 655 Elective	Internship or Project

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 International Relations and Land Use (4)

Legal and political problems in controlling the development and redevelopment of land. Conflict and cooperation within and between national, state, and local governments. Illustrations from projects in transportation, urban renewal, waste disposal, and recreation and environment.

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

PA 541 Law and Public Policy (4)

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

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

PA 568 Health Planning: Policies and Processes (4)

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

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

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

PA 601 Public Administration: Theory (4)

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

PA 602 Public Administration: Issues and Problems (4)

Contemporary controversies and trends in public administration systems. Cooperation and conflict between branches, units, and levels of government and its impact on the way programs are developed and services delivered.

PA 620 Quantitative Methods in Public Administration (4)

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

PA 621 Government Information Systems (2 to 4)

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

PA 631 Grants: Politics and Administration (4)

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

Prerequisite: Permission of instructor.

PA 632 Public Sector Collective Bargaining (2)

Policy, law, and process of public sector bargaining.

Prerequisite: Permission of instructor.

PA 633 Workshop in Fair Employment Practices (2)

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

Prerequisite: Permission of instructor.

PA 638 Public Sector Employee Relations (2 to 4)

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

PA 653 Public Budgeting and Finance (4)

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

PA 654 Public Personnel Administration (4)

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

PA 655 Public Policy Evaluation (4)

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

PA 657 Workshop in Capital Budgeting (2)

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

Prerequisite: Permission of instructor.

PA 658 Internship (4)

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

Prerequisite: Completion of core program.

PA 660 Public Administration Workshop (1 to 4)

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

PA 690 Research Project (4)

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

Prerequisite: Completion of core program.

PA 691 Directed Readings (2 to 4)

Special readings designed to supplement or augment the course offerings.

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

Special topics in public administration offered by the department.

Prerequisite: Permission of instructor.

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

Special topics in public policy offered by the department.

Prerequisite: Permission of instructor.

DEPARTMENT OF PSYCHOLOGY

Admissions to this program have been temporarily suspended.

Chairperson: David W. Shantz

Professors:

Edward Bantel, Ed.D., Columbia University
David C. Beardslee, Ph.D., University of Michigan
Jean S. Braun, Ph.D., Wayne State University
Harvey Burdick, Ph.D., University of Minnesota
Boaz Kahana, Ph.D., University of Chicago

Associate Professors:

Daniel N. Braunstein, Ph.D., Purdue University
Max Brill, Ph.D., University of Cincinnati
Ranald D. Hansen, Ph.D., University of Connecticut
Algea O. Harrison, Ph.D., University of Michigan
Lawrence G. Lilliston, Ph.D., Temple University
David G. Lowy, Ph.D., University of Tennessee
Dean G. Purcell, Ph.D., University of Toronto
Ralph Schillace, Ph.D., University of Cincinnati
David W. Shantz, Ph.D., Purdue University
Keith E. Stanovich, Ph.D., University of Michigan
Irving Torgoff, Ph.D., University of Rochester

Assistant Professors:

I. Theodore Landau, Ph.D., University of California, Berkeley
Robert B. Stewart, Ph.D., Pennsylvania State University
Harold Zepelin, Ph.D., University of Chicago

THE MASTER OF ARTS IN CLINICAL PSYCHOLOGY

The primary purposes of the program leading to the degree of Master of Arts in psychology are to train students at the intermediate professional level and to initiate students into advanced scholarship to prepare for additional graduate study at other institutions.

Assistantships

A limited number of assistantships are available; second-year graduate students are given priority.

Admission

The program in clinical psychology is designed to prepare students to evaluate and treat patients in a clinical setting. Individuals interested in becoming school diagnosticians will require some further preparation in educational psychology, but will find the basic program appropriate to acquire needed clinical skills.

An applicant for admission should have a bachelor's degree from an accredited institution or proof of equivalent achievement. While an undergraduate major in psychology is not required, students are expected to be acquainted with the field to the extent of having had the following courses or their equivalents: Foundations of Introductory Psychology, Experimental Psychology, Statistics and Research Design, and Abnormal Psychology. Theories of Personality is also recommended. Applications for admission will be accepted up to March 1 with decisions made by March 30.

for admission the following September, which is the only time new students are admitted. The number of students admitted to this program is limited.

Requirements for the Degree

In the first year of the two-year program, students take two courses each semester. These courses are generally offered in the late afternoon. The second year the student must have time for the practicums, which require half time during the traditional work week. Nine courses (36 credits) are required. All students must take PSY 692. In addition, the curriculum must include PSY 620, 621, 622, 623, 624 and 625. Students in the program have the option of completing a research project (PSY 690) or of taking an elective course, such as PSY 626. Students who plan to go on for a Ph.D. are urged to complete the research project.

Practicum placements must be arranged and approved by the faculty. Ordinarily, one semester (20 hours per week) is devoted to diagnostic workups and the second semester to therapy under intensive supervision.

A student is subject to dismissal from the program for any of the following reasons:

1. Two grades below 3.0.
2. Overall GPA below 3.0.
3. One grade below 2.5.
4. Less than 3.0 in each of the testing courses (PSY 620 and 621).
5. Failure to complete satisfactorily either practicum.
6. Failure to satisfy accepted professional standards.

Course Offerings

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 512 Tests and Measurements (4)

Theories of measurement and evaluation. Construction and examination of tests of ability, achievement, interests, and special aptitudes. Objective tests of personality.

Prerequisite: Permission of instructor or acceptance into the M.A.T. program.

PSY 513 Psychopathology of Childhood (4)

A survey of the psychopathology of children and adolescents emphasizing dynamic and cognitive-perceptual-motor variables.

Prerequisite: PSY 510 or 512 or acceptance into the M.A.T. program in special education, or acceptance into the graduate program in psychology, or undergraduate major in psychology, or permission of instructor.

PSY 520 Advanced Psychopathology (4)

Theories of psychopathology, research literature, and in-depth review of approaches to classification and definition of deviant behavior in adults and children.

Prerequisite: PSY 220 and 320.

PSY 540 Behavior Theory and Learning (4)

Conditioning, reinforcement, punishment, drives, and transfer of training are studied in relation to such complex human processes as education, psychotherapy, and the development of motives.

Prerequisite: Permission of instructor or acceptance into the graduate program.

PSY 541 Advanced General Psychology (4)

A survey of the current frontiers of knowledge and new methodology in the whole range of psychology. Intended for senior majors and graduate students. Normally offered in fall semester.

Prerequisite: Permission of instructor.

PSY 551 Advanced Statistics (4)

Following a review of descriptive and simple inferential statistics, major emphasis will be on analysis of variance procedures.

Prerequisite: An undergraduate course in statistics.

PSY 552 Sensation and Perception (4)

Approaches to the basic sensory systems and perceptual processes.

Prerequisite: Permission of instructor.

PSY 553 Cognitive Psychology (4)

Information processing, selective attention, short- and long-term memory models, theories of forgetting, verbal learning, and psycholinguistics.

Prerequisite: Permission of instructor.

PSY 570 Social and Personality Development (4)

Theory, research, and applied activity focusing on familial and extra-familial socialization, parent-child relations, peer influences, and impact of social change on personality. Field experiences.

Prerequisite: Permission of instructor.

PSY 571 Perceptual and Cognitive Development (4)

Developmental nature of perception, learning, reasoning, concept formation, cognitive style, problem-solving, and language. Field experiences.

Prerequisite: Permission of instructor.

PSY 572 Psychology of Adolescence and Aging (4)

Examination of significant structural, functional, and behavioral changes during adolescence and old age. This material will be integrated with field experiences in relevant settings.

Prerequisite: Permission of instructor.

PSY 575 Theories of Development (4)

Issues and theories of the developmental process from birth to old age. Approaches of such theorists as Lewin, Freud, Piaget, Erikson, and leading exponents of social-learning theory examined.

Prerequisite: Permission of instructor.

PSY 576 Socialization in the Family (4)

Examination of critical areas of research and theory of the socialization process. Areas of focus: attachment and separation, conscience development, sex-role identity, ego-identity, role of principal agents, e.g., family, peers, schools, etc.

Prerequisite: PSY 271, Child Development.

PSY 578 Work with the Elderly (4)

Field work in community agencies and institutions combined with lectures and readings on psychosocial services for the elderly.

Prerequisite: PSY 331 or 674 or their equivalent with consent of instructor.

PSY 590, 591, 592, 593, 594, 595 Seminar (4 each)

Seminars offered occasionally by faculty to explore special topics not listed among regular offerings, either on own initiative or request of a group of students.

Prerequisite: Permission of instructor.

PSY 596 Seminar (1, 2, 3, or 4)

Offered occasionally by faculty wishing to explore special topics not listed among regular offerings, either on own initiative or at the request of a group of students.

Prerequisite: Permission of instructor.

PSY 597, 598 Apprentice College Teaching (4 each)

Supervised participation in teaching undergraduate psychology courses. Discussion of teaching objectives and methods. Only one course may be offered to fulfill departmental requirements.

Prerequisite: Permission of instructor.

PSY 620 Individual Testing (4)

Theory of intelligence testing. Administration and interpretation of Stanford-Binet and Wechsler tests.

Prerequisite: Admission to graduate program in clinical psychology.

PSY 621 Projective Tests (4)

Theory, demonstration, and practical training in the use of projective techniques with emphasis on Rorschach and the Thematic Apperception Test.

Prerequisite: Admission to graduate program in clinical psychology.

PSY 622 Clinical Intervention (4)

Presentation and discussion of various approaches of clinical intervention, with emphasis on

major psychotherapeutic techniques.

Prerequisite: Admission to graduate program in clinical psychology.

PSY 623 Child Clinical Psychology: Normal and Abnormal Social-Personality Development (4)

Examination of normal and abnormal social-personality development in children, with emphasis on causative factors and implications for clinical activity.

Prerequisite: Admission to graduate program in psychology, or permission of instructor.

PSY 624 Advanced Abnormal (4)

Review of the major neurotic, psychotic, psychosomatic, and organic syndromes. Current issues and research in psychopathology.

Prerequisite: Admission to graduate program in clinical psychology.

PSY 625 Practicum I and II (8)

Experience in areas of specialized training. Credit for the first semester will not be granted until the second semester has been successfully completed.

Prerequisite: Admission to graduate program in clinical psychology and permission of adviser.

PSY 626 Child Clinical Psychology: Techniques of Assessment and Intervention (4)

Examination of various techniques for assessing and modifying the behavior of children and families with problems.

Prerequisite: Admission to graduate program in clinical psychology and PSY 623, or permission of instructor.

PSY 670 Applied Developmental Psychology (4)

Analysis of the role of the developmental psychologist specializing in primary prevention of psychological dysfunction: intervention to promote mental health in community, institutional, and social action settings; evaluation of programs.

Prerequisite: Permission of instructor.

PSY 671 Assessment and Decision-Making in Developmental Psychology (4)

Examination of procedures assessing developmentally relevant characteristics of individuals, their relations to others, to groups (peers, family, etc.), and to setting (home, school, institution).

Prerequisite: PSY 692 or permission of instructor.

PSY 672 Infancy and Childhood (4)

In-depth consideration of research and theory on the development of the human organism from conception to puberty. The interaction between the various behavioral and social processes will be emphasized along with a consideration of abnormalities in development. Field work may be required.

Prerequisite: Permission of instructor.

PSY 673 Adolescence and Youth (4)

Examination of significant age-related changes during adolescence and youth, with emphasis on the dynamic interactions between physical maturation, personality development, and social variables. Field experiences may be required.

Prerequisite: Permission of instructor.

PSY 674 Adulthood and Aging (4)

Intensive study of developmental phenomena from adulthood to death. Topics include marital and occupational adjustment as well as the relationship between personality and the aging process. Field experiences may be required.

Prerequisite: Permission of instructor.

PSY 675 Practicum in Developmental Psychology (4)

Supervised experience in an agency relevant to the student's area of specialization. The student is expected to use skills developed during course work. In addition, the development of new skills through practicum experience is encouraged.

Prerequisite: Permission of instructor.

PSY 690 Research Project (4)

Individual research project related to the student's area of concentration.

Prerequisite: Admission to graduate program in psychology and permission of adviser.

PSY 691 Proseminar (4)

Overview of current major issues and research in developmental psychology.

Prerequisite: Admission to graduate program in psychology.

PSY 692

Research Methods and Projects (4)

Study of issues in the formulation of research problems and hypotheses, design strategies, and techniques of data analysis. Students will be required to design individual research projects.

Prerequisite: Admission to graduate program in psychology.

DEPARTMENT OF SOCIOLOGY AND ANTHROPOLOGY

Chairperson: Peter J. Bertocci

(Italics in the following list designate specialty.)

Professors:

Nahum Z. Medalia, *Sociology*, Ph.D., Harvard University

Jesse R. Pitts, *Sociology*, Ph.D., Harvard University

Philip Singer, *Anthropology*, Ph.D., Syracuse University

Associate Professors:

Peter J. Bertocci, *Anthropology*, Ph.D., Michigan State University

William E. Bezdek, *Sociology*, Ph.D., University of Chicago

Judith K. Brown, *Anthropology*, Ed.D., Harvard University

James W. Dow, *Anthropology*, Ph.D., Brandeis University

Harry Gold, *Sociology*, Ph.D., University of Michigan

Jacqueline R. Scherer, *Sociology*, Ph.D., Syracuse University

Richard B. Stamps, *Anthropology*, Ph.D., Michigan State University

Donald I. Warren, *Sociology*, Ph.D., University of Michigan

Assistant Professors:

Edward J. McCabe, *Sociology*, Ph.D., Northwestern University

Gary A. Shepherd, *Sociology*, Ph.D., Michigan State University

THE MASTER OF ARTS IN SOCIOLOGY

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

Admission to the Program

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

Requirements for the Degree

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

1. Sociology of Law, Criminal Justice, and Corrections
2. Sociology of Community Institutions

78/Sociology and Anthropology (Arts and Sciences)

3. Social Aspects of Health and Welfare

4. Social Anthropology

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

Concentration in Law and Criminal Justice: SOC 522; 525; 527; and 537.

Concentration in Sociology of Community Institutions: SOC 543; 544; 545; and 560.

Concentration in Aspects of Health and Welfare: SOC 514; 515; 528; and 565.

Concentration in Social Anthropology: AN 501; 510; 530; and 540.

All candidates are required to complete SOC/AN 600: Thesis. The final product is to be a professional paper of journal length. Each student is free to choose one elective course from any of the graduate offerings in sociology. Appropriate graduate courses in other departments may be taken as an elective only with prior approval of the departmental chairperson or the director of the graduate program.

Typical Program of Full-Time Study

Fall

SOC/AN 500	Theories of Society and Culture	4
SOC 501	Survey and Interview Techniques	4
A course in the field of concentration		4

Winter

SOC 502	Specialized Field Techniques	4
SOC 503	Computer Packages	4
A course in the field of concentration		4

Fall

A course in the field of concentration		4
An elective		4
SOC/AN 600	Thesis	4
		<u>4</u>
		36

Course Offerings

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)

Trains 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)

Trains 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

Sociology and Anthropology (Arts and Sciences)/79

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 Medical Practice (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 Sociology of Aging (4)

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

SOC 580 Independent Study and Research (2 or 4)

Directed independent reading and research.

SOC 590 Seminar in Applied Sociology (4)

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

SOC 600 Thesis (4)

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

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

ANTHROPOLOGY

AN 500 Theories of Society and Culture (4)

Same as SOC 500

AN 501 Social Anthropology (4)

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

AN 502 Specialized Field Techniques (4)

Same as SOC 502

AN 510 Cultural Ecology (4)

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

AN 530 Systems of Wealth and Power (4)

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

AN 540 Anthropology of Law (4)

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

AN 580 Independent Study and Research (2 or 4)

Directed independent reading and research

AN 590 Seminar in Applied Anthropology (4)

Same as SOC 590

AN 600 Thesis (4)

Same as SOC 600

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

SCHOOL OF ECONOMICS AND MANAGEMENT

Office of the Dean:

Ronald M. Horwitz, Dean

John E. Tower, Associate Dean and Director of the M.B.A. Program

Professors:

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

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

Joseph E. Champagne, 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

Sid Mittra, Ph.D., University of Florida

Associate Professors:

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

Alice C. Gorlin, Ph.D., University of Michigan

Oded Izraeli, Ph.D., University of Chicago

Ravi Parameswaran, Ph.D., Georgia State University

Alan Reinstein, D.B.A., University of Kentucky, CPA

Miron Stano, Ph.D., Cornell University

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

Assistant Professors:

Zewdineh Assefa, Ph.D., University of Illinois

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

Paul S. Foote, Ph.D., Michigan State University

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

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

James E. Mallett, Ph.D., Wayne State University

Thomas R. McCarthy, Ph.D., University of Maryland

Scott A. Monroe, Ph.D., State University of New York at Binghamton

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

Leonard C. Schwartz, J.D., Wayne State University

Theresa M. Spinelli, Ph.D., Wayne State University

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

Instructors:

Elizabeth A. Frederick, M.B.A., Michigan State University

Gerald V. Post, B.A., University of Wisconsin—Eau Claire

Laura Stern, M.A., Wayne State University

Special Instructor:

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

Visiting Assistant Professor:

Satnarine Heeralall, Ph.D., Wayne State University

Visiting Instructors:

Frank P. Cardimen, M.B.A., Ohio University

Susan E. Moeller, M.B.A., Michigan State University

Deborah P. Paruch, M.B.A., University of Detroit, CPA

Adjunct Professors:

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

Theodore O. Yntema, Ph.D., University of Chicago

THE MASTER OF BUSINESS ADMINISTRATION

A program leading to the Master of Business Administration (M.B.A.) is offered by the School of Economics and Management. It is designed to educate students for managerial roles in either the private, public, or not-for-profit sectors of the economy. While learning to integrate areas of accounting, economics, behavioral science, and quantitative methods with functional aspects of managerial and business problems, students also are prepared for entry-level jobs.

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 and social sciences, mathematics, the humanities, business, health care, education, and other disciplines.

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 to achieve these goals.
3. Help students to understand their physical and social environments.
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.

BOARD OF VISITORS

Recognizing the need for a direct link between the industrial community and the School of Economics and Management, the school established a Board of Visitors in the fall of 1979. The board is comprised of outstanding corporate and professional leaders from the greater Detroit metropolitan area. Board members have been assisting the faculty of the school on several projects and providing consultation on goals and objectives, curricula designs, and research programs.

The members of the board are:

- Mr. F. James McDonald, President, General Motors Corporation (Chairman, Board of Visitors)
- Mr. James A. Aliber, Chairman of the Board, First Federal Michigan Corporation
- Mr. Edward E. Barker, Jr., Former Chairman and Chief Executive Officer, Pontiac State Bank
- Mr. William E. Giles, Former Editor and Vice President, The Detroit News
- Mr. William R. James, Vice President, Capital Cities Communications
- Mr. Paul L. John, Vice Chairman and Chief Executive Officer, Campbell-Ewald Company
- Mr. Kenneth E. Myers, President, William Beaumont Hospital Corporation
- Mr. Harold A. Poling, Executive Vice President, Ford North American Automotive Operations, Ford Motor Company
- Mr. Robert H. Robinson, Office Managing Partner, Arthur Young & Company
- Mr. Thatcher Root, President and Chief Operating Officer, Manley, Bennett, McDonald & Company
- Mr. Alan E. Schwartz, Senior Partner, Honigman, Miller, Schwartz and Cohn

Admission

Admission to the M.B.A. program is selective and depends on several elements, including scholarship and an ability to communicate effectively. The criteria used in making decisions on admission to the M.B.A. program are:

1. A bachelor's degree or equivalent from an institution of recognized standing is required, except for Oakland University students admitted to the "Accelerated Program."

2. The applicant's undergraduate grade point average.
3. The applicant's total score, verbal score, and quantitative score on the Graduate Management Admissions Test (GMAT).
4. A college course in economics or comparable business experience.
5. An aptitude for mathematics as demonstrated by college course work in mathematics or the quantitative score on the GMAT.

Applicants must also meet the general admission requirements for graduate study at Oakland University. Applications are considered by the Graduate Admission Committee of the School of Economics and Management. In making admission decisions, the admission committee assesses the potential of applicants for success in the M.B.A. program by examining their undergraduate records, their GMAT scores, their responses to questions on the supplementary 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. No other test may be substituted. For more information write GMAT, Educational Testing Service, Box 966-R, Princeton, New Jersey 08541, 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, but especially those intending to enroll as part-time 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.

Length of Program

The program varies from 36 to 57 credits, depending on the student's prior preparation. The core of the program consists of 36 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, or spring terms depending upon their background. Full-time students normally take 12 credits (four courses) during the day in the fall and winter semesters and two courses in a spring or summer session. The full-time student can finish the complete 57-credit program in two calendar years (24 months). Students with sufficient background in business courses may be able to complete the minimum 36 credit M.B.A. program in one year (12 months) of full-time study.

Part-time students must take six credits (two courses) each semester and three credits (one course) each spring and summer session. The part-time student should finish the complete 57-credit program in three and one-third calendar years (40 months) in a lock-step, year-around program. Both the day and evening programs are highly structured and a student entering these programs without any background in business will take the courses with the same set of students through the precore and core parts of the program.

Because of the sequential, integrative nature of the program, students must obtain special permission to take M.B.A. courses in a pattern other than the prescribed schedule for their entering class or as listed in their plan-of-work. 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 Economics and Management, in conjunction with other schools and departments of the university, offers an accelerated program leading to the M.B.A. and a baccalaureate in a field other than management in 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 their baccalaureate as "free" undergraduate electives. This program is available to both full-time and part-time students.

The departments which administer the majors of the accelerated program must certify that the students have a GPA in the top 15% of their class and approve their application for the accelerated program. Upon acceptance into the program, the students are considered undergraduates (paying undergraduate tuition) until the baccalaureate is earned and a graduate student (paying graduate tuition) thereafter. Formal admission into the M.B.A. is presumed subject to satisfactory performance in the final courses taken to meet the undergraduate degree requirements. Accelerated program students must take at least 36 credits in the M.B.A. program after receiving the baccalaureate. 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.

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 will be expected to have either a college course in economics or background in business and some skill with algebra. In some cases, M.B.A. applicants may be directed to enroll in appropriate undergraduate courses prior to admission to obtain algebra skills or a background in economics. 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 Course	Credits	Who Will Probably Need It?
QMM 501 Quantitative Methods for Management	3	Applicants with no calculus background or who need a refresher and review in math through calculus.
MIS 502 Computer Methods for Management	3	Applicants with no prior computer programming experience.
or		
MIS 503 Computer Orientation	(1)	Applicants with knowledge of a computer language. This is an orientation to the local computing environment, especially the mainframe and micro-computer resources available for 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 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 legal environment or business law course.

Admission to the precore courses requires the complete application process, including submission of GMAT scores.

To be exempted from these courses the applicant must have passed either an equivalent or higher level graduate or undergraduate course within the previous ten years, or passed a proficiency test at an acceptable level. 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 36 credits. Most of the business and nonbusiness M.B.A. students will be required to take either MIS 502 or MIS 503. For those required to take MIS 503, the minimum program will be 37 credits. Exemptions from precore courses are determined by the M.B.A. office after an evaluation of a student's transcript.

M.B.A. Core Program

The core program introduces the M.B.A. student to the functional areas of management and applies the tools of accounting, economics, quantitative methods, organizational behavior, marketing, and finance to problems and cases in management policy and strategy.

The core courses are:	Credits
ACC 512 Managerial Accounting Systems	3
ECN 522 Macroeconomic Analysis	3
FIN 533 Managerial Finance	3
MKT 560 Marketing	3
MIS 524 Management Information Systems	3
ORG 531 Human Resources Management	3
QMM 521 Operations Management	3
MGT 535 Policy, Strategy, and Goals	3
	<u>24</u>

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 passed either an equivalent or higher level course at the undergraduate or graduate level within the past ten years, or passed a proficiency test at an acceptable level. Students exempted from taking ACC 512, FIN 533, or MKT 560 will be required to take an elective in the same area to replace the core course. Students exempted from ECN 522, MIS 524, ORG 531, or QMM 521 will be required to take additional M.B.A. electives to replace these courses. MGT 535 will be required of all M.B.A. candidates. Exemptions from core courses and acceptable elective courses are determined by the M.B.A. office after an evaluation of the student's transcript.

M.B.A. Electives

M.B.A. candidates complete their program by selecting a minimum of twelve credits of M.B.A. electives. These elective credits may be M.B.A. courses offered by the School of Economics and Management, a very limited set of approved courses offered by other units of Oakland University, or the master's project. The school does not offer formal concentrations or specializations within the M.B.A. program. Through selection of electives or work on the optional master's project, students may concentrate their efforts in one of several areas. Resources permitting, stu-

dents may pursue advanced work in accounting, economics, finance, human resource management, marketing, management information systems, quantitative methods, or international management.

A Typical Full-Time Program For Nonbusiness Majors

The following program is the standard structured program for the M.B.A. student that must take the complete 57 credit program on a full-time basis during the day.

First Term (sp/su)	Second Term (fall)	Third Term (winter)
FIRST YEAR:		
QMM 501 Quantitative Methods	ACC 511 Financial Accounting	MGT 550 Legal Environment
MIS 502 Computer Methods	ECN 520 Microeconomic Decision Analysis	ACC 512 Managerial Accounting
	QMM 510 Statistical Analysis	QMM 521 Operations Management
	ORG 530 Organizational Behavior	ORG 531 Human Resources Management
SECOND YEAR:*		
ECN 522 Macroeconomics	FIN 533 Managerial Finance	MGT 535 Policy
	MKT 560 Marketing	Elective
	MIS 524 Management Information Systems	Elective
	Elective	Elective

*If a full-time student wishes to advance the program completion it is possible to take more electives in the spring and summer terms of the second year.

A Typical Full-Time Program for Business Majors

The following program is a standard program for the M.B.A. student with an undergraduate business major and the appropriate background to take the minimum 36 credit program.

First Term (fall)	Second Term (winter)	Third Term (sp/su)
FIRST YEAR:		
FIN 533 Managerial Finance	ACC 512 Managerial Accounting	ECN 522 Macroeconomics or M.B.A. elective
or FIN elective	or ACC elective	
MKT 560 Marketing	QMM 521 Operations Management	MGT 535 Policy
or MKT elective	or M.B.A. elective	
MIS 503 Computer Orientation	ORG 531 Human Resources Management	Elective
MIS 524 Management Information System	or M.B.A. elective	
or M.B.A. elective	Elective	Elective

A Typical Part-Time Program for Nonbusiness Majors

The following program is the standard structured program for the M.B.A. student that must take the complete 57 credit program on a part-time basis in the evening, generally from 6:30 to 9:20 p.m. two nights a week:

First Term (sp/su)	Second Term (fall)	Third Term (winter)
FIRST YEAR:		
QMM 501 Quantitative Methods	QMM 510 Statistical Analysis	ECN 520 Microeconomic Decision Analysis
MIS 502 Computer Methods	ACC 511 Financial Accounting	ORG 530 Organizational Behavior
SECOND YEAR:		
MGT 550 Legal Environment	ACC 512 Managerial Accounting	FIN 533 Managerial Finance
ECN 522 Macroeconomics	QMM 521 Operations Management	MIS 524 Management Information Systems
THIRD YEAR:		
ORG 531 Human Resources Management	MGT 535 Policy	Elective
MKT 560 Marketing	Elective	Elective
FOURTH YEAR:		
Elective		

Typical Part-Time Program for Business Majors

The following program is a standard program for the M.B.A. student with an undergraduate business major and the appropriate background to take the minimum 36 credit program.

First Term (fall)	Second Term (winter)	Third Term (sp/su)
FIRST YEAR:		
ACC 512 Managerial Accounting or ACC elective	FIN 533 Managerial Finance or FIN elective	ORG 531 Human Resources Management or M.B.A. elective
QMM 521 Operations Management or M.B.A. elective	MIS 524 Management Information Systems or M.B.A. elective	MKT 560 Marketing or MKT elective
MIS 503 Computer Orientation		
SECOND YEAR:		
ECN 522 Macroeconomics or M.B.A. elective	MGT 535 Policy	Elective
Elective	Elective	Elective

Time of Admission

The full-time program for nonbusiness majors starts in the spring session. Applicants who wish to enter the full-time program should have their applications completed by February 28 prior to the spring session of entry. A completed application means that the potential M.B.A. student has on file in the graduate admissions office a completed application for graduate study, an M.B.A. supplementary application, transcripts sent directly from all previous colleges and universities, and a GMAT score. If applicants have a mathematics background through calculus and a computer programming course, they can start the full-time program in the fall semester. Applicants with a business degree normally would start the full-time program in the fall semester and should complete their applications by June 30 prior to the fall semester in which they plan to enter the M.B.A. program.

The part-time program for nonbusiness majors starts in the fall semester and spring session. Applicants who wish to enter the part-time program should have

their applications completed by June 30 for the fall semester and by February 28 for the spring session. Students with a mathematics background through calculus and computer programming also may enter the M.B.A. program in the winter semester and should have their applications completed by November 15. Applicants with a business degree can enter the M.B.A. program in the fall and winter semesters and spring sessions. They should have their applications completed by the previous June 30, November 15, and February 28, respectively.

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 School, up to 9 credits of relevant graduate course work may be transferred from an accredited institution. For credit to transfer the student must have earned a grade of 3.0 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 by the M.B.A. office after an evaluation of a student's transcript.

Student Evaluation and Grading

M.B.A. students must maintain at least a 3.0 grade point average in accordance with the university requirements for graduate students. Dismissal may result from severe deficiencies, such as failure (less than 2.0) in any course, two or more course grades below 3.0, or insufficient progress toward a degree.

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 3.0 grade point average does not necessarily guarantee continuation in the program. Generally, two course grades below 3.0 within the first 24 credits of graduate work are viewed as excessive, especially when accompanied by a marginal GPA. Similarly, failure to complete individual courses on schedule jeopardizes progress toward the degree, regardless of GPA, making the student liable for probation or dismissal. Students who do not complete an M.B.A. course for 12 months must formally apply for readmission to the M.B.A. program. Even if students leave the program voluntarily and in good standing, readmission is not automatic.

Master's Project (Optional)

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

The student obtains a faculty project adviser and, with the adviser's approval, obtains a second faculty person to act as a reader. The reader may be from another discipline. A copy of the project proposal as approved and signed by the adviser, reader, and student, should be submitted to the M.B.A. office during the first week of the semester in which the project course is taken.

The master's project is graded as "S" (satisfactory) or "N" (unsatisfactory). A grade of "P" (progress) may be assigned if the project is not complete at the semester's end, and if sufficient progress has been made to warrant the "P" grade. If the project is not completed within two years, the "P" grade becomes an "I" (no credit) grade and the student must register for the course a second time to receive credit for the completed project.

Course Offerings

ACCOUNTING COURSES

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. The results of current research on the behavioral impact of accounting instruments are stressed.

Prerequisite: M.B.A. precore.

ACC 610 Managerial and Cost Accounting (3)

An in-depth analysis of available procedures and techniques to sharpen accounting analyses for managerial planning and control.

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

ACC 611 Auditing (3)

Introduction to the objectives, techniques, and standards of internal and external audits of the accounts of an enterprise. Generally accepted auditing standards will be critically examined.

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

ACC 612 Regulatory, Government and Not-for-Profit Accounting (3)

Examination of the nature, origin, and workings of the SEC, ICC, and other regulatory agencies as related to the accounting profession. Analysis of the characteristics and objectives of not-for-profit entities and their use in identifying and defining the basic concepts of accounting for funds.

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

ACC 614 Accounting Theory (3)

Examination of selected topics of current interest in accounting theory. Opinions of the Accounting Principles Board (APB), statements of the Financial Accounting Standards Board (FASB), and the output of similar standard-setting committees of the accounting profession will be examined.

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

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 616 Contemporary Accounting Issues (3)

An examination of the changes in accounting associated with infusions of theories of other disciplines: behavior science, organizational theory, economic theory, and sociology. Topics include the changing role of the accountant in response to current social and legal demands for nonfinancial reporting.

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 procession. Internal control, security, and auditing features will be stressed. Includes analysis of computer hardware and software needs, systems analysis, system development, and implementation.

Prerequisite: M.B.A. precore, MIS 524 and ACC 512.

ACC 690 Independent Study in Accounting (3)

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

Prerequisite: M.B.A. precore, ACC 512, and prior approval of instructor.

ECONOMICS COURSES

ECN 520 Microeconomic Decision Analysis (3)

Analysis of microeconomic decision makers in a market environment. Includes models of: consumer theory, the firm, production processes, costs, pricing, resource allocation, market and

industry structure, decision making under certainty, and an introduction to decision making under uncertainty.

Prerequisite: QMM 501 and QMM 510.

ECN 522 Macroeconomic Analysis (3)

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

Prerequisite: M.B.A. precore.

ECN 648 Labor Economics (3)

Economic analysis of the functioning of labor markets, with emphasis on: investment in human capital; the role of education; labor market differentiation by race, sex, and age; unemployment; and the geographic and occupational mobility of labor.

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

ECN 673 International Trade and Finance (3)

Examination of the theory of international trade, international monetary mechanisms, exchange-rate regimes, the balance of payments, and economic interdependence.

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

ECN 678 Economic Analysis of Law (3)

Economic analysis of the basic institutions of legal systems. Emphasis is on laws that are not directly intended to regulate the economy, including property, contract, tort, criminal, and procedural law. Labor and anti-trust law will be discussed only tangentially.

Prerequisite: M.B.A. precore.

ECN 690 Independent Study In Economics (3)

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

Prerequisite: M.B.A. precore, ECN 522, and prior approval of instructor.

FINANCE COURSES

FIN 533 Managerial Finance (3)

Introduction to and survey of finance. Development of the tools of financial analysis and forecasting, the basics of investment decision making, the fundamentals of valuation theory, and the types of long-term financing.

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

FIN 617 Financial Theory (3)

Examines in detail securities market operations, including yields and returns expected by investors in various segments of the capital market. Includes an analysis of the relative merits of obtaining funds for company growth through stocks, bonds, or retained earnings.

Prerequisite: M.B.A. precore and FIN 533.

FIN 618 Portfolio Analysis (3)

Comprehensive treatment of security analysis and portfolio theory. Includes the scope of investment management, organized securities markets, the influence of macropolicy instruments on the money and capital markets, and analytical procedures for appraising securities.

Prerequisite: M.B.A. precore and FIN 533.

FIN 620 Money and the Financial System (3)

Examination of the nature of money and credit, the supply of money and credit through commercial banks and other financial intermediaries, and the role of the Federal Reserve System in the money supply process and interest rate determination.

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

FIN 627 Multinational Finance and Accounting (3)

Examination of capital markets, ownership strategies, project evaluation, account consolidation, and auditing across national and currency boundaries.

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

FIN 642 Cases In Managerial Finance (3)

Analysis of cases in managerial finance applying and expanding principles introduced in FIN 533.

Prerequisite: M.B.A. precore and FIN 533.

FIN 656 Public Finance (3)

Analysis of the basis for public spending and taxation including: equity, efficiency, and flexibility of alternative tax revenue bases; expenditure determination; effects on income distribution, growth, and various sectors of the economy; financing the public debt.

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

FIN 690 Independent Study In Finance (3)

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

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

MANAGEMENT COURSES (Including Business Policy and Business Law)

MGT 535 Policy, Strategy, and Goals (3)

Application of management tools of economics, statistics, organizational behavior, accounting, marketing, finance, operations management, and management information systems to the analysis of organizational case studies.

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

MGT 550 Legal Environment of Business (3)

Examination of the legal framework in which business decisions are made and conflicts resolved. Emphasizes the law of contracts, sales, agency, partnership, corporations, antitrust, and government regulation.

Prerequisite: ECN 520.

MGT 611 Master's Project (6)

Independent elective project.

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

MGT 626 Managing the Multinational Enterprise (3)

Analysis of the scope, structure, and strategies of the multinational enterprise. Includes strategic planning, production and distribution logistics, selection of technology, shifting targets, transfer prices, political risk forecasting, and control of strategy.

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

MGT 630 Legal Environment of Personnel Decisions (3)

Summarizes major bodies of law which affect personnel-related business decisions. Includes the wage and hour law, equal employment opportunity law, occupational health and safety law, and employees' personal rights.

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

MGT 638 Labor-Management Relations (3)

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

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

MGT 660 Launching and Managing Small Businesses (3)

Analysis of the role of small businesses in the U.S. economy, the small business administration, franchise opportunities, consulting as a business, and the launching, financing, and managing of a small business. A significant term project is required.

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

MGT 667 Health Care Organization (3)

Application of the tools of economic analysis to the health care industry and government health policy. Examination of proposed changes in the current system and benefit/cost analysis applied to public policy and resource allocation.

Prerequisite: M.B.A. precore and QMM 521.

MGT 670 Nonprofit Sector Management (3)

Managerial principles for, and cases on, the management of nonprofit institutions. Examination of goal setting, progress evaluation, cost-benefit analysis, program design, and financing.

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

MGT 690 Independent Study In Management (3)

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

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

MANAGEMENT INFORMATION SYSTEMS COURSES

Course designations in parentheses indicate previous identification.

MIS 502 (QMM 502) Computer Methods for Management (3)

Introduction to computers; computing concepts; computer applications in word processing, financial analysis, data-base management, statistics, accounting; data communication, and accounting; and the BASIC language. Programs will be executed on microcomputers and the university's mainframe computer.

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

MIS 503 (QMM 503) Computer Orientation (1)

Familiarization with the local mainframe and microcomputer environment, including software packages such as an "electronic spread sheet," financial modeling, word processing, data-base management, and the Explore, Minitab, SPSS, and BMDP statistical programs.

Prerequisite: Admission to the M.B.A. program and knowledge of a computing language.

MIS 524 (QMM 524) Management Information Systems (3)

Examination of: the evolution, planning, selection, and operation of a management information system; what the manager should know about the computer; and the development of computer-based information systems for decision making.

Prerequisite: M.B.A. precore.

MIS 600 (QMM 605) Analysis of Complex Systems (3)

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

Prerequisite: M.B.A. precore, MIS 524, and QMM 521.

MIS 607 Computer Systems for Problem-Solving (3)

An advanced communications and problem-solving course in which students learn to specify and design systems for computers. Consists of field studies by teams of students, leading to computerized prototype solutions of "real-world" problems.

Prerequisite: M.B.A. precore, MIS 524, and knowledge of two high-level computer languages (e.g., BASIC, COBOL, FORTRAN, PL/I, or Pascal).

MIS 644 Simulation in Management (3)

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

Prerequisite: M.B.A. precore, MIS 524, and QMM 521.

MIS 690 Independent Study in Management Information Systems (3)

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

Prerequisite: M.B.A. precore, MIS 524, and prior approval of instructor.

MARKETING COURSES**MKT 560 Marketing (3)**

Focuses on problems of product planning, market segmentation, demand analysis, consumer behavior, product distribution, pricing, and promotion. The approach to these problems considers both the normative or theoretical, and the empirical or marketing research orientations.

Prerequisite: M.B.A. precore.

MKT 604 Consumer Behavior (3)

Study of basic factors influencing consumer behavior, with emphasis on structuring and managerial use of consumer decision-making models. Social-psychological and economic variables, including learning, motivation, attitude, personality, small groups, demographic, and cultural factors are examined.

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

MKT 608 Marketing Management (3)

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

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

MKT 680 Seminar in Marketing (3)

Applications of recent theoretical and empirical findings in marketing. Students work on a project, in cooperation with local firms, where they apply the tools acquired in marketing and related courses to a current managerial problem.

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

MKT 690 Independent Study in Marketing (3)

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

Prerequisite: M.B.A. precore, MKT 560, and prior approval of instructor.

ORGANIZATIONAL BEHAVIOR COURSES**ORG 530 Organizational Behavior (3)**

Organizational behavior is analyzed at individual, group, and organizational levels. Individual and group processes such as perception, learning, motivation, communication, and conflict are studied in depth. Organizational-level topics include size, structure, complexity, and effectiveness.

Prerequisite: Admission to the M.B.A. program. Corequisite: QMM 510.

ORG 531 Human Resources Management (3)

Theoretical and empirical issues of the personnel function in modern organizations. Includes job analysis and design, employee recruiting, compensation policies and practices, research techniques, government policy, law, and social and environmental factors related to decision making.

Prerequisite: M.B.A. precore.

ORG 635 Assessment of Organizational Behavior (3)

Use of findings and methods of behavioral research strategies as inputs for managerial problem solving. Comparison of case, experimental, correlational, and other approaches. Includes practice in collecting and evaluating data.

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

ORG 636 Leadership and Group Performance (3)

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

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

ORG 637 Motivation and Work Behavior (3)

Analysis of the individual organizational factors affecting employee motivation, performance, and satisfaction. Includes the role of leadership, job design, environmental variation, compensation policies, goal-setting techniques, and group influences.

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

ORG 654 Research Methods (3)

Topics in methods of organizational research. Representative subjects include development of hypotheses, sampling, research design, research types, measurement, methods of data collection, and analysis and interpretation of data.

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

ORG 690 Independent Study in Organizational Behavior (3)

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

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

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

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

Prerequisite: Admission to M.B.A. and intermediate or 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

94/School of Economics and Management

modeling, and regression analysis. Real-world applications and use of "canned" computer programs are stressed.

Prerequisite: QMM 501.

QMM 521 Operations Management (3)

Economic problems of production management in manufacturing and service industries, such as inventory management, statistical quality control, plant and equipment investment, facility location, optimization, and operations scheduling. Qualitative problems of the production environment are also considered.

Prerequisite: M.B.A. precore.

QMM 640 Operations Research (3)

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

Prerequisite: M.B.A. precore and QMM 521.

QMM 652 Forecasting (3)

Survey of analytical forecasting methods, such as exponential smoothing, time series decomposition, Box-Jenkins, simple econometric and distributed lag models, seasonality and autocorrelation, Delphi and other qualitative methods, assessment of commercially available forecasting services, and case studies of the managerial forecasting environment. Extensive use of computer packages to prepare actual forecasts for written and oral presentation.

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

QMM 655 Econometric Data Analysis (3)

Formulation and testing of statistical models using regression techniques. Topics include: violations of regression assumptions, binary variables, autoregressive and distributed lag models, "large" simultaneous equation models and alternatives to ordinary least squares. Includes extensive experience using computer packages to prepare analyses of read data for written and oral presentation.

Prerequisite: M.B.A. precore.

QMM 690 Independent Study in Quantitative Methods (3)

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

Prerequisite: M.B.A. precore, QMM 521, and prior approval of instructor.

School of Engineering and Computer Science/95

SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

Office of the Dean:

Mohammed S. Ghausi, *Dean and John F. Dodge Professor of Engineering*

Howard R. Witt, *Associate Dean*

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John Carroll Hill, Ph.D., Purdue University
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Brian P. Sangeorzan, Ph.D., University of Wisconsin
Christian C. Wagner, Ph.D., Michigan State University
Mohamed A. Zohdy, Ph.D., University of Waterloo

Special Instructor:

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

Visiting Instructor:

Robert P. Van Til, MSME; Northwestern University

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Michael Marcotty, B.S., University of Reading
Kenneth A. Meade, Sc.D. (Honorary), Eastern Michigan University and Oakland University

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George W. Buckley, Ph.D., Southampton University
Mark M. Shamamy, Ph.D., University of Illinois

Adjunct Assistant Professors:

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 Susanne M. Gatchell, Ph.D., University of Michigan
 Steven L. Plee, Ph.D., Purdue University
 Ranjit K. Roy, Ph.D., University of Missouri

The School of Engineering and Computer Science offers work leading to the Master of Science degree in electrical and computer engineering, mechanical engineering, systems and industrial engineering, engineering management, and computer and information science, and the Doctor of Philosophy degree in systems engineering.

The School of Engineering and Computer Science is housed in Dodge Hall, a modern facility with extensive laboratories for research and design studies. Laboratories cover experimental stress analysis, heat transfer, system simulation, circuits and communications, control, mechanical and electrical properties of materials, thin film microelectronics, microprocessors, minicomputers, computer graphics, computer-aided design, and robotics. Students have access to the various computing facilities of the school and the university's Honeywell 68/DPS-2 MULTICS system. Fully equipped and staffed electronics and machine shops complement these facilities.

Graduate Student Handbook

This section of the catalog describes the requirements and conditions for the various graduate programs of the School of Engineering and Computer Science. To assist students in program planning and to clarify regulations pertaining to progress and academic standing the school also publishes a Graduate Student Handbook. Copies are available in the office of the dean, Room 248 Dodge Hall.

THE DOCTOR OF PHILOSOPHY IN SYSTEMS ENGINEERING

The field of systems engineering has evolved into a blending of disciplines that is well-suited for dealing with such concerns as energy conservation and production systems, fluid and thermal systems, resource management, transportation systems, dynamic systems and control, and telecommunication and information processing systems. Oakland's School of Engineering and Computer Science is concentrating its efforts in these areas at the Ph.D. level.

Oakland's Ph.D. program in systems engineering is specifically for students who plan careers in industrial or governmental research and development laboratories or problem-oriented agencies as well as in the academic field. Students can begin doctoral study on a part-time basis, availing themselves of late afternoon or evening courses while working full-time in local industry. However, later phases of study and research will require full-time devotion to the program. Students must also fulfill a residency requirement.

Admission

The Ph.D. program is designed for students with academic backgrounds in engineering, although a background in mathematics or the physical sciences may be acceptable. Superior performance in a master's program is excellent preparation. Students with outstanding undergraduate records may apply directly for admission to the doctoral program, but normally a master's degree from an accredited institution is an admission requirement. Admission is highly selective; applicants should present transcripts of all previous academic work and recommendations from three faculty members of their most recent study program who can evaluate their scholarly achievement and promise. Foreign applicants must submit scores from the Graduate Record Examination general and engineering subject tests.

Entrance Classification

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

Transfer from Post-Master's to Regular Status

Post-master's students who have demonstrated outstanding achievement and who later wish to become degree-seeking students may request transfer of status. Students desiring to transfer status must complete a new application form, available from the Office of Graduate Admissions, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the engineering faculty will weigh most heavily the applicant's performance level at Oakland.

Advisory Committee

A student admitted to the Ph.D. program will be assigned an interim adviser to assist in the initial phase of formulating a program of study. As soon as possible after admission and before applying to take the Ph.D. preliminary examination, students must form an advisory committee which will direct and guide the progress of their programs. The interim adviser need not be a member of the student's doctoral advisory committee. Such a committee is composed of four Oakland faculty members, specified as follows:

1. Three faculty members nominated by the student, one designated as chairperson and one a member of a department outside the School of Engineering and Computer Science.
2. One member appointed by the dean of engineering and computer science.
3. Upon recommendation of the advisory committee, following successful completion of the Ph.D. preliminary examination, one member from outside the university community may either be added to the committee or replace a member for the thesis proposal and review.

The entire committee must have the approval of the dean of engineering and computer science and the dean of the Graduate School.

The specific courses required of a particular student for the Ph.D. degree are specified by the advisory committee, subject only to the minimal requirements listed under "doctoral degree requirements." Incoming Ph.D. students should discuss their proposed concentration area with faculty in that area, with a view toward formation of an advisory committee. Students are urged to form the committee as soon as possible to receive maximum benefit from its counsel. Students must formulate a Plan of Study and secure the approval of their doctoral advisory committees. Such an agreement spells out the courses accepted in the Ph.D. program and the course work the student must complete for the degree. *An advisory committee is not obligated to accept toward the degree any credits earned before its formation.*

Examinations

Each Ph.D. student is required to pass three special examinations administered by the advisory committee: preliminary examination, thesis proposal, and thesis defense. The purpose and scope of the examinations are described below.

Doctoral Degree Requirements

The basic requirement for the Ph.D. is completion of a unified program of formal course work and independent research, directed and approved by the advisory committee. While the courses and examinations for a particular student are specified by the advisory committee, all programs are subject to the following general regulations.

Residence: Writing a doctoral thesis requires a full commitment to research. Such research cannot effectively be pursued in an environment which places that research in a secondary role. Traditionally, doctoral students have been required to be full-time students for the one or two years of their active thesis research. When possible, the doctoral student should arrange such a period of residency. Although this represents the ideal, there are alternatives for creating a supportive environment for doctoral research. Students must plan their research programs to create such a supportive atmosphere. Two alternatives follow:

1. A two-semester period of residency on campus while the student pursues doctoral research full-time.
2. If the student's employer and faculty advisory committee agree that the thesis research will constitute a major portion of the student's job assignment while he/she is actively pursuing thesis research, then such an agreement constitutes a full commitment to research. The doctoral advisory committee will periodically review the student's research progress and determine the effectiveness of the work/study agreement. If students and their employer are unable to live up to the terms of the agreement, the advisory committee can declare the residency requirements unfulfilled.

The student must obtain an agreement from the advisory committee at the time of the thesis proposal to pursue any alternative to a two-semester residency requirement.

Course Work Credits: At least 56 credits must be earned for course work beyond the bachelor's degree (exclusive of thesis). The normal full-time load is 12 credits per semester. Students who have earned credits in a master's degree program at Oakland or another university may petition to have these credits applied toward the 56. The advisory committee will evaluate the student's prior work and allow Ph.D. credits for courses relevant to the proposed Ph.D. course of study. All candidates must complete at least 16 credits of course work exclusive of these at Oakland University. In the Ph.D. program graduate credit will not be awarded for courses in which a grade less than 3.0 is earned. All grades earned are used in computing a student's GPA.

Preliminary Examination: After being admitted to the Ph.D. program and before earning more than 16 credits toward the Ph.D., the student must apply to take the preliminary examination. The student must then take the examination at the next offering. A student not having an engineering background or with insufficient background may be granted a longer period of time to prepare by the advisory committee.

The examination will be administered twice each calendar year, during the fifth week of the fall and winter semesters. With the approval of the graduate committee, the student's advisory committee may choose to make its own arrangements for a preliminary examination to be given during the spring or summer session.

The examination, which assesses the student's facility with analytical reasoning essential to later Ph.D. research, contains both oral and written components. The written portion will include coverage of work in the student's major and minor area of study as well as in mathematics. The questions will be set and graded by faculty members chosen by the student's advisory committee.

Advisory committees may allow students to repeat the examination in a sub-

sequent semester if their performance is deemed inadequate. No additional repeat examination is permitted.

Thesis: Each candidate will submit a thesis to the advisory committee. The thesis must be the candidate's own work and must constitute a contribution to knowledge in his/her field of endeavor.

Thesis Proposal Review

As soon as a candidate and the advisory committee chairperson agree on a specific thesis research topic, the candidate must write a thesis 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.

Thesis Research Credits

Students who have advisory committee approval of their thesis proposals and are conducting thesis 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 thesis. These judgments are always made by the advisory committee. The thesis is judged completed upon successful completion of the final examination.

Final Examination

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

Time Limit

Students have a seven-year time limit to complete all requirements for the Ph.D. beginning with the first term of enrollment in the program. Credits accepted in transfer toward the degree may not be more than seven years old at the time of completion of the program.

Graduation

Students expecting to graduate in a given semester must file an application for degree card at the Office of the Registrar and pay the graduation service fee. Failure to do so on time will preclude graduation in that semester.

GENERAL REGULATIONS FOR MASTER'S DEGREE PROGRAMS

Admission

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

A suitable background for the program leading to the Master of Science in computer and information science is a baccalaureate in computer science, mathematics or engineering. A degree in another field may be acceptable but a student with such credentials should expect to spend additional time in residence acquiring

the fundamentals necessary to the computer and information science major. The engineering management program is designed to accommodate students with a bachelor's degree in engineering or computer science.

Admission to master's study is selective; applicants should have a GPA of 3.00 or better. Applicants should present academic transcripts and recommendations from two members of the undergraduate major department who are familiar with their accomplishments and promise. These recommendations form an important part of the admission credentials. Graduate Record Examination general and subject test scores are required of graduates of foreign institutions, of engineering applicants who are graduates of programs not accredited by the Accreditation Board of Engineering and Technology (ABET), and are encouraged for other applicants whose credentials do not meet regular admission criteria. The TOEFL score must be submitted by applicants who are graduates of programs taught in a language other than English. Additional entrance requirements for the computer and information science 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 Status: For applicants who merely wish to attend classes and do not intend to pursue a degree. To be admitted to special status, students must provide evidence of technical competence and must obtain approval from the Office of the Dean of Engineering and Computer Science. Credits earned as a special student do not apply toward the Master of Science from Oakland University unless the student subsequently transfers to regular status and the courses are accepted as part of the Master of Science program.

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

Transfer to Regular Status

Students desiring to transfer to regular status must complete an application form available from the Office of Graduate Admissions, and submit appropriate transcripts and letters of reference if these were not included with the original application for admission. When considering changes of status, the faculty will weigh heavily the applicant's performance at Oakland. A 3.00 cumulative average in Oakland graduate courses is a minimal requirement.

Master's Adviser

The progress of each regular student toward the Master of Science degree is directed by the master's adviser, who is a faculty member of the School of Engineering and Computer Science nominated by the student and approved by the dean of engineering and computer science. Each regular student must select an adviser during the first semester of enrollment. Incoming students seeking the degree are urged to discuss their proposed concentration area with faculty members in that area, with a view toward selecting an adviser later in the semester. In order to receive the maximum benefit of counseling, students are urged not to delay the selection of an adviser.

Course Credit

Normally, graduate credit is awarded only for courses numbered 500 or higher. However, up to 4 credits of senior-level courses in the major can be approved for graduate credit by the master's adviser. With the added approval of the graduate committee of the school, an additional 4 credits of senior-level courses can also be counted toward the required 32 credits. Course credit will not be awarded for work applied toward another degree.

Work Load and Scheduling

Full-time students normally register for up to 12 credits per semester. Students holding half-time assistantships in the School of Engineering and Computer Science normally register for 8 credits.

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 in 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. Any graduate student receiving more than one grade less than 3.0 in any course or having a grade point average less than 3.00 will be placed on academic probation and a student receiving more than two grades less than 3.0 may be subject to dismissal.

In all programs the minimum grade point requirement is an average of at least 3.00. If a student's grade point average is less than 3.00 after having attempted 16 credits then the student will be recommended for dismissal from the program.

THE MASTER OF SCIENCE DEGREES IN ELECTRICAL AND COMPUTER ENGINEERING, MECHANICAL ENGINEERING, AND SYSTEMS AND INDUSTRIAL ENGINEERING

Students may earn the Master of Science in electrical and computer engineering, mechanical engineering, or systems and industrial engineering. Programs do not require a thesis, although a design project is optional. The object of the Master of Science program is to provide students with broad education in an area of engineering rather than a narrow apprenticeship in a specific research area.

General Degree Requirements

To fulfill the requirements for a Master of Science degree in electrical and computer engineering, mechanical engineering, or systems and industrial 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 engineering or computer and information science courses.
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 and industrial engineering.

Adviser's approval is required for independent study, project and special topics courses used to fulfill program requirements. Not more than 8 credits of project work may be applied toward the degree.

Electrical and Computer Engineering Requirements

In addition to the general degree requirements a student must fulfill the following program requirements to be awarded the Master of Science in electrical and computer engineering.

Mathematics: 4-8 credits chosen from

APM 563	Applied Mathematics: Discrete Methods I (4)
MTH 531-532	Mathematical Methods in Engineering (4 each)
MTH 555-556	Complex Analysis (4 each)

 4-8
Required Courses:

CIS 501	Programming and Data Structures	4
ECE 581	Integrated Circuits and Devices	4
SYS 520	Signal and Systems Analysis	4
ECE 518	Switching Theory and Digital Logic (4) or	
ECE 533	Random Signals and Processes (4)	4

 16

Electives: Remaining 8-12 credits chosen from any graduate level ECE courses or from

SYS 532, 558, 563, 569, 722, 731, 732, 734
CIS 513, 517, 518, 542
EGR 594, 595, 690, 795
PHY 562, 574, 583, 673

 8-12

 32
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

MTH 531-532	Mathematical Methods in Engineering (4 each)
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 4-8
Required Courses: One of

ME 521	Dynamics (4), or
ME 582*	Fluid and Thermal Energy Systems (4)

 4

Depth Areas: Two courses from each of two of the following depth areas

Energy Systems

ME 582*	Fluid and Thermal Energy Systems
	and one of the following:
ME 554*	Solar and Alternate Energy Systems (4)
ME 555*	Combustion Processes (4)
ME 556*	Energy Systems Analysis (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)
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and one of the following:

ME 524	Vibration Analysis (4)
ME 569	Finite Elements (4)

Experimental Stress Analysis

ME 565	Stress Analysis (4)
ME 665	Experimental Stress Analysis (4)

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Electives: Remaining course work from those listed under depth areas above or from the following:

ME 561, 572, 610
SYS 520, 557, 630
CIS 517, 518
EGR 594, 595, 690, 795

 4-8

 32

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

*These courses are cross-listed as advanced undergraduate and graduate courses. Students who have completed these as 400-level courses may consider them in meeting depth requirements, but may not count them toward the 32-credit requirement of graduate-level work.

Systems and Industrial Engineering Requirements

Three options are available for the Master of Science in systems and industrial 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 and industrial engineering.

Dynamic Systems and Control Option

Mathematics: 4-8 credits from

APM 553	Advanced Ordinary Differential Equations (4)
MTH 531-532	Mathematical Methods in Engineering (4 each)
MTH 555	Complex Analysis I (4)

 4-8
Required Courses:

SYS 520	Signal and Systems Analysis	4
SYS 630	Optimal Control	4
SYS 631	Estimation and Control Theory	4
ECE 533	Random Signals and Processes	4

 16

Electives: Remaining 8-12 credits chosen from

SYS 523, 532, 574, 721, 722, 731, 732, 734
ECE 518, 564, 570, 571, 625, 637, 725
ME 521, 556, 582
CIS 517, 518
EGR 594, 595, 690, 795
PHY 562

 8-12

Robotics Option**Mathematics:** 4-8 credits from

APM 553	Advanced Ordinary Differential Equations (4)
MTH 531-532	Mathematical Methods in Engineering (4 each)
MTH 555	Complex Analysis I (4)

4-8**Required Courses:**

SYS 520	Signal and System Analysis	4
SYS 523	Dynamics and Control of Robot Manipulators	4
ECE 570	Microprocessors and Microcomputers	4

12**Electives:** 12-16 credits. At least 8 credits chosen from group A and the remainder from group B**Group A**

SYS 574	Digital Control Systems (4)
CIS 513	Pattern Recognition (4)
CIS 516	Artificial Intelligence (4)
EGR 595	Special Topics: Vision Systems (4)

Group B

SYS 510, 517, 532, 563, 569, 583, 585, 630, 631
ECE 518, 533, 571
ME 521
CIS 511, 542, 545
EGR 594, 595, 690, 795
PHY 562

12-16

32**Manufacturing Systems Option****Required Courses:**

APM 563	Discrete Mathematics	4
SYS 563	Foundations of Computer-Aided Design	4
SYS 583	Production Systems	4
SYS 684	Computer-Integrated Manufacturing Systems	4
CIS 545	Database Systems	4

20**Electives:** 12 credits. At least 8 credits chosen from group A and the remainder from group B**Group A**

SYS 517	Probability and Its Manufacturing Applications (4)
SYS 520	Signal and Systems Analysis (4)
SYS 523	Design and Control of Robot Manipulators (4)
SYS 569	Simulation in Engineering (4)
SYS 585	Statistical Quality Control (4)
SYS 664	Advanced Computer-Aided Design (4)
CIS 501	Programming and Data Structures (4)
CIS 516	Artificial Intelligence (4)
EGR 690	Graduate Engineering Project (4)

Group B

SYS 510, 574, 788
ME 569
CIS 570, 571
EGR 594, 595, 690, 795

STA 526, MTH 531, 532

12

32**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 554	Solar and Alternate Energy Systems
ME 555	Combustion Processes
ME 556	Energy Systems Analysis
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 790	Doctoral Thesis Research
EGR 795	Advanced Special Topics in Energy Systems

Related Courses include: ECE 570, 571; ME 538, 548, 572, 638, 648; SYS 520, 569, 581, 630, 682, 685, 731, 764, and PHY 573.

THE MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

The Master of Science program in engineering management is offered by the School of Engineering and Computer Science in cooperation with the School of Economics and Management. Intended for students with a bachelor's degree in engineering or computer science, the program has as its goal the provision of the background necessary for making sound management decisions in business and industry.

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

1. successfully complete a minimum of 41 credits of graduate level work as specified below.
2. earn a grade point average of at least 3.00 in courses applied toward the degree.

Credit Hours**Required Courses:**

ACC 511	Financial Accounting	3
ACC 512	Managerial Accounting Systems	3
FIN 533	Managerial Finance	3
ECN 520	Microeconomic Decision Analysis	3
ORG 530	Organizational Behavior	3
MGT 535	Policy, Strategy, and Goals	3
SYS 517	Probability and Its Manufacturing Applications	4
SYS 581	Industrial Engineering/Operations Research: Deterministic Systems	4
SYS 569	Simulation in Engineering	4
SYS 680	Engineering Decision Analysis	4

Elective Courses: Complete one course from Group A and one from Group B

7-8

Group A

SYS 510	Systems Optimization and Design (4)
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- SYS 520 Signal and Systems Analysis (4)
 SYS 557 Energy Conservation Systems (4)

Group B

- MIS 524 Management Information Systems (3)
 CIS 545 Database Systems (4)
 SYS 583 Production Systems (4)

41-42

THE MASTER OF SCIENCE IN COMPUTER AND INFORMATION SCIENCE

The Master of Science program in computer and information science is designed to prepare students for significant computer-related careers in business and industry and simultaneously for further graduate study. To be accepted into the Master of Science degree program in computer and information science, an entering student must have a bachelor's degree from an accredited institution. Preference will be given to students with majors in CIS, mathematics, and engineering. In addition, prospective students must:

1. demonstrate familiarity with assembly language programming and proficiency in at least one high-level programming language.
2. have received credit for college-level courses in data structures and machine organization.
3. have received credit for at least two years of college mathematics including 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 may be required to complete appropriate undergraduate work before being admitted to the program.

Degree Requirements

To fulfill the requirements for a Master of Science degree in computer and information science a student must:

1. successfully complete 32 credit hours of approved graduate-level work, at least 24 credits of which must be in approved CIS, ECE and SYS courses.
2. have earned a cumulative grade point average of at least 3.00 in courses applied toward the degree.
3. have completed the following program requirements.

Required Courses:

APM 563	Applied Mathematics: Discrete Methods I	4
CIS 542	Data Structures	4
CIS 550	Operating Systems	4
and one of:		
CIS 535	Run-Time Structures in Programming Languages (4)	
ECE 564	Computer Organization and Architecture (4)	4

16

Course Combination: Complete any one of the following combinations

CIS 511 and 538	CIS 535 and 565
CIS 511 and 542	CIS 542 and 545
CIS 513 and 516	CIS 550 and ECE 564
CIS 517 and 518	CIS 570 and 571

4-8

Approved Electives: Remaining credits from courses in the above groupings or from
 CIS 513, 516, 538, 594, 595, 690
 ECE 518, 567, 568, 637, 665
 SYS 563, 569, 664
 APM 564

8-12

32

Adviser's approval is required for independent study, project and special topics courses used to fulfill program requirements. Not more than 8 credits of project courses may be applied toward the degree.

Course Offerings in Engineering

EGR 500 Engineering Seminar (1)

Lectures and discussions conducted by faculty, graduate students, and speakers from industry and other universities. Emphasis is on current research interests of the school.

EGR 594 Independent Study (2 to 4)

Advanced independent study in a special area. Topic must be approved prior to registration.

EGR 595 Special Topics (2 to 4)

Advanced study of special topics in engineering. May be taken more than once.

EGR 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project. Topic must be approved prior to registration.

EGR 790 Doctoral Thesis Research (2 to 12)

Directed research toward the thesis.

EGR 794 Independent Study (2 to 4)

Advanced independent study in a special area. Topic must be approved prior to registration.

EGR 795 Special Topics (2 to 4)

Advanced study of special topics in engineering. May be taken more than once.

ELECTRICAL AND COMPUTER ENGINEERING

For additional related courses students should refer to the course offerings in Systems Engineering (SYS) and Computer and Information Science (CIS).

ECE 518 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.

ECE 533 Random Signals and Processes (4)

This course provides the foundation needed to work with the random signals which are encountered in engineering. Concept of a random variable. Properties of one and multi-dimensional random variables. Concept of a stochastic process. Characterization of random waveforms using power spectral density and the correlation function. Random signals in linear systems. Applications to engineering systems.

Prerequisite: SYS 520.

ECE 534 Principles of Data Communications (4)

Concepts of data communications: baseband data transmission, optimization of baseband systems, equalization of baseband systems, digital carrier modulation schemes, amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK), digital carrier demodulation techniques and applications.

Prerequisite: SYS 520.

ECE 535 Information Theory and Coding in Digital and Computer Communications (4)

Coding in communications and computers, introduction to Galois field, linear block codes, binary cyclic codes, BCH codes, majority logic decoding of cyclic codes, burst error detecting/correcting codes, convolutional codes and sequential decoding, error control and intersymbol

interference, etc.

Prerequisite: A course in engineering probability and statistics.

ECE 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: ECE 518 or permission of instructor.

ECE 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.

ECE 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.

ECE 570 Microprocessors and Microcomputers (4)

Introduction to microprocessors and microcomputers; the CPU on a chip; interfacing microprocessors with external systems; programming considerations; logic design with microcomputers; hands-on laboratory experience. Credit may not be earned for both CIS 570 and ECE 570.

ECE 571 Microprocessor Systems Applications (4)

The design of microprocessor-based equipment and systems. Interfacing techniques. Serial asynchronous and synchronous communications methods. Direct memory access, A/D and D/A converters, peripheral interface devices, computer graphics. Project-oriented course. Credit may not be earned for both CIS 571 and ECE 571.

Prerequisite: ECE 570.

ECE 581 Integrated Circuits and Devices (4)

Fundamentals of semiconductor electronics. Theory and operation of PN junctions and junction devices. MOS devices. Semiconductor technology as related to integrated circuits, including epitaxy, photolithography, oxidation, diffusion, ion implantation, and the design of some typical ICs.

ECE 588 Integrated Electronics Laboratory (2 to 4)

Experimental projects on solid-state materials and devices. Experiments on material preparation, characterization, fabrication, and parameter measurements of devices.

Prerequisite: Permission of instructor.

ECE 625 Integrated Active Network Design (4)

Introduction to network synthesis, basic concepts in synthesis with emphasis on filter theory and design, active RC filter design, multiple loop feedback design, sensitivity considerations.

Prerequisite: SYS 520.

ECE 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: SYS 532.

ECE 637 Digital Signal Processing (4)

Analysis of discrete signals and systems. Introduction to digital filters including discrete Fourier and Fast Fourier transformation, Z-transform, finite and infinite impulse response filters, application of digital filters.

Prerequisite: SYS 520.

ECE 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, architecture and software considerations.

Prerequisite: ECE 564.

ECE 682 Field-Effect Devices (4)

Electronic structure of semiconductor surfaces; concepts of surface states and surface charges;

the MOS diode. Conductivity modulation and theory of MOS transistors, thin-film phenomena and devices; Silicon integrated device technology; oxidation, diffusion, epitaxy and ion implantation.

Prerequisite: ECE 581.

ECE 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.

ECE 726 High-Frequency Electronics (4)

Topics relating to the generation, transmission, amplification, and detection of radio signals at HF, VHF, and UHF. Large- and small-signal resonant-load amplifiers, high-frequency effects in transistors, oscillators, impedance matching, transmission lines, cavity resonators, and filters. With laboratory.

Prerequisite: SYS 520.

ECE 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.

ECE 745 Electromagnetic Signals and Waves (4)

Electromagnetic theory with applications such as radiation, wave propagation diffraction, resonant cavities, and guided waves.

Prerequisite: SYS 520.

ECE 784 Microwave Solid-State Devices (4)

General properties of negative-resistance amplifiers and oscillators. Microwave bipolar and FET transistors, Gunn amplifiers; generators and logic elements; IMPATT and TRAPATT devices, microwave integrated circuits. Parametric amplifiers, harmonic generators, mixers and detectors, microwave switches, attenuators and limiters.

Prerequisite: ECE 581.

MECHANICAL ENGINEERING

ME 521 Dynamics (4)

Matrix-tensor 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. With laboratory.

ME 538 Fluid Transport (4)

Study of the fundamentals of fluid mechanics and their applications; angular momentum principle; generalized study of various turbomachines, potential flow of inviscid fluids, laminar and turbulent boundary layer theory compressible flow; dimensional analysis and similitude; compressible flow.

ME 548 Thermal Energy Transport (4)

Basic concepts, properties, and descriptions of the three fundamental modes of heat transfer (conduction, convection, and thermal radiation); theoretical, numerical, and analog methods of analysis of steady, transient, single, and multidimensional problems. With laboratory.

ME 554 Solar and Alternate Energy Systems (4)

The analysis and design of energy conversion systems. Principles of optimum power transfer and efficiency. Availability analysis of systems for heating, chemical conversion and electrical generation. Emphasis on solar applications and alternative energy technology.

Prerequisite: ME 331 and 341 or equivalent.

ME 555 Combustion Processes (4)

Thermodynamics of state, mixtures, Gibbs free energy; chemical equilibrium, stoichiometry;

chemical reaction kinetics, reaction rate, mixing, catalyst action; fluid vaporization, condensation, atomization; applications, spark and compression ignition, continuous combustion.

ME 556 Energy Systems Analysis (4)

Thermodynamics of non-reacting mixtures, psychrometry. Concepts of availability and irreversibility; power cycles; vapor, gas and combined cycles; reciprocating engines and compressors; refrigeration and heat pump cycles; vapor compression system; air-conditioning; thermodynamics of reacting mixtures; combustion.

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, and mechanical stability.

ME 565 Stress Analysis (4)

Experimental determination of stress and strain in loaded members. Use of brittle coatings, strain gauges, two-dimensional photoelasticity, and photoelastic coatings. Emphasis on optical designs. With laboratory.

ME 569 Finite Elements (4)

Structural analysis through matrix formulation using direct and variational methods; stiffness and flexibility matrices for triangular, quadrilateral and isoparametric elements in two- and three-dimensions. Finite element programs and available graphics hardware for data preparation.

ME 572 Mechanical Properties of Materials (4)

Mechanical behavior of materials, with emphasis on defect structures in metals. True stress-strain properties of real materials. Plastic deformation and fracture of materials. Theories of yield and fracture strength. Cyclic loading behavior including cumulative damage. Creep, temperature, and rate-of-loading effects.

ME 582 Fluid and Thermal Energy Systems (4)

Systems involving fluid and thermal phenomena. Emphasis on systematically applying fundamental integral, differential, and lumped modeling techniques to formulate theoretical descriptions of systems for analysis, design, and optimization. Examples from energy conversion, transport processes, pollution control, and measurement problems.

Prerequisite: Permission of instructor.

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 motor 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. Approximation techniques. Boundary layer theory. Introduction to turbulent transport processes. Hydrodynamics of two-phase flows.

Prerequisite: Permission of instructor.

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.

Prerequisite: Permission of instructor.

ME 663 Applied Elasticity (4)

Fundamentals of solid mechanics, stress-strain and equilibrium and compatibility equations, generalized Hook's law, boundary conditions. Plane strain and generalized plane stress, plane elasticity. Airy stress function, torsion and bending, St. Venant principle, and introduction to thermoelasticity.

ME 665 Experimental Stress Analysis (4)

Modern contemporary optical methods in experimental stress analysis, including three-dimensional photoelasticity, speckle methods, correlation methods, x-ray and optical diffraction methods. With laboratory.

SYSTEMS ENGINEERING

For related courses students should refer to course offerings in electrical and computer engineering.

SYS 510 Systems Optimization and Design (4)

Computer techniques for systems optimization and design. Direct and indirect search techniques including gradient methods and the Newton-Raphson algorithm, linear programming. The course emphasizes a capstone design experience involving systems modeling, simulation and optimal design.

Prerequisite: SYS 469, CIS 418.

SYS 517 Probability and Its Manufacturing Applications (4)

Review of probability theory and applications of the effects of randomness on manufacturing systems, congestion, Markov chains, scheduling, inventories, etc.

Prerequisite: SYS 317 or equivalent.

SYS 520 Signal and System Analysis (4)

Fundamentals of continuous-time and discrete-time signals and linear systems. Formulation of describing equations in the time and frequency domains. Convolution operations and time response functions. State-space realization of transfer functions. Fundamental and state transition matrices, modal decomposition characteristics. Fourier integrals, discrete Fourier transform, and applications.

SYS 523 Dynamics and Control of Robot Manipulators (4)

Homogenous transformations, Denavit and Hartenberg link modeling; forward and backward solution of kinematic equations; Euler-Lagrange and Newton-Euler formulation of dynamic equations; simplification of dynamic equations; linearization and servo control; joint interpolated motions; application of manipulator dynamics to development of robot language.

Prerequisite: SYS 520.

SYS 532 Analysis of Nonlinear Control Systems (4)

Analysis of nonlinear physical systems with engineering applications. Phase-plane analysis for autonomous systems, singular points, and characterization of equilibrium points. Stability analysis via theorems of Liapunov, existence of limit cycles, harmonic analysis, and describing functions.

SYS 557 Energy Conservation Systems (4)

Techniques for improving energy use in industrial and commercial applications. Topics include: energy accounting; energy auditing; energy conservation management; net energy analysis; second law methods of analysis; combined use energy systems; new technology for energy conservation; assessment of alternative technology.

SYS 558 Electrical Energy Systems (4)

Generation and transmission of electrical energy. Analytical methods for solution of planning and operation problems with effective computer utilization. Analysis of synchronous machines, transformer excitation, prime mover governing, transmission networks and loads. System dynamic performance under disturbance conditions, line switching, and parameter variations with attention to frequency and voltage control strategies.

SYS 563 Foundations of Computer Aided Design (4)

The design of computer aided graphics software for electrical, mechanical and systems engineering. Raster graphics fundamentals, fill algorithms, transformations, curve generation, user input techniques, and 2-D animation. Application programs using data structures are written in Pascal.

Prerequisite: CIS 342.

SYS 569 Simulation in Engineering (4)

Basic modeling and simulation methodology for discrete and continuous systems. The selection of input parameters and probability distributions. On-line user interactive graphical displays for output analysis and validation.

Prerequisite: CIS 342.

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: ECE 470 or ECE 570.

SYS 581 Industrial Engineering/Operations Research: Deterministic Systems (4)

Linear programming: simplex method, matrix methods, duality, post optimality analysis. Survey of other mathematical programming methods.

SYS 583 Production Systems (4)

Computer manufacturing systems which control the flow of manufactured products from forecast to ordering: parts explosion, billing of material, Pareto distribution and inventory control, lead times, shop floor control, etc.; all illustrated by a computer system for a typical product.

SYS 585 Statistical Quality Control (4)

Fundamentals of statistical quality control with particular emphasis on applications. Control charts for mean and range for variable, control charts for attributes, cusum charts, runs and other process quality monitoring topics. Single, double, and multiple sampling inspection plans, sequential sampling, and related topics.

Prerequisites: SYS 317 or SYS 517 or equivalent.

SYS 630 Optimal Control Theory (4)

Modern control theory applied to linear dynamical systems. Differential and difference equations; controllability, reachability, observability and constructibility of linear systems; stability of optimal control systems; dynamic programming; calculus of variation and Pontryagin's minimum principle; optimally switched control systems, linear regulator problem application of theory to practical control system design methodology; simulation and laboratory demonstration of optimal control systems.

Prerequisite: SYS 520.

SYS 631 Estimation and Control Theory (4)

Stochastic differential and difference equations; Luenberger observer theory; Kalman-Bucy filtering theory; design of stochastic optimal and microprocessor-based control systems; duality between optimal estimation and control problems; the separation principle; simulation and laboratory implementation of observers and filters in stochastic control system.

Prerequisite: SYS 630, ECE 533.

SYS 664 Advanced Computer-Aided Design (4)

Three dimensional graphics in computer aided design systems. Hidden surface elimination, shading, algebraic surface drawing, solid modeling, and 3-D animation. Projects emphasize the application of 3-D graphics to engineering design and analysis.

Prerequisite: SYS 463 or 563.

SYS 680 Engineering Decision Analysis (4)

Consideration of risk and uncertainty in decision criteria for resource allocation. Mathematical programming in engineering applications for multi-attribute utility analysis.

Prerequisite: SYS 517, SYS 581.

SYS 682 Industrial Engineering/Operations Research: Stochastic Processes and Noise Characterization (4)

Definition of random processes, correlation function, power spectral density, characteristic function, stationary processes, Gaussian processes, central-limit theorem, series representation of random processes, Karhunen-Loeve expansion, spectral decomposition, characterization of noise as a random process, sources of noise, noise power spectral density, filtered noise.

Prerequisite: SYS 317 or equivalent.

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.

Prerequisite: CIS 545, SYS 563, SYS 583.

SYS 685 Human Factors Engineering (4)

Behavioral characteristics of man which affect performance at the man/machine interface; man's sensory, information processing, and motor capabilities studied in a systems context; techniques for collecting and analyzing human performance data.

SYS 721 Large-Scale Dynamic Systems (4)

Analysis using a systems methodology including state variable modeling, and multilevel structure. Structural stability, dynamic reliability, aggregation and decomposition. Application to

estimation and control of large systems.

Prerequisite: SYS 520.

SYS 722 Advanced Linear Systems Theory (4)

Linear independence and linear mappings, solutions and properties of linear differential equations; structure of linear mappings, controllability and observability, realization theory; minimization in inner product space, least-square theory; stability of linear dynamical systems; continuous time and discrete time systems.

Prerequisite: SYS 520.

SYS 731 Stochastic Optimal Control Theory (4)

Foundation of modern stochastic optimal control theory. Continuous-time and discrete-time stochastic linear and nonlinear systems; stochastic processes; stochastic integrals and stochastic differential equations; analysis and design of stochastic optimal control systems; nonlinear filtering, smoothing and prediction theory; and adaptive control.

Prerequisite: SYS 630.

SYS 732 Estimation Theory (4)

Modern estimation theory for both deterministic and stochastic linear systems will be considered. Observer theory, analysis and design of observers; analysis and design of Kalman-Bucy filters, square root filtering; smoothing; prediction; parameter identification and adaptive estimation; stability of filters and parameter identification algorithm.

Prerequisite: SYS 630.

SYS 734 Statistical Communication System Theory (4)

Harmonic analysis, sampling theory, stochastic processes and correlation functions, linear systems response to random inputs, optimum linear systems (matched filters, Wiener filters) coherent and noncoherent filtering, nonlinear systems with random input (zero memory, square law, nth law devices), modulation theory, interference considerations.

Prerequisite: ECE 633

SYS 788 Propagation of Error (4)

Study of systems with imperfect elements, with emphasis on the statistical tolerancing problem. Analytical determination of joint distribution functions of several random variables with applications to tolerancing for mass production, quality control, reliability, and sensitivity analysis.

Prerequisite: SYS 317 or equivalent.

COMPUTER AND INFORMATION SCIENCE

For additional computer courses students should refer to the course offerings in Electrical and Computer Engineering.

CIS 501 Programming and Data Structures (4)

An advanced-level introduction to the operating system of a large computer, including the command language, the file system and the text editor; a major, high-level language such as PL/1; structured, modular programming; data structures such as stacks, queues, lists, trees, and graphs; applications such as discrete simulation. Credit not applicable toward the M.S. in CIS.

Prerequisites: Differential and integral calculus and a knowledge of at least one high-level programming language.

CIS 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.

CIS 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.

CIS 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.

Prerequisites: CIS 335, CIS 342 or equivalent.

CIS 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.

CIS 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.

CIS 526 Assembly Language for Microprocessors (4)

An introduction to the use of 6502 Assembly Language on personal computers; hexadecimal numbers, computer memory, registers and assembly language instruction, stack, branching and status register, addressing modes, video displays, keyboards, parallel and serial interfacing, interrupts. Hands-on laboratory experience on Apple II computers. Enrollment limited to majors in the School of Human and Educational Services.

Prerequisites: CIS 525 or ED 595 or equivalent.

CIS 527 The PASCAL Language (4)

The PASCAL language; structured programming; structured flowcharts, modularization, documentation. Some basic data structures: arrays, stacks, linked lists, trees, file maintenance, emphasis on application. Enrollment limited to majors in the School of Human and Educational Services.

Prerequisite: CIS 525 or ED 595 or equivalent.

CIS 535 Run-Time Structures In Programming Languages (4)

Language processors; data storage structures; operations in programming languages; sequence control structures; data control structures; storage management; operating environment and block structures; syntax and translation.

CIS 538 Programming Methodology (4)

Systematic approach to the design and analysis of computer programs. Program development cycle; semantical analysis of programs; program control structures and structured programming; abstract data structures; top-down, step-wise refinement programming synthesis; testing; program metrics.

Prerequisite: CIS 342 or equivalent and major standing.

CIS 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: CIS 342, and APM 263 or equivalent.

CIS 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: Knowledge of data structures.

CIS 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.

CIS 565 Compiler Design (4)

The student is directed through development of a compiler. Major items include: scanning; parsing via bottom-up and top-down methods; precedence grammars; internal forms for source programs; semantic routines; and symbol table organization. The compiler is con-

structed in a high-level language.

Prerequisite: Knowledge of data structures and programming languages.

CIS 570 Microprocessors and Microcomputers (4)

Introduction to microprocessors and microcomputers; the CPU on a chip; interfacing microprocessors with external systems; programming considerations; logic design with microcomputers; hands-on laboratory experience. Credit may not be earned for both CIS 570 and ECE 570.

Prerequisite: Ability to program in at least one language.

CIS 571 Microprocessor Systems Applications (4)

The design of microprocessor-based equipment and systems. Interfacing techniques. Serial asynchronous and synchronous communications methods. Direct memory access, A/D and D/A converters, peripheral interface devices, computer graphics. Project-oriented course. Credit may not be earned for both CIS 571 and ECE 571.

Prerequisite: CIS 570.

CIS 594 Independent Study (2 to 4)

Advanced independent study in a special area. Topic must be approved prior to registration. May be taken more than once.

CIS 595 Special Topics (2 to 4)

Advanced study of special topics in computer and information science. May be taken more than once.

CIS 690 Graduate Computer Science Project (2 to 8)

Independent work on an advanced project. Topic must be approved prior to registration. May be taken more than once.

SCHOOL OF HUMAN AND EDUCATIONAL SERVICES

Office of the Dean:

Gerald J. Pine, Dean
Donald M. Miller, Associate Dean

Professors:

Edward A. Bantel, Ed.D., Columbia University
Jane M. Bingham, Ph.D., Michigan State University
Harold C. Cafone, Ed.D., University of Arizona
George E. Coon, Ed.D., Wayne State University
Ronald L. Cramer, Ph.D., University of Delaware
Gerald G. Freeman, Ph.D., University of Michigan
Sidney W. Graber, Ed.D., Wayne State University
Harry T. Hahn, Ed.D., Temple University
W. Dorsey Hammond, Ph.D., University of Delaware
James W. Hughes, Ed.D., University of New Mexico
Jacqueline I. Lougheed, Ed.D., Wayne State University
Donald M. Miller, Ph.D., University of Wisconsin
William F. Moorhouse, Ed.D., University of Wyoming
Gerald J. Pine, Ed.D., Boston University
Roderic E. Righter, Ed.D., Wayne State University
Howard Splete, Ph.D., Michigan State University

Associate Professors:

John Atlas, Ed.D., Wayne State University
Richard F. Barron, Ph.D., Syracuse University
Gloria T. Blatt, Ph.D., Michigan State University
David C. Bricker, Ph.D., Johns Hopkins 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
Jean L. Easterly, Ed.D., University of Arizona
Joel S. Fink, Ph.D., Boston University
William C. Fish, Ed.D., Columbia University
Patrick J. Johnson, Ed.D., Wayne State University
William H. Jones, Ph.D., University of Michigan
David P. Meyer, Ph.D., Arizona State University
Billy Joe Minor, Ph.D., Indiana University
Mary L. Otto, Ph.D., Indiana University
Robert G. Payne, Ph.D., University of Michigan
James C. Schmidt, Ph.D., Wayne State University
Ronald M. Swartz, Ph.D., New York University

Assistant Professors:

Anne Cairns Federlein, Ph.D., University of Michigan
David C. Housel, Ph.D., Arizona State
Anne Jaworski, Ph.D., Wayne State University
Linda Lentz, Ed.D., Temple University
Luellen Ramey, Ph.D., University of Florida
Robert M. Schwartz, Ph.D., University of Illinois
Carol A. Swift, Ph.D., University of Arizona

Adjunct Professor:

William I. Martin, Jr., Ph.D., Northwestern University

Adjunct Associate Professors:

Jeffrey A. Kottler, Ph.D., University of Virginia
Elinor B. Waters, Ed.D., Wayne State University

The School of Human and Educational Services offers programs leading to the Doctor of Philosophy degree in reading, the Education Specialist degree, and to the Master of Arts in Teaching degree in four areas: early childhood, elementary education, reading and language arts education, and special education. The Master of Arts degree is offered in counseling. In addition, the College of Arts and Sciences and the School of Human and Educational Services jointly sponsor candidates for the degrees of Master of Arts in Teaching in English and mathematics. Descriptions of these programs are in the Arts and Sciences section of this catalog.

Applications are reviewed as they become complete, except in the Ph.D. reading program whose admission procedure is described below. Students should be careful about the number of courses taken in a special graduate or post-master's status, because several programs restrict the credits in this status which can be applied toward the graduate degree.

In order to remain in good standing, students must earn a grade point average of 3.0. 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.

THE DOCTOR OF PHILOSOPHY IN READING

Reading education draws upon diverse areas of knowledge, including linguistics, psychology, literature, composition, and statistics. Training is also required in diagnosis, correction, language learning, and clinical and classroom instructional procedures for both children and adults. Reading is a specialized field, but its successful application in schools, universities, and research laboratories requires knowledge of related disciplines, the ability to conduct basic research, and an understanding of practical and theoretical applications to reading instruction.

The Ph.D. degree is intended for students who plan careers in public or private schools, universities, and in government research and development agencies.

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; and second, candidates who successfully pass the screening step meet with the interview committee, which makes admission recommendations, in conjunction with the reading area, to the dean of the Graduate School.

Residence

It is believed that students benefit from the concentrated effort that full-time study permits. Although one may begin doctoral study on a part-time basis, all students must complete two full-time semesters in residence, earning 12 credits each of the two semesters and working as a graduate assistant. The combined spring/summer sessions can constitute one semester toward residency. Stipends and tuition waivers are generally available to students pursuing full-time study. Other full-time employment is not permitted during the residence period.

Course Credits

At least 76 credits must be earned beyond the master's degree, including the

thesis. 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 area faculty. However, program requirements are such that transfer credit is seldom granted.

Course of Study

The Ph.D. program has three components. The reading component provides a background of educational experiences and course work for clinical and classroom reading instruction, language learning, diagnosis and correction of reading disabilities, and theoretical models of reading acquisition. The minor specialization component provides depth in a cognate area related to reading, such as linguistics, psychology, English, learning disabilities, early childhood, or other areas. The investigative processes component trains students in research and provides a background in statistics, research design, and applied research culminating in a thesis. Emphasis is placed on investigation of theoretical and practical problems in reading acquisition.

Advisory Committees

Upon acceptance into the program, a student is assigned an interim academic adviser and a program committee to assist in the selection of initial courses and to provide academic guidance and counseling. This arrangement allows the student to become acquainted with the faculty and the various program options. After the first year in the program students may request a change of faculty adviser at any time.

After completing one year (24-36 credits) toward the Ph.D. at Oakland, the students in consultation with their advisers must submit a final program plan to the reading area faculty for approval. The final program plan is an agreement between the faculty and the student which specifies the transfer credits accepted and the course work the student must complete for the Ph.D. degree.

After the completion of 48 credits toward the degree the students may request that their advisers form a committee to conduct the qualifying examination. Students must declare their intention to take the examination at least six weeks prior to scheduled date for the exam. This committee will consist of five Oakland University faculty members, including at least three members from the reading area, one member from the student's area of minor concentration, and one member at large.

The thesis committee is also arranged by the student's adviser in consultation with the student at a point when the student is engaged in the development of a thesis proposal and the oral defense of the proposal is to be scheduled. Prior to the appointment of the thesis committee to direct the dissertation, students should feel free to consult with any member of the faculty about possible proposal topics and research ideas. Students may nominate their own thesis advisers, who serve as thesis committee chairpersons, as well as the other thesis committee members. The student's nominees are always considered subject to availability, number of doctoral advisees a faculty member may be directing, and other constraints. The director of the doctoral program, the dean of the School of Human and Educational Services, and the dean of the Graduate School must approve the selection of the thesis committee.

Admission to Candidacy

The student may apply for admission to candidacy when 48 credits have been completed and approved toward the Ph.D. Acceptance into degree candidacy is contingent upon passing the oral and written qualifying examination and achieving a cumulative grade point average of 3.00 or above.

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 should 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/language arts content, special interest content, and minor specialization content. The committee assembles the examination questions and evaluates the student's work. The oral examination, administered by the qualifying committee, can be taken only after successfully completing the written test.

Students may elect to write a position paper on a topic agreed upon in advance by the student and the committee faculty members. Election of this option will result in the waiver of special interest questions. Students choosing the position paper option will have a period of four weeks to complete it. The position paper must be submitted to the committee prior to administration of the written examination.

The committee may permit a student to repeat the qualifying examination. Should a student fail the examination three times, the committee will recommend (via the reading area to the Graduate School dean) that the student's Ph.D. program be terminated. Passing evaluations on either the written or oral portions of the examination do not preclude specification for additional courses or learning experiences if the committee feels such action is warranted.

Thesis

Each candidate must complete a thesis which makes a worthwhile contribution to the major field of study. The thesis committee chairperson will direct the candidate through the stages of thesis preparation.

When the proposed thesis committee chairperson and the candidate have agreed on a thesis topic, the candidate must submit a written thesis 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 thesis committee and any other interested faculty and Ph.D. students, insuring that all questions relevant to the selected topic, justification, and procedures are considered ahead of time. Once the thesis committee approves the proposal, the candidate may initiate the study.

A draft of the thesis must be submitted to the committee for modification and approval before the final copy is prepared and approved by the thesis committee.

Thesis Research Credits

Students with approved thesis proposals who are conducting thesis research should register for ED 799. At least 24 credits in ED 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 thesis. The thesis is deemed completed only after successful oral defense and after final approval of the document by the thesis committee.

Oral Examination

Each candidate must orally defend the thesis before the thesis committee. The examination is scheduled after the thesis committee has approved the thesis.

While interested faculty and outside observers may be involved in the thesis defense, only the advisory committee votes on passing or failing the oral defense. The thesis committee may permit re-examination once if the initial thesis defense is deemed inadequate.

Time Limits

All requirements, including the thesis, must be completed within five years after admission to candidacy or within eight years after admission to the program. If

four consecutive semesters elapse without a student accumulating credits toward the degree the student will be dropped from the program. Students may petition the reading area faculty to waive this requirement, or to seek readmission, should this be necessary.

THE EDUCATION SPECIALIST DEGREE

At the time of publication of this catalog, applications for admissions to the Education Specialist Degree program are not being accepted. As a result of a university-wide curricular review, the program is being redesigned. In a general way the description given below indicates the direction in which the restructuring is taking place. Upon completion of the review and redefinition of the program by school faculty and on approval of the modified program by the Graduate School, the university senate, and the board of trustees, the program will be reopened. Announcement of this will be made in timely fashion. Full program details will then be made available.

The graduate program leading to an Education Specialist degree (Ed.S.) offers advanced work in several specializations beyond the master's degree. It is a 36-credit program that is designed to enhance the leadership qualities of experienced educators who have a master's degree and at least two years of professional work in the field of education. Emphasis is upon applied research and field work that can promote change and improvement in educational settings within southeast Michigan. Application must be to a specialization. At present two specializations, computers in education and school leadership are offered. Others may soon be added.

Admission

Admission to the program will be considered when the following have been received by the Office of Graduate Admissions: 1) an application for admission to graduate study, accompanied by the appropriate fees, 2) transcripts of all graduate and undergraduate course work, 3) two recent recommendations, one from a faculty instructor or adviser, the other from a work-superior, 4) a personal statement of 500 to 1,000 words that sketches the applicant's academic and professional work biography, with special attention to the following questions: What personal or professional experiences have shaped the applicant's academic interests along the way? Which specialization is the applicant interested in pursuing? In what ways will this program help to extend the applicant's professional goals and experience? What sort of leadership contributions does the applicant expect to make to the field of education with the aid of this program?

An interview with members of the Ed.S. council may also be required for admission. A general guideline of a 3.50 GPA at the master's level is used to assess academic potential. The applicant must have completed a master's degree in education or a related field.

Degree Requirements

The Education Specialist degree is a 36-credit program, of which 12 credits are required core courses and 24 credits are determined by the specialization. All must be completed within a six-year time limit. The 12-credit core includes the entry course, ED 770 (Perspectives in Education), and an 8-credit culminating course sequence, (ED 787, Applied Problems in Education, or ED 788, Research Problems in Education; and ED 789, Field Study in Education). The remaining 24 credits are selected under the specialization.

THE MASTER OF ARTS IN TEACHING: EARLY CHILDHOOD

The graduate program in early childhood leads to the Master of Arts in Teaching (M.A.T.). The program trains persons to work with children from birth

through age nine in school, home, and agency settings. It also provides training for leadership in the field, including preparation for educating parents and other adults, for directing and evaluating early childhood programs, and for coordinating community resources for young children and their families. The program combines theory with observation and participation in clinical, community, and school practicum settings.

The academic program stresses the linguistic and psychological aspects of children's language development, the sociological and anthropological foundations of child development, and the medical and psychological bases of physiological and mental growth.

To balance the academic program, practicums are available in a variety of predominantly urban settings including hospitals, nursery schools, day care centers, infant and toddler programs, kindergartens, and primary grade classrooms.

Special Options

Persons who hold provisional or continuing elementary certificates may work toward the endorsement in early childhood as an addition to their certificates. A combined program option with special education is also available in which the student receives the M.A.T. in early childhood degree with the early childhood endorsement and with either the emotionally impaired endorsement or the learning disabilities endorsement. Persons who hold no elementary certificate may work toward certification during their pursuit of the M.A.T.; however, credits are required for this option in addition to those needed for the M.A.T.

Admission

Candidates for the degree program must provide a written statement describing their philosophy of early childhood, reasons for wishing to pursue the degree, and career goals, in addition to the academic and reference requirements of the Graduate School. No more than 12 credits of special graduate status study will be accepted toward the degree.

Requirements for the M.A.T. in Early Childhood

Degree requirements are 36 credits, distributed as follows:

EARLY CHILDHOOD FOUNDATIONS (16 credits—all required):

- ED 540 Theories of Early Childhood (4)
- ED 542a Applied Development Principles—Early Childhood (4)
- ED 543 Teacher as Child Advocate and Adult Educator (4)
- ED 650 Practicum in Early Childhood (4)

EDUCATIONAL FOUNDATIONS (4 credits):

- ED 500 Foundations of Reading Instruction
- ED 501 Introduction to the Education of Exceptional Children
- ED 503 Major Theorists in Education (4)
- ED 509 School and the Student (4)
- ED 601 History in Education (4)
- ED 602 Philosophy in Education (4)
- ED 603 Cross-Cultural Studies in Education (4)
- ED 604 Sociology in Education (4)
- ED 605 Politics in Education (4)
- ED 606 Psychology in Education (4)

PSYCHOLOGICAL FOUNDATIONS (4 credits):

- *PSY 510 Developmental Psychology (4)
- PSY 513 Psychopathology of Childhood (4)
- ED 542b Applied Development Principles—Early Childhood: Special Topics (4)

- ED 547 Infants: Normal and Exceptional Development and Programming (4)
 ED 548 Toddlers: Normal and Exceptional Development and Programming (4)
 ED 549 Development of the Young Exceptional Child (4)

*Required if student has not had an equivalent course

SPECIALIZATION SEQUENCES (12 credits):

Specializations are currently offered in administration/consulting, early childhood programming, reading/language arts, infancy/toddlers, pediatric play, and special education. For those who do not choose to specialize, the 12 credits required to complete the program may be selected from a broad range of courses, with adviser approval. Required courses for the specializations follow:

Early Childhood Programming: ED 544 and 546, and one additional course from special options.

Administration/Consulting: ED 544, ED 545 and one additional course from special options.

Infancy/Toddlers: ED 544, 547, and 548.

Pediatric Play: ED 544, 550, and 644.

Reading/Language Arts: ED 544 and 546, and one additional course from specific options.

Special Education (nonendorsement option): ED 501, 544, and one additional special education course.

THE MASTER OF ARTS IN TEACHING: ELEMENTARY EDUCATION

At the time of publication of this catalog, the Elementary Education—M.A.T. program is undergoing a review by the area faculty and the Graduate School. In a general way the program is being refocused along the lines described below—toward two well-defined concentrations. Since the review process has not yet been completed, further course or program modifications may occur. Full details will be made available in timely fashion. Please contact the faculty adviser to assist you with any individual concerns.

This master's program is designed to enrich the expertise and competence of teachers and other professional staff in the fields of curriculum, instruction and leadership. In addition to completing their general course requirements, students are given the opportunity to take courses in one of two concentrations.

Admission

Recommendations are important to the application procedure. The two references required for application to the master's program must be from administrators who have been in a supervisory relationship to the applicant.

Course Requirements

The first required class is ED 510—Introductory Seminar in Education. During this class students are required to plan the remainder of their degree programs. Students work individually with faculty advisers in completing this task.

Additional requirements are ED 512 and ED 554. Students are also required to choose one course from the following options: ED 509, ED 580 or ED 585.

The exit plan options include ED 699—Terminal Project or ED 555—Practicum. Students choosing ED 699 complete their research under the direction of their faculty advisers. Under this plan, students complete the M.A.T. requirements in 36 credits. Those selecting ED 555 must take an additional course of 4 credits with adviser approval. Under this plan, students complete the M.A.T. requirement in 40 credits.

- ED 510 Introductory Seminar in Education (4)
 ED 512 Curriculum Development in the Public School (4)
 ED 554 Interaction Laboratory for Teacher Development (4)
 ED 509 The School and the Student (4)
 or ED 580 Theories and Techniques of Leadership for Teachers (4)
 or ED 585 The Law and the Teacher (4)
 16 credits from one concentration (see below)
 ED 555 Practicum (4) and 4 credits with adviser approval
 or ED 699 Terminal Project (4)

CONCENTRATIONS

Sixteen credits must be chosen from one of two concentrations: curriculum and instruction or leadership. All selection of courses must be done with adviser approval.

Concentration A: Curriculum and Instruction (16 credits)

- ED 500 Foundations of Reading Instruction (4)
 or ED 534 Reading—Language Arts Instruction in the Elementary School (4)
 or ED 538 Guiding Reading—Learning in Content Subjects (4)
 SCS 505 Science and Children (4)
 SCS 506 Outdoor Education (4)
 ED 577 Art for the Elementary Teacher (4)
 ED 581 Teaching about Black Africa in the Public Schools (4)
 ED 587 Social Studies in the Elementary School (4)
 ED 589 Unified Science and Mathematics (2 or 4)
 ED 594 Computer Literacy and Personal Computing (4)
 ED 597 Oakland University-Greenfield Village Practicum in the Social Studies (8)
 ED 612 Curriculum Studies (4)
 ED 613 Open Math (4)
 ED 687 Global Education in the Elementary and Middle School (4)

Concentration B: Leadership (16 credits)

- ED 509 The School and the Student (4)
 ED 513 The Organization of the Elementary School (4)
 ED 580 Theories and Techniques of Leadership for Teachers (4)
 ED 585 The Law and the Teacher (4)
 ED 611 Issues in Education (4)
 ED 612 Curriculum Studies (4)
 ED 658 The Educational Administrator (4)
 ED 659 Advanced Seminar in Law for Teachers and Administrators (4)

With the guidance and approval of their advisers, students may choose two courses from Concentration A and two courses from Concentration B for a Combined Concentration in Curriculum, Instruction and Leadership.

THE MASTER OF ARTS: COUNSELING

The counseling program is dedicated to educating and training persons to work in professional counseling roles with children, youth, parents, and other adults in school and community settings.

Admission

All applicants must submit a written statement which explains reasons for wanting to enter the counseling program (including tentative program emphasis

and setting). The statement should include employment goals and describe experiences and accomplishment in helping relationships with children, youth, and adults.

Candidates for the M.A. in counseling must have at least 24 undergraduate or graduate credits in behavioral disciplines such as psychology, sociology, ethics, or anthropology before completing the degree work. Persons will not be admitted until they have at least 16 credits toward this requirement. This requirement is evaluated by the admissions committee. The student's adviser may recommend courses to remove any deficiency.

Recommendations are important to the application procedure, and the two references required for application to the counseling program must be from professionals who can attest to the applicant's academic ability and effective interaction with youth and adults. Therefore, the applicant should carefully choose persons to write recommendations.

Graduation Requirements

At least 36 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 on 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 their advisers regarding endorsement.

Satisfactory full-time teaching or counseling experience equivalent to one school year or more is required before completion of the degree. Students may acquire an "equivalency" of teaching or counseling experience through a combination of supervised field work, volunteer work, and additional credit in the internship in counseling or related course work beyond the 36-credit minimum as specified by the adviser and approved by the program chairperson.

Required Core Courses

All candidates for the M.A. in counseling must take three core courses as follows:

- CNS 562 Measurement and Evaluation in Counseling (4)
- CNS 563 Group Procedures (4)
- CNS 565 Counseling Theory and Practice (4)

Upon completion of the core courses, each student must select an emphasis either in school or community counseling as the setting for their course work and internship or research. The courses required for each emphasis and setting are listed below. A combined program with special education is described on page 130.

Counseling Emphasis in School Settings

The following courses are for persons preparing for a position as a school counselor and seeking school counseling endorsement. In addition to the three core courses, students must take CNS 561 or 566, CNS 576, 661, 664, 665, and 666.

Counseling Emphasis in Community Settings

The following courses are designed for persons preparing for counseling positions in community, industry, and agency settings. In addition to the three core courses, students must take CNS 576, 661, 664, 665, 666, and an elective (4 credits as approved by the adviser).

Program Options

Full-Time Program

The full-time program is designed for students who wish an intensive and concentrated degree program with a counseling emphasis. This program option is most appropriate for students with strong undergraduate preparation in areas such as human resources development, psychology, sociology, social work or other related helping fields. Students who enroll in the full-time program will generally not be otherwise employed.

The full-time program allows completion of the degree in 3 consecutive semesters or one calendar year. Students receive intensive practicum and internship experiences and attend both day and late afternoon classes.

Full-time students take three courses per term and finish the program within one calendar year. Admission is highly selective. Students are admitted into the full-time program only in the fall semester. Completed application must be received prior to May 1 for admission in September.

A TYPICAL FULL-TIME PROGRAM

Semester 1	Semester 2
CNS 565 Counseling Theory and Practice	CNS 562 Measurement and Evaluation in Counseling
CNS 563 Group Procedures	CNS 665 Career Development and Life/Work Planning
CNS 661 Techniques of Counseling	CNS 664 Counseling Practicum
Semester 3	
CNS 576 Developmental Counseling	
CNS 666 Internship in Counseling Elective	

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. Students in the part-time program are expected to meet all regular admission requirements.

The part-time program allows completion of the degree within five semesters although students may progress at their own pace. Students generally take two courses (8 credits) per semester. Admissions are made in all semesters.

A TYPICAL PART-TIME PROGRAM

Semester 1	Semester 2
CNS 565 Counseling Theory and Practice	CNS 562 Measurement and Evaluation in Counseling
CNS 563 Group Procedures	CNS 576 Developmental Counseling
Semester 3	Semester 4
CNS 661 Techniques of Counseling	CNS 664 Counseling Practicum
CNS 665 Career Development and Life/Work Planning	Elective

Semester 5
CNS 666 Internship in Counseling

THE MASTER OF ARTS IN TEACHING: SPECIAL EDUCATION

The master's program in special education allows students to design a balanced program consistent with their educational backgrounds and career goals. These individualized programs assist in developing the skills required to meet professional demands within the special classroom, resource room, or institutional setting. They also help regular classroom teachers meet the needs of children who have moderate learning and/or behavior problems.

Admission

Initial application for admission to the M.A.T. in special education and application for admission as a post-master's student in special education must be made to the Office of Graduate Admissions. Candidates for the M.A.T. degree in special education and candidates for post-master's endorsement in special education must have a valid Michigan teacher's certificate. Candidates for admission to the M.A.T. program in special education and post-master's candidates for endorsement in special education must be interviewed by a special education admission adviser, and must submit three copies of a valid teaching certificate and a written statement describing personal and professional goals in special education. The interview, goal statement, and subsequent program authorization are part of the admission procedures, and must be fulfilled before a candidate's application can be acted upon. All courses taken before formal admission to special education programs are accepted for credit at the discretion of the special education admission adviser. Applicants should seek admission to the program as early as possible. Under no circumstances should an applicant take more than 12 credits before seeking admission.

Upon completion of the degree program, students will be recommended by Oakland University for state endorsement either in teaching emotionally impaired children or in teaching learning disabled children.

Degree requirement

A total of 36 to 44 credits, depending on program option, are required for the M.A.T. in special education and endorsement in either emotional impairment or learning disabilities. Any grade below 3.0 in ED 523, ED 524, or ED 621 may lead to an evaluation of the student's progress in the special education program and could lead to dismissal from program. Students who do not have full time teaching experience will be individually evaluated and may be required to complete a 2-credit field experience in addition to the regular course work.

Course Work

The following course sequences are possible options to fulfill master's degree requirements and endorsement in emotional impairment or learning disabilities. These courses are listed for information purposes only and do not constitute program authorization. A final program is tailor-made for each applicant and may deviate from the course listings. A final program authorization can only be made during the admission interview by a special education adviser.

General Special Education Core (24 credits—all required)

(Note: Students with undergraduate special education degree choose 16 credits with adviser's approval)

- ED 500 Foundations of Reading Instruction (4)
- ED 501 Introduction to the Education of Exceptional Children (4)
- ED 502 Legal Issues in Educating Exceptional Children (4)
- ED 524 Assessment in the School Setting (4)
- ED 618 Behavior Management (4)
- ED 619 Theoretical Foundations of Exceptionality (4)

Emotionally Impaired Core (20 credits—all required)

- ED 616 Consultation Skills for Teachers of Emotionally Impaired Children (4)
- ED 620 Social Deviancy in Special and Regular Education (4)
- ED 621 Management and Curriculum for Emotionally Disturbed Children (4)
- ED 627 Behavioral and Emotional Disorders in School Children (4)
- ED 622 Practicum—Emotionally Disturbed Children (4)

Block II Learning Disabilities Approval: ED 501, 502, 523, 524, 618, and 626.

This program involves a dual admissions/advising process. Following admission to graduate studies, an advising interview should be scheduled with both the reading/language arts area and the special education area. Failure to arrange both interviews may result in loss of completed credits and/or suspension from the program.

Master of Arts in Counseling with Special Education Endorsements

Two program options are available: the student selects either the M.A. in counseling or the M.A.T. degree in special education. Within either degree, students work toward endorsements in both school counseling and emotionally impaired or in both school counseling and learning disabled. Students take courses from either of the following sequences.

SEQUENCE A: School Counseling and Special Education/Learning Disabilities

Core Special Education/Learning Disabilities

- *ED 501 Introduction to the Education of Exceptional Children (4)
- ED 523 Educational Procedures for Children with Learning Disabilities (4)
- ED 500 Foundations of Reading Instruction (4)
- ED 632 Diagnosis of Reading Disabilities (4)
- ED 633 Correction of Reading Disabilities (4)
- ED 617 Language Disabilities (4)

Core Counseling

- CNS 565 Counseling Theory and Practice (4)
- CNS 563 Group Procedures (4)
- CNS 661 Techniques of Counseling (4)
- CNS 664 Counseling Practicum (4)
- CNS 665 Career Development and Life/Work Planning (4)

Combined Courses

- ED 568 Collaborative Programs in Counseling and Special Education (4)
- CNS 562 Measurement and Evaluation in Counseling (4)
- or ED 524 Assessment in the School Setting (4)
- CNS 666 Internship in Counseling (2, 4, 6 or 8)
- or ED 626 Practicum in Special Education—Learning Disabled Children (4)

This total program requires 56 hours of course work and a program plan must be approved by the student's adviser before 12 credits are earned.

SEQUENCE B: School Counseling and Special Education/Emotionally Impaired

Core Special Education/Emotionally Impaired

- *ED 501 Introduction to the Education of Exceptional Children (4)
- ED 618 Behavior Management (4)
- ED 620 Social Deviancy in Special and Regular Education (4)
- ED 621 Management and Curriculum for Emotionally Impaired Children (4)
- ED 627 Behavioral and Emotional Disorders in Children (4)

Core Counseling

- CNS 563 Group Procedures (4)
- CNS 565 Counseling Theory and Practice (4)
- CNS 661 Techniques of Counseling (4)
- CNS 664 Counseling Practicum (4)
- CNS 665 Career Development and Life/Work Planning (4)
- CNS 576 Developmental Counseling (4)

Combined Courses

- ED 568 Collaborative Programs in Counseling and Special Education (4)
 CNS 562 Measurement and Evaluation in Counseling (4)
 or ED 524 Assessment in the School Setting (4)
 CNS 666 Internship in Counseling (2, 4, 6 or 8)
 or ED 622 Practicum in Special Education—Emotionally Impaired (4)

This total program requires 56 hours of course work and a program plan must be approved by the student's adviser before 12 credits are earned.

*Students who have had an undergraduate introductory course in special education may elect ED 619.

CERTIFICATE PROGRAM IN MICROCOMPUTER APPLICATIONS IN EDUCATION

Oakland University's School of Human and Educational Services offers a 16-credit certificate indicating focused training in microcomputer applications for teachers, administrators, and professional staff interested in educational and training activities with microcomputers at a variety of educational levels. The certificate is designed to be responsive to the emerging needs of educational professionals in the challenging and rapidly changing field of microcomputers in education. This is a nondegree program available to special graduate status students. The required courses are ED 594, 595, 779, and 781.

MICHIGAN CONTINUING CERTIFICATE PLANNED PROGRAMS

To meet the continuing certificate requirements of the State of Michigan, candidates must complete three years of experience within their certificate level and 18 semester hours of course work in an approved planned program subsequent to issuance of the provisional certificate. In addition, elementary candidates must show evidence of completing 6 semester hours (3 for secondary candidates) in methods of teaching reading. These credits should be verified on admittance to program by presentation of transcripts to the certification adviser. *This new state rule applies to all students seeking change of certification after July 1, 1983.*

Candidates for the continuing certificate are urged to complete their planned program as part of a master's degree. This choice offers maximum flexibility, transferral of course work and endorsements.

Nondegree planned programs are also offered as an alternative. They are as follows.

Planned Program in Early Childhood

Early Childhood Foundation (all required): ED 540, ED 542a or PSY 510, ED 543, 544.

Elective: Choose one from ED 532, 542b, 545, 546, 550, 574. (Other electives may be selected with adviser's approval.)

Planned Program in Elementary Education

The planned program in elementary education parallels the M.A.T. program. All students must take ED 510 and either ED 512 or ED 554. Students then elect 8 credits from one of the program concentrations and 4 credits from the other program concentration. Students should examine the M.A.T. elementary education program for program concentration requirements and course options.

Planned Program in Counseling

Core Courses (all required): CNS 562, 563, 565.

Learning Disabilities Core (20 credits—all required)

- ED 523 Educational Procedures for Children with Learning Disabilities (4)
 ED 617 Language Disabilities (4)
 ED 632 Diagnosis of Reading Disabilities (4)
 ED 633 Correction of Reading Disabilities (4)
 ED 626 Practicum—Learning Disabled Children (4)

When necessary, students may be required to take additional courses to make up for deficiencies in background, training, and experience.

Practicum placements in students' own rooms are not permitted. Students who are employed will complete practicum during the summer semester. Students who are not employed may complete the practicum during fall, winter or summer semesters.

In addition to the regular M.A.T. special education program, students may elect one of the following program options: post-master's endorsements in emotionally impaired or learning disabilities, or M.A.T. in special education with no endorsement. Available special education combined programs with reading/language arts, early childhood and counseling are described on page 130.

THE MASTER OF ARTS IN TEACHING: READING-LANGUAGE ARTS

No other field of instruction is so directly related to the daily classroom responsibilities of teachers. The reading-language arts M.A.T. prepares teachers to perform their daily classroom teaching responsibilities with the highest degree of professional competence. An M.A.T. graduate is fully qualified to serve as a reading consultant, reading specialist, or remedial reading teacher. It is our philosophy, however, that these specialized roles can be performed best by a teacher who is trained in classroom applications of the reading-language arts curriculum. Most of the graduates of this program continue teaching in the classroom. However, many of our graduates are employed as reading consultants, reading specialists, remedial reading teachers, college teachers of reading, supervisors, principals, curriculum directors, and other similar positions.

Degree 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 credit hours)

- ED 500 Foundations of Reading Instruction
 ED 632 Diagnosis of Reading Disabilities
 ED 633 Correction of Reading Disabilities
 ED 571 Foundations of Literature for Young People
 ED 575 Teaching Writing in the Elementary and Secondary Schools
 ED 699 Terminal Project

or

Students may elect the following two course option in lieu of ED 699:

- ED 534 Reading-Language Arts Instruction in the Elementary School
 ED 570 The Author's and Illustrator's Art and Craft

Elective Program (12 credit hours)

The student must select 12 credits from the two blocks shown below. A minimum of 4 credits must be selected from each block. Candidates for the Michigan Elementary Continuing Certificate must elect ED 534 if they need additional credits to meet new state certification reading requirements. Candidates for the Michigan Secondary Teaching Certificate must elect ED 538 in order to meet state certification requirements.

Block I (Reading, Language Arts, and Literature): ED 505, 514, 531, 532, 533, 534, 536, 538, 570, 572, 573, 574, 590, 598, 630, 631, 654, 711. Additional options may be offered at the discretion of the student's adviser and require written approval of the adviser.

Block II (Open): Students may elect any courses numbered 500 or above for which they have prerequisites. The selection must be approved in advance by the student's adviser.

A combined program with special education is described below.

COMBINED PROGRAMS

As additional options for students, a number of combined programs are offered. Students must be specifically accepted into these programs with adviser approval of both the master's area and the concentration or endorsement area. Intent to enter a combined program should be stated on initial application to a master's program.

M.A.T. in Early Childhood or in Special Education with both Early Childhood and Special Education Endorsements

Two core options are available in this program. The student selects either the M.A.T. in early childhood or the M.A.T. in special education. Within either M.A.T., students work toward endorsements in both early childhood and emotionally impaired or in both early childhood and learning disabled. Students take both core sequences and select either the emotionally impaired or learning disabled option.

Special Education Core—16 credits

ED 501	Introduction to the Education of Exceptional Children
ED 502	Legal Issues in Educating Exceptional Children
ED 618	Behavior Management
ED 645	Assessment of the Young Exceptional Child

Early Childhood Core—16 credits

ED 540	Theories of Early Childhood
ED 542a	Applied Developmental Principles—Early Childhood
ED 543	Teacher as Child Advocate and Adult Educator
ED 544	Play as a Learning Medium

Learning Disabled Option—8 credits

ED 523	Educational Procedures for Children with Learning Disabilities
ED 655	Practicum in Special Education/Early Childhood (combined)

Emotionally Impaired Option—8 credits

ED 621	Management and Curriculum for Emotionally Impaired Children
ED 655	Practicum in Special Education/Early Childhood (combined)

Blocks A and B—12 credits

Select at least one from each block

Block A: ED 500, 616, 617, 619, 620, 627

Block B: ED 542b, 547, 548, 549, 590 (Art for the Handicapped Child)

M.A.T. in Reading/Language Arts and Certificate Endorsement in Learning Disabilities

The reading/language arts area and the special education area offer a combined program leading to the M.A.T. in reading/language arts and a Michigan teaching certificate endorsement in learning disabilities and reading. The dual program consists of 48 credits.

Courses are selected from two blocks:

Block I Reading Foundations: ED 500, 571, 575, 632, 633, and 699 (candidates may substitute ED 570 and 534 for ED 699).

Electives: CNS 665 or 576 and one course from CNS 561, 566, 668.

Planned Program in Health, Physical Education, and Recreation

Core Courses (all required): EXS 506, 507, 518.

Electives: Choose at least 12 credits from ED 508, 528, 551, 552, 556, EXS 558.

Planned Program in Reading/Language Arts

Required courses are: ED 500, 534 or 538, 571, 575, and one elective. The elective course and application of transfer credits, if any, to the program require approval from a reading/language arts faculty member.

Planned Program in Special Education

Required courses are ED 501, 502, 619, 618, 523, or 621.

Planned Program in Vocational Education

Individuals who hold a secondary provisional teaching certification with a vocational endorsement may be recommended for a continuing certificate in vocational education upon completion of three years of successful teaching experience and the following planned course of study.

Vocational education courses A minimum of 10 credits are required from the following courses:

VTE 510	Design of Vocational Courses (2)
VTE 511	Vocational Laboratory Planning (2)
VTE 520	Instructional Methods and Media Use (4)
VTE 530	Vocational Guidance and Placement (2)
VTE 540	Issues and Trends in Vocational Education (2 or 4)

Up to 8 credits in related electives approved by adviser in areas such as: area studies, communication arts, computer sciences, economics, education, (i.e., administration, law, career guidance, reading, special education, early childhood) English, engineering, management, mathematics, nursing, political science, psychology, sociology.

Planned Program in Microcomputer Applications in Education

Required courses are ED 594, 595, 779, 781 and one elective.

ADDITIONAL TEACHER CERTIFICATION PROGRAMS

Endorsement programs can also be used as planned programs for continuing certification.

Endorsements

Endorsements generally refer to any content areas, specializations, or change of grade levels which are added to a certificate. Endorsements which require completion of a master's degree at Oakland University are counseling, special education, and reading. Nondegree endorsements are as follows.

Change of level endorsements require evaluation of previous course work by an adviser. The basic components are for a secondary education area teaching major (36-40 credits), teaching minor (20-24 credits) and a professional sequence. Student teaching may be waived with verification of two years of successful teaching at 7-12 level. Elementary endorsement requirements are five methods courses (20 credits) and an appropriate major/minor. Student teaching may be waived with verification of two years of successful teaching at K-9 level.

Major/minor endorsements can be completed in any of the subject areas approved by the State of Michigan for Oakland University.

Specializations can be added in nondegree programs. An early childhood endorsement requires 20 credits approved by an adviser. An emotionally impaired or learning disabilities endorsement requires 20 credits subsequent to earning a master's degree in special education at Oakland University. Holders of other master's degrees should be evaluated by the special education adviser.

Initial Certification

Holders of bachelor's degrees can complete elementary or secondary certification in nondegree programs. Previous undergraduate and graduate course work can be applied, with adviser approval, toward the requirements listed below:

Elementary Certification

Professional Sequence	32 credits
Major	36 credits
Minor	24 credits
Student Teaching	12 credits

Secondary Certification

Teaching Major	30-40 credits
Teaching Minor	20-24 credits
Professional Sequence	32 credits
Student Teaching	12 credits

Course Offerings

EDUCATION

ED 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.

ED 501 Introduction to the Education of Exceptional Children (4)

Introduction to special education that presents the characteristics and problems of each of the different clusters of atypical children. Individual differences—interindividual and intra-individual—are stressed. The environment of the learner and curricular and instructional adaptations are discussed.

Prerequisite: Graduate standing.

ED 502 Legal Issues in Educating Exceptional Children (4)

Intensive study of PL-94-142 and the Michigan Special Education Code and its implications for educating handicapped children. Evaluation, IEP's, related services, free and appropriate education, placement options, adequate referral and evaluation, investigation, and due process hearings highlighted.

Prerequisite: Graduate standing.

ED 503 Major Theorists in Education (4)

Intensive study of the works of one or more major figures in the development of educational theories.

ED 505 Reading as a Language Process (4)

Focuses on language acquisition, language and thought, dialects, and the interrelation of the language process and the implications for teaching reading.

ED 508 Physical Education in the Preschool and Elementary School (4)

A theory and activity course in philosophies, theories, and practices in physical education for preschool and elementary school children.

ED 509 The School and the Student (4)

Examines strategies for achieving educational equity in the regular classroom for students with varying backgrounds due to economics, social status, cultural background, sex, aptitude, achievement, emotional impairment, or disruptive, delinquent behavior.

ED 510 Introductory Seminar in Education (4)

Introduces the student to graduate study in curriculum, instruction and supervision. Students

will be assisted in developing their plan of work for the M.A.T. Must be taken within the first 8 credits of the program.

ED 511 Interaction Analysis (4)

Seeks to improve effectiveness of instruction through a study of pupil-teacher interaction. Techniques of observation, methods of gathering data, and analyzing behavior in the affective and cognitive fields are emphasized.

Prerequisite: Admission to a graduate program or permission of instructor.

ED 512 Curriculum Development in the Public School (4)

The study of basic elements of curriculum design and ways of planning, organizing, and implementing new curricula at the elementary and secondary levels.

ED 513 The Organization of the Elementary School (4)

Examines past changes in the elementary school organization and their causes, the changing nature of the present-day elementary school, and possible future changes as suggested by trends in elementary school curriculum.

ED 514 Classroom Diagnosis and Correction (4)

Emphasizes diagnosis and correction of reading problems in group settings. Students learn to select, administer, and score appropriate testing instruments, interpret test data, and develop instructional programs based on diagnostic information.

ED 519 Issues and Trends in Special Education (4)

Indepth coverage of relevant issues in areas of learning disabilities, emotional, mental, sensory impairment, speech and language impairment, and gifted. Students will research current topics of interest and be exposed to nationally prominent figures in the field.

Prerequisite: Graduate standing.

ED 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.

ED 521 Special Education in the Regular Classroom (4)

Assists regular classroom teachers needing additional training to teach children with mild and moderate learning and behavioral problems. Implications of Public Law 94-142, delivery of educational services to handicapped children, diagnostic, prescriptive teaching techniques, and writing performance objectives are emphasized.

Prerequisite: Graduate standing.

ED 522 Behavior Modification Techniques for Classroom Management (4)

Introduces teachers to the principles and application of behavior modification techniques. Includes specific methods for changing children's classroom behavior with emphasis on the child displaying learning or conduct problems.

Prerequisite: Admission to graduate study.

ED 523 Educational Procedures for Children with Learning Disabilities (4)

Emphasis on identification, diagnosis, planning, treatment, and evaluation of learning disabled students. Informal assessment techniques and instructional methods focus on difficulties in reading, spelling, arithmetic, perception, and behavior. Emphasis is placed on designing and implementing a resource room program.

Prerequisite: ED 501 or 502 or permission of instructor.

ED 524 Assessment in the School Setting (4)

Students learn to conduct evaluations of the various perceptual processes, including visual, auditory, and sensory motor areas. In addition, they assess various areas of academic achievement through the use of standardized tests.

Prerequisite: Graduate standing.

ED 526 Secondary Assessment Procedures in Special Education (4)

Basic concepts for interpreting standardized assessment instruments. Students become familiar with a number of assessment instruments commonly used to identify secondary students with learning disabilities and develop new informal assessment devices.

Prerequisite: ED 501 or 502 and ED 619 or permission of instructor.

ED 528 Movement Education—Physical Education for Handicapped Children (4)

Theories and practices in movement education and physical education activities for the handicapped. Teaching techniques and appropriate activities for children with cardio-respiratory,

neuromuscular, orthopedic, mental, emotional, and nutritional disabilities.

ED 529 Modification and Adaptation of Materials for Exceptional Children (4)
Study of existing curricula for exceptional children. Modification and adaptation of materials and instructional methodology emphasized. Includes affective domain as well as various content areas appropriate for K-12.

Prerequisite: ED 501 or permission of instructor.

ED 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.

ED 531 Current Trends in the Teaching of Reading (4)

Recent trends, practices, problems, and research in reading are examined and evaluated to determine their applicability to reading instruction.

ED 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.

ED 533 Teaching Reading in the Middle School (4)

Examines principles, practices, and research related to teaching reading in middle schools. Emphasizes reading in the content areas, developmental reading instruction, and adjustment of instruction to individual needs.

ED 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.

ED 535 Forum on Reading and the Language Arts (2 or 4)

Distinguished educators present their research, experience, and insights on issues in reading, language arts, and literature. Students interact with educators invited to participate in this forum. May be elected with a different subtopic for a total of 8 credits.

ED 536 Teaching Reading to the Special Child (4)

Focuses on the reading process as it relates to slow learners, emotionally disturbed, handicapped, learning impaired, and gifted children. Includes study of diagnostic, remedial, and corrective instructional resources and procedures.

ED 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.

ED 539 Substitute Teaching—Practice and Procedures (4, 6, or 8)

This course is designed for those desiring entry or reentry to the profession via the substitute teaching role. Participants will be exposed to current methods and materials in the content areas of public education, as well as a variety of practices and procedures for substitutes.

ED 540 Theories of Early Childhood (4)

Views of education discussed from perspectives of Montessori, Piaget, Bereiter-Englemen, British Infant Schools, behavior modification, and developmental or "traditional" schools. Analyzes diverse contemporary theories of early childhood and broader issues such as "education for future vs. education for immediate needs."

ED 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 the relations between parents and early childhood educator are affected by professionalism.

ED 542 (a, b) Applied Developmental Principles—Early Childhood (4)

In-depth exploration of the relation of learning processes to development of infants, toddlers, preschoolers, and kindergarteners as seen from pediatric, developmental, and educational perspectives. ED 542a is an overview of all age levels and topics. ED 542b focuses on a developmental topic.

Prerequisite: Permission of instructor.

ED 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: ED 540, 542, or permission of instructor.

ED 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.

ED 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: ED 540, 542, or permission of instructor.

ED 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.

ED 547 Infants: Normal and Exceptional Development and Programming (4)

Research on infants to 15 months, including exceptional infants; analysis of appropriate play environments and learning experiences. Students work with infants in small groups and interact with infants and parents at the Lowry Infant/Parent Program for at least 32 hours.

Prerequisite: ED 542a or PSY 510 or equivalent.

ED 548 Toddlers: Normal and Exceptional Development and Programming (4)

Developmental/intellectual aspects unique to toddlers (15 to 36 months), including the handicapped. Evaluate research on toddlers and analyze appropriate play environments and learning experiences. Students work with toddlers and their parents at least 32 hours per semester and evaluate toddler and parent development and behavior.

Prerequisite: ED 542a or PSY 510 or equivalent.

ED 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.

ED 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.

ED 551 Cooperative-Independent Study in Health, Physical Education, and Recreation (4)

Independent study in cooperation with a faculty member in the Department of Physical Education and Athletics.

ED 552 Issues and Problems in Health, Physical Education, Recreation and Athletics (4)

Examines contemporary issues in physical education, recreation, and competitive athletics with attention to problems confronting the schools.

ED 553 Curriculum and Environment of the Middle School (4)

Investigates psychological factors, philosophical bases, and methods for middle school curriculum development. Teachers develop curricula that consider characteristics of the pre-adolescent, organizational patterns, scheduling, teaching techniques, the architectural design of middle school facilities, and staffing patterns.

ED 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 take part in role-playing, simulation games, and action-oriented problem-solving.

ED 555 Practicum (4)

This practicum is part of an 8-credit hour alternative to ED 699. Students have an opportunity in class to synthesize knowledge gained from M.A.T. course experiences and apply this knowledge in positive ways in the profession.

Prerequisites: See M.A.T. elementary education program requirements.

ED 556 Creative Movement for Children and Youth (4)

Explores movement as a means of artistic, emotional, and physical expression. Movement is used as a means of communication and a medium for aiding children's growth and development.

ED 568 Collaborative Programs in Counseling and Special Education

This course provides an overview of Special Education and Counseling programs and delivery models. Current issues, legislation, regulations and trends in these programs will be discussed. Basic counseling, consulting and coordinating skills will be reviewed.

ED 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.

ED 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.

ED 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.

ED 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.

ED 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.

ED 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.

ED 577 Art for the Elementary School Teacher (4)

This course will provide teachers with an opportunity to learn about art materials, media, and procedures suitable for primary and intermediate elementary students.

ED 580 Theories and Techniques of Leadership for Teachers (4)

Investigates roles of the teacher as a classroom leader and as a leader within groups. Examines leadership in relationship to the organization, situation, task, leader, and group; leadership responsibilities; leader behavior; effective acts of leading; and group motivation.

ED 581 Teaching About Black Africa in the Public Schools (4)

Includes contemporary and historical topics of Black Africa applicable to new elementary and secondary social studies programs. Material evaluation and selection of Black African topics for classroom use.

ED 583 The Middle School (2 or 4)

Deals with all aspects of the emerging middle school including organizational patterns, curriculum, psychological factors, philosophical bases, and methodologies. Includes an in-depth analysis of the relationship of this organizational pattern to contemporary educational, social, and student needs.

Prerequisite: ED 512.

ED 585 The Law and the Teacher (4)

Introduction to school law for the classroom teacher, offering a unique opportunity to study crucial areas in public/private education that affect all educators. Landmark cases concerning teachers', students', and parents' rights and responsibilities are studied, applied, and interpreted by a lawyer and a faculty member.

ED 587 Social Studies in the Elementary School (4)

Intensive study of current trends, challenges, characteristics, and content of effective social studies programs, with emphasis on the relationships among social studies discipline areas. Stresses application of these studies in urban elementary schools.

Prerequisite: ED 245 and acceptance into a graduate or certification program.

ED 589 Unified Science and Mathematics (2 or 4)

Explores methods and materials for implementing a realistic problem solving approach in the elementary classroom. Emphasis is on thematic unit planning using problems which integrate natural science, social science and mathematical components.

ED 590 Special Problems in Education (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.

ED 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.

ED 592 Research Techniques in Education (4)

Study of research techniques in the behavioral sciences and education, methods of gathering evidence, elementary statistical concepts in education, research design, etc. Especially useful for students preparing to start their terminal project.

ED 593 Evaluation and Accountability in Teaching (4)

Allows educators to become familiar with assessment techniques, educational measurements in teaching and learning, valuing in the context of evaluation and accountability, and means of reviewing the importance of accountability and its validity.

ED 594 Computer Literacy and Personal Computing (4)

An evaluation of the use of computers and their role in education at the elementary and secondary school levels. Includes personal computing, computer-aided instruction and computer-managed instruction. Enrollment limited to majors in the School of Human and Educational Services.

ED 595 Computer Applications in Education (4)

An in-depth examination of the characteristics of computer-aided instruction and computer-managed instruction as they relate to learning in the classroom. The student will acquire proficiency in the programming language BASIC and this skill will be applied to the development of programs for classroom applications. The course stresses use and operation of microcomputers. Enrollment is limited to majors in the School of Human and Educational Services.

Prerequisite: ED 594.

ED 597 Oakland University/Greenfield Village Practicum in the Social Studies (8)

A specialized field-centered practicum to assist teachers in developing and using primary resources for their social studies and science programs. This year-long course utilizes the facilities of Henry Ford Museum, Greenfield Village, and Oakland University. Includes hands-on activities and discussions of cause-and-effect relationships of inventions, arts and crafts, and technology as they relate to social studies and science.

ED 598 Using Microcomputers in the Elementary Reading Language Arts Program (4)

This course is designed to introduce classroom teachers and other educators to the use of existing microcomputer techniques and materials in an elementary-level reading and language arts program. No previous work with microcomputers is required.

ED 599 Workshop in Education (1 to 8)

Provides an opportunity for professional staff in education to develop competency in new practices or to adapt certain teaching skills to different subjects or age groups. Is offered under different topics based upon current needs identified or requested by professional educators. May be taken more than once for a maximum of 8 credits. May be applied toward degree programs only with permission of adviser. (Graded S/N.)

Prerequisite: Experience as a professional educator.

ED 601 History in Education (4)

Study of the historical development of educational institutions in Western society, emphasizing one or more of the following themes: teaching as a profession; changing conceptions of the student-teacher relationship; the learning process; future as history.

ED 602 Philosophy in Education (4)

Study of philosophical issues in education and their relevance to the personal and professional lives of teachers, emphasizing one or more of the following themes: knowledge and values; human nature and teaching; moral education; analysis of concepts.

ED 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: school-community relations; school policy and cultural pluralism; international education policies.

ED 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.

ED 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.

ED 606 Psychology in Education (4)

Study of personhood throughout the life cycle, including concepts of mind, intelligence, cognition, consciousness, meaning awareness, and competence in the context of behavioral analysis, situation analysis, and psychoanalysis.

ED 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.

ED 611 Issues in Education (4)

Study of issues impacting the organization, administration, and environment of schools. Issues include: being an advocate for youth, federal involvement in the schools, educational equity, collaborative governance in professional development programs.

ED 612 Curriculum Studies (4)

This course considers practices and research in curriculum in modern public school settings. Students have an opportunity to investigate the total experiences of young people in schools and to challenge existing practices on the basis of recent curriculum developments.

ED 613 Open Math (4)

A television format provides over 250 ideas designed to assist teachers and parents helping children in preschool through junior high apply basic math skills to everyday situations. Participants communicate by mail with a personal tutor. "Make and Take" workshop/seminars are held on campus.

ED 616 Consultation Skills for Teachers of Emotionally Impaired Children (4)

Course is designed to develop the consultation skill of special education teachers who work with mental health professionals and classroom teachers. It enables special education teachers to translate consultations into educational programs.

ED 617 Language Disabilities (4)

Research in the area of language and learning disabilities will be covered, with emphasis on assessment and intervention strategies. Both oral and written language will be considered, preschool through adult.

Prerequisite: ED 523 or permission of instructor.

ED 618 Behavior Management (4)

This course is designed to expose students to a variety of behavior management techniques for the exceptional child. Emphasis is on behavior modification and transactional analysis.

ED 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). Relevant research in related areas also included.

ED 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. Assistance will be provided to classroom teachers in programming for students manifesting deviant behaviors in the classroom.

Prerequisite: Admission to M.A.T. special education program or post-master's endorsement in special education and completion of core program in special education or permission of instructor.

ED 621 Management and Curriculum for Emotionally Impaired Children (4)

Focuses on identifying effective helping strategies, available and ideal service delivery modes, roles of instructional personnel, parent education, and behavior management techniques.

Prerequisite: ED 501 or 502 or permission of instructor.

ED 622 Practicum in Special Education—Emotionally Impaired Children (4)

Specialized experience in a special education setting for emotionally impaired children. Observation, tutoring, diagnostic and prescriptive teaching, and use of materials and equipment are part of the experience. The student receives individual, small group, and total group responsibility.

Prerequisite: Completion of all course requirements for M.A.T. and/or endorsement in special education and permission of instructor.

ED 623 Project in Special Education (1 to 8)

An action-research project. Field testing intervention techniques, designing new education models, or evaluating special education instruments are examples of projects. Seminars may be required.

ED 625 Transactional Analysis in the Classroom (4)

Provides teachers with skills, experiences in analysis of own and student's classroom behaviors using Transactional Analysis perspective. Teachers apply theory to achieve awareness and understanding of themselves, and to positively affect their classroom behavior. Teachers also present TA to students.

ED 626 Practicum in Special Education—Learning Disabled Children (4)

Specialized experience in a special education setting for learning disabled children. Includes observation, tutoring, diagnostic and prescriptive teaching, and use of materials and equipment. The student receives individual, small group, and total group responsibility. Seminars may be required.

Prerequisite: Completion of all course requirements for M.A.T. and/or endorsement in special education and permission of instructor.

ED 627 Behavioral and Emotional Disorders in Children (4)

Investigates the characteristics of emotionally impaired students, and related screening, identification and diagnostic evaluation processes. Reviews literature and etiology and EI children.

Prerequisite: ED 501 or 502 or permission of instructor.

ED 628 Advanced Practicum in Special Education (4)

Geared to the education, background, and training of the student, designed to provide in-depth experience other than at a classroom level.

Prerequisite: Recommendation by at least two special education faculty, three years' teaching experience (one of which must be in special education), and completion of all course work.

ED 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.

ED 631 Problems in Reading Instruction (4 or 8)

Analyzes diagnostic, methodological, organizational, and administrative issues in reading instruction.

Prerequisite: One course in reading instruction.

ED 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, ED 500, and permission of instructor. Must sign up for this course with the reading area one semester prior to registration.

ED 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, ED 632, and permission of instructor.

ED 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: ED 542a or PSY 510 or equivalent, and ED 544.

ED 645 Assessment of the Young Exceptional Child (4)

Assessment of young exceptional children, with training in interpreting standardized tests for young children. Critical evaluation and actual use of these tests are included. Emphasizes examining and using appropriate developmental tests and alternative assessment procedures.

ED 650 Practicum in Early Childhood (4)

Students write a proposal, select appropriate materials and methods, and implement and evaluate the action phase. An "on-site" course individually related to the student's area of specialization or particular interest. Proposals may be related to program development, materials development, or action research.

Prerequisite: Completion of all other degree requirements.

ED 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.

ED 654 Teaching Reading to the Gifted (4)

Examines the nature of language, reading, and writing with implications for gifted education. The course will also focus on cognitive development and taxonomies of thinking with implications for developing reading and the related language arts competencies of gifted students.

ED 655 Practicum in Special Education/Early Childhood (combined) (4)

Culminating experience for the joint endorsements of early childhood and special education. Includes a specialized experience in a special education/early childhood setting for LD or EI children. Includes writing a proposal relating to the specialization and evaluating its usefulness in the special education/early childhood classroom.

Prerequisite: Completion of all other requirements of the combined program.

ED 658 The Educational Administrator (4)

Emphasizes processes and procedures in functional educational administration as well as the theoretical roles and models of the administrator. Also explores the roles of federal, state, and local government in supervision of school instruction.

Prerequisites: Completion of ED 580, 585 and 588, or equivalent courses, or permission of instructor.

ED 659 Advanced Seminar in Law for Teachers and Administrators (4)

In-depth analysis of decisions of the courts that have affected education in general and teachers and administrators in particular. Focuses on the cause and effect relationships and the general context of landmark decisions.

Prerequisites: ED 585 or equivalent class.

ED 711 Topics in Literature for Children (4)

Focuses on the application of literary criteria to selected children's books, the history of children's literature, children's responses to literature, and controversial issues. Intended to broaden knowledge and appreciation of children's literature.

ED 687 Global Education in the Elementary and Middle Schools (4)

This course will help elementary and middle school teachers identify ways they can meet objectives of global education within their existing curriculum and become more competent in using content, materials, methods and evaluation techniques unique to objectives of global education.

ED 688 Global Education in the Secondary Schools (4)

This course will help secondary school teachers identify ways they can meet objectives of global education within their existing curriculum and become more competent in using content, materials, methods and evaluation techniques unique to objectives of global education.

ED 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 in elementary education, and counseling, or reading instruction, 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.

ED 700 Introduction to Educational Statistics and Research Design in Reading/Language Arts (8)

Two-semester sequence (700 A and B) focusing on the design and analysis of educational research in reading/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.

ED 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.

ED 702 Applied Research in Reading/Language Arts (4)

An independent research project. The major course requirement is design, conduct, and analysis of a research investigation. The study should be based on significant revision of a proposal submitted in partial fulfillment of the requirements of ED 700. The student will write research results in a manner suitable for publication and submit this material to his/her doctoral committee for discussion and evaluation.

Prerequisite: ED 700, 701, PSY 531, or permission of instructor.

ED 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 ED 632 and 633, or instructor permission.

ED 704 Reading as a Language Process (4)

An in-depth study of how language and thought affect the reading process. Beginning reading, reading comprehension, and diagnosis of reading performance will be examined as they relate with language and thinking. Pertinent reading research will be presented.

Prerequisite: Admission to the Ph.D. program or instructor permission.

ED 705 Perspectives in Reading (4)

Examines selected perspectives about the reading process. These perspectives will be analyzed in terms of theory building, their premises, assumptions, and implications for teaching and research.

Prerequisite: Admission to Ph.D. program or instructor permission.

ED 706 Evaluation of Reading Programs and Materials (4)

Theory, problems, and procedures of evaluating reading programs and materials.

Prerequisite: Admission to Ph.D. program or instructor permission.

ED 710 Advanced Analysis and Design Procedures in Reading/Language Arts (4)

Presents a general data analytic system closely related to theoretical and inferential methods and procedures involved in reading/language arts research. Focus is on multivariate techniques that provide a means of investigating complex educational problems.

Prerequisite: ED 700 and instructor permission.

ED 711 Topics in Literature for Children (4)

Focuses on the application of literary criteria to selected children's books, the history of

children's literature, children's responses to literature, and controversial issues. Intended to broaden knowledge and appreciation of children's literature.

ED 745 Staff and Curriculum Development, K-12 (4)

This course is designed to focus on instructional improvement as an interwoven process consisting of staff and curriculum development. Major emphasis is placed on analysis of leadership skills and knowledge. Special workshop sessions will be presented to help participants develop skills in problem and special interest areas. A problem solving process model, developed and implemented through group and individualized workshop sessions, will evolve through a set of core experiences.

ED 770 Perspectives In Education (4)

Examines one or more key perspectives on evaluation and change within schools and other educational settings. Successful completion of the course includes the development of an individualized plan of study for the Ed.S. degree program.

Prerequisite: Master's degree and permission of the program director.

ED 771 Topics In Educational Leadership (2 or 4)

Topics selected primarily for students in the education specialist program. Different topics may be offered. Possible themes include staff development, educational change, leadership processes, community relations, millages, curriculum leadership. May be taken more than once for up to 8 credits.

Prerequisite: ED 770 or permission of the instructor.

ED 775 Learning Models (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: ED 595 or permission of instructor.

ED 776 School and Teacher Time Management Issues (2 or 4)

Investigates school time from individual, institutional, and societal perspectives. Examines social and school time systems, personal time management styles, stress reduction, classroom scheduling, and curricular designs for student time-telling and time-coping skills.

ED 779 Instructional Design (4)

An introduction to instructional design. The student will become familiar with the procedures for analysis, development, and management of learning. The student will apply design skills to the development of a computer assisted learning experience.

Prerequisite: ED 775 or permission of instructor.

ED 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.

ED 781 Instructional Design Applications (4)

Application of instructional design principles covered in ED 779. The student will participate in a team to solve school building or district level problems relating to the use of computers.

ED 787 Applied Problems In Education (2 to 4)

Students assess key restricting or supporting factors that may be affecting their own educational settings. Strategic plans are laid for the implementation and evaluation of proposed changes for that setting.

Prerequisite: ED 770, completion of 28 approved hours, and adviser approval.

ED 788 Research Problems In Education (2 to 4)

Students plan procedures for evaluating aspects of their own education strategies, or for researching a current problem in education that directly or indirectly impacts upon those strategies.

Prerequisite: ED 770, completion of 28 approved hours, and adviser approval.

ED 789 Field Study In Education (2 to 4)

Strategic changes previously begun or arranged in ED 787 or ED 788 are continued. A concluding report is prepared on findings, changes and recommendations, which in appropriate cases may be made available to the cooperating school, agency, or school district.

Prerequisite: ED 787 or ED 788.

ED 790 Independent Study (2, 4, or 8)

Directed readings for Education Specialist 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.

ED 799 Thesis Research (4 to 24)

Preparation of a research project culminating in the doctoral thesis.

Special Courses

SCIENCE

Students enrolled in the M.A.T. elementary degree program described in this catalog may need one or more of the following courses. For specifics on their applicability within a given program, see the description of that program.

SCS 505 Science and Children (4)

A study of new science curricula for the elementary school. Topics include: teacher verbal skills, creativity, the special child in science, outdoor education, thematic units, integrated science, math and social studies, and current issues in science education. Field trips are included.

SCS 506 Outdoor Education (4)

Deals with the methods, materials, and places for education in, for and about the outdoors. Topics include: backpacking, family camping, ecological systems, bringing the outdoors indoors, personal challenge, and planning outdoor education programs. Field trips are included.

COUNSELING COURSES

CNS 560 Special Problems In Counseling and Personnel Work (2, 4, 6, or 8)

Study of specialized problems in various phases and areas of guidance and counseling. Specific topics are based on student needs. May be taken more than once, but for no more than a total of 8 credits. May be elected for independent study.

Prerequisite: Permission of instructor.

CNS 561 Counseling and Guidance in Elementary-Middle Schools (4)

Examines dimensions of prevention vs. treatment and direct vs. indirect guidance and counseling services to children. Emphasizes approaches to help children develop in self-understanding, self-concept, intro- and interpersonal skills, and valuing and decision-making skills. (Required for K-9 counseling endorsement.)

CNS 562 Measurement and Evaluation In Counseling (4)

Application of assessment procedures with children, adolescents, and adults for individual counseling, educational, and vocational planning including subjective and objective assessment procedures and techniques. Covers commonly used statistical procedures, various assessment instruments, comprehensive assessment programs, evaluation techniques, and basic research methodology.

Prerequisite or corequisite: CNS 565 (Required for core program.)

CNS 563 Group Procedures (4)

Theory and practice of small group procedures in helping relationships. Provides opportunities to develop awareness of one's own interpersonal style and to acquire the core interpersonal skills used in group settings. Includes a study of the ethics of group leadership.

Prerequisite or corequisite: CNS 565.

CNS 564 Delivery of Human Services (4)

Surveys key issues in providing human services to the public. Legal, historical, and social factors are examined. Includes examples of systems approaches to the delivery of employment, mental health, vocational rehabilitation, and welfare services. Includes delivery of human services in business and industry settings.

Prerequisites: CNS 562, 563, and 565 or permission of instructor.

CNS 565 Counseling Theory and Practice (4)

An introductory course covering historical, theoretical, and ethical backgrounds for the counseling and guidance profession. Surveys classic counseling modalities. Includes models for organizing and delivering counseling services.

CNS 566 Counseling and Guidance In Secondary and Adult Education (4)

Study of issues, trends, and models for counseling and guidance with adolescents and adults in a variety of traditional and nontraditional educational settings. (Required for 7-12 endorsement.)

CNS 567 Workshop In Counseling and Guidance (2, 4, 6, or 8)

Evaluation and development of guidance and personnel programs and practices through the study of a particular area of professional service for implementation in school, college, community agency, or business setting. Offered on request by school or agency personnel.

CNS 576 Developmental Counseling (4)

An overview of life-span developmental theory for counseling children, adolescents, and adults. Includes the use of case studies to assess developmental needs of clients in a variety of settings.

Prerequisites: CNS 562, 563, and 565 or permission of instructor.

CNS 657 Counseling and Guidance for the Gifted and Talented (4)

Investigates the role of the school counselor and the teacher in developing and implementing counseling and guidance programs for the gifted and talented.

CNS 660 Research in Counseling (4, 6, 8)

Study of research techniques and procedures in counseling, including research design, data collection, and statistical analysis. The major course requirement is to identify a problem in counseling, design a research study to investigate this problem, conduct the study, analyze the data and describe the results in research report. May be elected for independent study.

Prerequisite: CNS 562 or permission of instructor.

CNS 661 Techniques of Counseling (4)

Laboratory training in counseling and consultation skills and application of theory and research to practice. Development of a personal theory of counseling is expected. Includes audio and video taping of counseling interviews with clinical supervision.

Prerequisites: CNS 562, 563, 565 and admission to the counseling program.

CNS 664 Counseling Practicum (4)

Application of counseling and consulting theories and techniques. Emphasizes skill practice with clients in a supportive lab environment. Students develop and critique audio and video counseling and consulting tapes. Includes individual and group clinical supervision. May be elected a second time with instructor's permission for a total of not more than 8 credits.

Prerequisites: Admission to program in counseling and CNS 661.

CNS 665 Career Development and Life/Work Planning (4)

Covers theories of career development and strategies for life/work planning with individuals from early childhood to adulthood. Emphasizes the processes for providing career guidance for self-understanding, decision-making, and employability.

Prerequisite: CNS 562, 563, 565, and admission to program in counseling or permission of instructor.

CNS 666 Internship In Counseling (2, 4, 6 or 8)

A field counseling experience supervised by an approved counseling practitioner. Placement is at a site suitable to the counseling emphasis requirements and interests of the student. Related course seminars are conducted by the university instructor.

Prerequisite: Completion of final course work as specified in the student's authorized degree program plan.

CNS 668 Affective Approaches In Guidance (4)

Emphasizes a synthesis in education of the affective and cognitive domains. Presents models for the enhancement of affective learning and development including theoretical bases, rationale, and strategies for application. Examines legal and ethical issues in affective education.

Prerequisite: Teaching experience or permission of instructor.

CNS 671 Supervision In Human Services (4)

Introduces students to fundamentals of supervision theory and practice. Compares several approaches to supervising counselors and others in human services. Covers aspects of program development, employee training and performance evaluation.

Prerequisite: CNS 562, 563, 565, or permission of instructor.

CNS 676 Internship In Guidance (2, 4, 6, or 8)

A field guidance experience under the supervision of an approved guidance practitioner. Placement is at a site suitable to the program emphasis, requirements, and interests of the student. Related course seminars may be required by the university instructor.

Prerequisite or corequisite: Completion of final course work as specified in the student's authorized degree program plan.

CNS 677 Reaction to Significant Loss (4)

Covers the concept of significant loss, behavioral and psychosocial reactions to such loss and effective counseling strategies. Among losses covered are those resulting from death, divorce, and loss of self esteem and mobility.

Prerequisite: Admission to program in counseling or permission of instructor.

CNS 678 Program Planning and Evaluation

Covers programs, materials, and systems for the comprehensive planning and evaluation of counseling, human services, and vocational guidance in a broad range of community, business, and industry settings. Includes methods and models for program planning and emphasizes techniques and practices of program evaluation. Includes skills for managing, evaluating and obtaining funding for government supported human service programs.

Prerequisites: CNS 562, 563, 564, 565 and 665 or permission of instructor.

CNS 763 Advanced Group Counseling (4)

Problems of group leadership composition, selection, intervention, termination, evaluation and follow-up. Students develop a written description of their own group counseling approaches and validate the description with concurrent application in a supervised group counseling experience.

Prerequisites: CNS 563, 661 and permission of instructor.

CNS 772 Seminar In Counselor Supervision (4 or 6)

Topics include theories of supervision, major supervision models, methods of assessing counseling effectiveness, and the role of ethics and values in the supervision process. The lab portion of the course will consist of assisting graduate faculty members in supervising counselor education students enrolled in CNS 661 and 664.

Prerequisite: CNS 661, 664, 666 and permission of instructor.

CNS 774 Advanced Consultation Techniques (4)

Various theories of consultation will be reviewed and related consultant roles will be presented. The majority of the course will include demonstrations of consulting techniques, as well as practice of these techniques in the classroom and in the field.

VOCATIONAL EDUCATION COURSES**VTE 510 Design of Vocational Courses (2)**

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)

Includes building construction, design to comply with program standards of quality, arrangement of learning stations, placement of equipment and furnishings, planning for access of materials and tools, utility service, lighting, communications, safety training considerations, storage of student projects, and facilities for supervision, instructional media, and computer access as pertaining to occupational specialization of each student in consultation with appropriate experts.

VTE 520 Instructional Methods and Media (4)

Covers methods of instruction in vocational education in conjunction with the use of instructional materials and media. Emphasis is on the application of learning theory in classroom management approaches and on the evaluation of student learning based upon performance objectives. Includes teacher-student interaction, laboratory experience, simulation, and project methods 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.

Prerequisite: 6 credits in vocational education.

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 COURSES**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 512 Tests and Measurements (4)

Theories of measurement and evaluation. Construction and examination of tests of ability, achievement, interests, and special aptitudes. Objective tests of personality.

Prerequisite: Permission of instructor or acceptance into the M.A.T. program.

PSY 513 Psychopathology of Childhood (4)

A survey of the psychopathology of children and adolescents emphasizing dynamic and cognitive-perceptual-motor variables.

Prerequisite: PSY 510 or 512; or acceptance into the graduate program in psychology; or undergraduate major in psychology; or permission of instructor.

EXERCISE SCIENCE COURSES**EXS 506 Introduction to Research in Health and Physical Education (2)**

Historical, philosophical, experimental, descriptive, and research methods. Techniques of problem selection, data gathering, analysis, interpretation, and presentation of results.

EXS 507 Theory and Practice of Physical Conditioning for Personal and Professional Use (2)

Programs and teaching techniques to develop physical fitness. Subject matter includes weight control, nutrition, cardiovascular training, weight training, ergogenic aids.

EXS 518 Exercise Physiology (4)

Emphasis is placed on the physiology of the cardio-respiratory systems with application to human performance. Includes the study of neuromuscular, circulatory, and respiratory responses to exercise and training. Laboratory experiences develop techniques for measuring and interpreting physiological parameters.

EXS 557 American Red Cross First Aid and Safety Practices (4)

Techniques for the immediate and temporary care of the victims of a sudden accident or illness; with special emphasis on C.P.R. Development of curricular materials for safety education.

EXS 558 Prevention, Care and Rehabilitation of Activity-Oriented Injuries (4)

Includes both didactic and practicum components in prevention, care, and rehabilitation of injuries incurred in physical education, recreation, and competitive sports. The purpose and management of the school first-aid room and athletic training room are described. Laboratory experiences include instruction and practice in techniques for prevention and care of student injuries, including protective wrapping and taping.

SCHOOL OF NURSING

Dean:

Andrea R. Lindell

Professor:

Andrea R. Lindell, D.N.Sc., Catholic University of America, R.N.

Associate Professor:

Nadia Boulous, Ph.D., University of Michigan, R.N.

Assistant Professors:

Janet Barnfather, M.S.N., Wayne State University, R.N.

Pamela Clarke, M.P.H., University of Michigan, R.N.

Faithy Justin, M.P.H., University of Michigan, R.N.

Sandra Lowery, M.S.N., Indiana University, R.N.

Gary Moore, Ph.D., Wayne State University, R.N.

Elizabeth Pinkstaff, M.P.H., University of California (Los Angeles), R.N.

Trinidad Pit-og, M.N., University of the Philippines, R.N.

Terrill Stumpf, M.N., University of California (Los Angeles), R.N.

Diane Wilson, Ph.D., Michigan State University, R.N.

Instructors:

Penny Cass, M.S., University of Michigan, R.N.

Frances Jackson, M.A., M.S., Wayne State University, R.N.

Visiting Instructors:

Debra Gorney, M.S.N., Wayne State University, R.N.

Patricia Johnson, M.S.N., University of Michigan, R.N.

THE MASTER OF SCIENCE IN NURSING

The program leading to the Master of Science in Nursing has been approved but not yet implemented. There is some likelihood that it will be implemented during the life of this catalog. Therefore, program details are provided. Timely announcement of the program's opening will be made.

The Master of Science in Nursing program is designed to provide students who hold a baccalaureate degree in nursing with an organized sequential plan of study which leads to specialization in administration in geriatric nursing.

The program is distinctive, offering a strong clinical focus and including the following components:

preparation in the role of administrator of nursing services

advanced preparation in geriatric nursing

preparation in research and analysis

Upon completion of the program the graduate will have acquired specialized skills in planning and providing nursing care for the elderly, in the analysis and formulation of health care policy, and in nursing research activities.

Admission

An applicant for admission to the Master of Science in Nursing program should have a bachelor's degree in nursing from an institution accredited by the National League for Nursing (NLN), with an undergraduate cumulative GPA of 3.00 or above. Applicants should show satisfactory achievement on the Graduate Record Examination general test (GRE) and have completed STAT 320 or its equivalent. Individuals must have a current license to practice as a registered nurse. It is preferred that the applicant have at least one year of prior clinical nursing experience.

Requirements for the Degree

The average candidate entering in the fall semester requires two full-time academic years to successfully complete the 48 credits of graduate course work distributed as follows:

- NRS 500 Research in Nursing (4)
- NRS 510 Organization of Nursing Care Delivery Systems (4)
- NRS 520 Geriatric Nursing (6)
- NRS 530 Management in Geriatric Nursing (6)
- NRS 550 Master's Thesis (8)

In addition, 4 credits in specially designed management courses and 4 credits in statistical methods will be required.

Electives: Choose 12 credits of electives in consultation with an adviser from the School of Nursing graduate faculty. NRS 559 (2, 4, 6) may be taken as an elective.

COURSE DESCRIPTIONS

NRS 500 Research in Nursing (4)

A study of the formulation of research problems and hypotheses, research designs used by investigators in biologically oriented as well as behaviorally and sociologically oriented studies.

NRS 510 Organization of Nursing Care Delivery (4)

The continuum of care services for the aged, quality assurance, and methodologies for evaluation of nursing and program outcomes.

NRS 520 Geriatric Nursing (6)

Theory and field practice focused on nursing needs and diseases of the aged population. Topics will include nursing needs of the aged, adjustments of aging, nursing theory and its application to the aged, nursing principles, and diseases of the aging.

NRS 530 Management in Geriatric Nursing (6)

A preceptorship experience in nursing service administration. Content will identify measures to assess quality and nursing techniques and their effect on present and future delivery of health care in agencies.

NRS 550 Master's Thesis (8)

Preparation of a thesis is required. The topic must relate to aging (a clinical manifestation) or the nurse manager role. The research process must apply to nursing and solution of nursing problems and include development of a theoretical framework and rationale. An oral defense of the thesis may be required.

NRS 559 Independent Study for Nursing (2, 4, 6)

Advanced independent study in a specialty area. The student must have approval of the supervisory instructor before registration.

CENTER FOR HEALTH SCIENCES

Associate Provost and Director:

Moon J. Pak, M.D., Yonsei University, Ph.D., University of Minnesota

Professors:

Philip Singer, Ph.D., Syracuse University
Carl R. Vann, Ph.D., Syracuse University

Associate Professor:

Uwe Reischl, Ph.D., University of California (Berkeley)

Assistant Professors:

Michael Chopp, Ph.D., New York University
Varick Olson, Ph.D., University of Iowa
Richard J. Rozek, Ph.D., Wayne State University
J. Lynne Williams, Ph.D., Wayne State University

Special Instructors:

Christine Pillow, M.A., Wayne State University
Mary L. Sherman, M.S., Wayne State University

Visiting Instructor:

Patricia Custer, M.A., University of Michigan

MEDICAL PHYSICS PROGRAM

Note: This program is suspended for 1983-84.

Director:

Abraham R. Liboff, *Physics*, Ph.D., New York University

Assistant Director:

Michael Chopp, *Physics and Health Sciences*, Ph.D., New York University

Clinical Professors:

Howard J. Dworkin, M.D., Albany Medical College
Harold D. Portnoy, M.D., Wayne State University

Clinical Assistant Professor:

Ronald A. Rocchio, M.S., University of Pittsburgh

THE MASTER OF SCIENCE IN MEDICAL PHYSICS

The program leading to the degree of Master of Science in medical physics consists of lecture and laboratory courses, in-hospital clinical training, research, seminar participation, and a thesis. Graduates will be prepared to work as medical physicists in hospitals and to take the American College of Radiology (ACR) Certification Examination in medical physics.

The candidate will receive strong preparation both in pure physics and in the medical applications of physics and will gain experience in local hospitals as part of the degree requirements. The courses include an introduction to the physics of diagnostic and therapeutic radiology, nuclear medicine, and radiation biophysics. The average candidate entering in the fall semester usually requires two academic years in addition to a spring and summer session to complete the degree. The clinical course work will satisfy one year of the hospital residency requirement for ACR certification.

Admission

An applicant for admission to the Master of Science in medical physics program should have (a) a bachelor's degree from an accredited institution, (b) a strong background in physics and mathematics, and (c) course work in physiology and anatomy. The student may meet entrance requirements (b) and (c) by satisfactorily completing either Modern Physics (PHY 371) or Quantum Mechanics (PHY 472) and Physiology/Anatomy (BIO 221-222) by the end of the first year.

Requirements for the Degree

1. Successful completion of 44 credits of graduate course work distributed as follows:

PHY 417	Advanced Laboratory (2)
PHY 525	Radiation Biophysics (4)
PHY 542	Advanced Electronics (4)
PHY 548	Advanced Electronics Laboratory (2)
PHY 552	Theoretical Physics (4)
PHY 573	Nuclear Physics (4)
PHY 600	Graduate Seminar (2)
MPH 441	Physics of Radiology I (2)
MPH 442	Physics of Radiology II (2)
MPH 443	Physics of Nuclear Medicine I (2)
MPH 541	Physics of Non-Ionizing Diagnostic Techniques (4)
MPH 605	Special Topics (4)
MPH 651	Physics of Radiotherapy (4)
MPH 690	Research (4)

2. Master's thesis.

By petition to the department, a maximum of 12 credits may be waived from the master's degree requirement, subject to approval by the Graduate School, if the student has successfully completed equivalent course work as an undergraduate.

Research Fields

Medical physics research in the Department of Physics involves several areas: the hydrodynamics of the cerebrospinal fluid and intracranial pressure monitoring, magnetocardiography and magnetic measurements of cardiac bloodflow, radiation dosimetry and radiation protection in diagnostic radiology and radiotherapy, laser light scattering and optical diffraction of cataracts, toxins and other biological materials, and electrically mediated growth mechanisms in living systems. The department has access to various research resources in local hospitals, including CT-scanning, linear accelerators, ultrasonic diagnostic devices, and computerized treatment planning.

Course Descriptions

Courses labeled PHY in the degree requirements are described in the Department of Physics course section in this catalog.

MPH 441 Physics of Radiology I (2)

Physical principles underlying the practice of radiology. Offered fall only.
Prerequisite: Department approval and PHY 371, 381, and either PHY 247 or 347.

MPH 442 Physics of Radiology II (2)

A continuation of MPH 441. Offered winter only.
Prerequisite: MPH 441.

MPH 443 Physics of Nuclear Medicine I (2)

Physical principles of diagnostic and therapeutic applications of radionuclides. Offered fall only.
Prerequisite: Approval of department, PHY 371, 381, and either PHY 247 or 347.

MPH 444 Physics of Nuclear Medicine II (2)

A continuation of MPH 443. Offered winter only.
Prerequisite: MPH 443.

MPH 541 Physics of Non-Ionizing Diagnostic Techniques (4)

The clinical applications and biological effects of electromagnetism and heat. Topics include ultrasound, thermography, EEG, ECG, evoked potentials, and lasers in medicine.
Prerequisite: PHY 351 and 371 or equivalent.

MPH 605 Special Topics (2 or 4)

Current topics of special interest in medical physics. May be taken more than once.
Prerequisite: PHY 351 and permission of instructor.

MPH 651 Physics of Radiotherapy (4)

Design and calibration of high-energy accelerators and teletherapy machines: cyclotrons, betatrons, linear accelerators, and cobalt and cesium units. External beam treatment planning by various modalities: charged particle beams, high energy x-ray and γ -ray beams.
Prerequisite: MPH 441, 442, 443, or permission of instructor.

MPH 690 Research (2, 4, 6, or 8)

MEDICAL REVIEW PROGRAM

Director:

Moon J. Pak, Yonsei University, Ph.D., University of Minnesota

Assistant Program Director:

Arthur J. Griggs, M.S., Wayne State University

Clinical Associate Professors:

Michael Garcia, M.D., University of Michigan
Nasirul Haque, M.D., Dacca Medical College
Alexander Ullmann, M.D., University of Munich

Clinical Assistant Professors:

Jaime V. Aragonés, M.D., University of Santo Tomas
Arnold L. Brown, M.D., University of Texas
E. Patrick Juras, M.D., Wayne State University
Satish C. Khaneja, M.D., Prince of Wales Medical College
Moufid Mitri, M.D., St. Joseph University
Ahmad M. Samhour, M.D., University of Al-Mosul

The Medical Review Program is a graduate level, nondegree, short course for physicians preparing for examinations for medical licensure or graduate medical education opportunities. The examinations for which this program prepares physicians include the Educational Commission for Foreign Medical Graduates Examination (ECFMG) and the Federation Licensing Examination (FLEX). This program, which is strictly didactic in nature, is offered on an annual or biannual basis. The duration of the program is three months. During this time approximately 350 hours of lecture are presented on the fundamentals underlying the basic and clinical science subjects associated with medical education programs in the United States. To be eligible for this program, applicants must be graduates, or senior year students, of medical education programs recognized by the World Health Organization.

INDEX

Academic advising, 17
 Academic probation, 18
 Accounting courses, 89
 Accreditation, 11
 Add/drop form, 18
 Administration/consultation
 specialization, early childhood
 programming, 122
 Admission:
 conditional admission, 15
 certificate status, 15
 foreign students, 16
 post-baccalaureate status, 16
 post-master's status, 16
 special graduate status, 15
 Admission to programs, see
 department and school entries
 Advising, academic, 17
 Affiliations, 11
 Anthropology courses (AN),
 (sociology program) 79
 Appeal procedure, 18
 Application fee, 21
 Application for degree, 20
 Applied language studies courses
 (ALS), 48
 Applied mathematics courses
 (APM), 56
 Applied mathematics, Master of
 Science, 52
 Applied music courses (MUA), 61
 Applied statistics courses (STA), 57
 Applied statistics, Master of Science,
 52
 Arts and Sciences, College of, 24
 Assistantships, 23
 Audio Visual Services Center, 13
 Biological Sciences, Department of, 24
 Biological Sciences, Institute of, 12
 Biology courses (BIO), 27
 Biology, Master of Science, 26
 Board of visitors, economics and
 management, 82
 Business Administration, Master
 of, 82
 Certificate Status, 15
 Changes in enrollments, 18
 Chemistry courses (CHM), 33
 Chemistry, Department of, 30
 Chemistry, Master of Science, 32
 Clinical psychology, Master of Arts, 73
 Combined programs, education, 130

Competency credit, 18
 Computer Science and Engineering,
 95
 Computer and information science
 courses (CIS), 113
 Computer and information science,
 Master of Science, 106
 Computer Services office, 12
 Concentrations:
 English language, 37
 curriculum and instruction
 (elementary education), 123
 leadership (elementary education),
 123
 Conditional admission, 15
 (see also department and school
 entries)
 Continuing certificate planned
 programs:
 education, 128
 music, 59
 Counseling, Master of Arts, 123
 Counseling and psychology clinic, 14
 Counseling courses (CNS), 143
 Counseling, planned program, 128
 Course classification, English, 38
 Course competency credit, 18
 Course fees, 21
 Course numbering system, 19
 Courses taken as an undergraduate, 18
 Credit system, 19
 Degree application, 20
 Degrees offered, 10
 Dismissal from the university, 18
 Doctor of Philosophy
 reading, 117
 systems engineering, 96
 Doctoral theses, 20
 cellular biology of aging, 24
 health and environmental
 chemistry, 30
 medical physics, 64
 reading, 119
 systems engineering, 96
 Early childhood, Master of Arts in
 Teaching, 120
 Early childhood planned program, 128
 Early childhood M.A.T. (combined
 program), 130
 Economics and Management,
 School of, 81

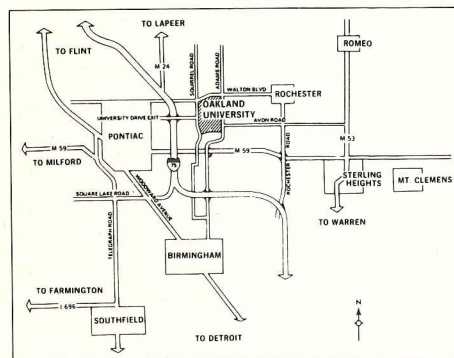
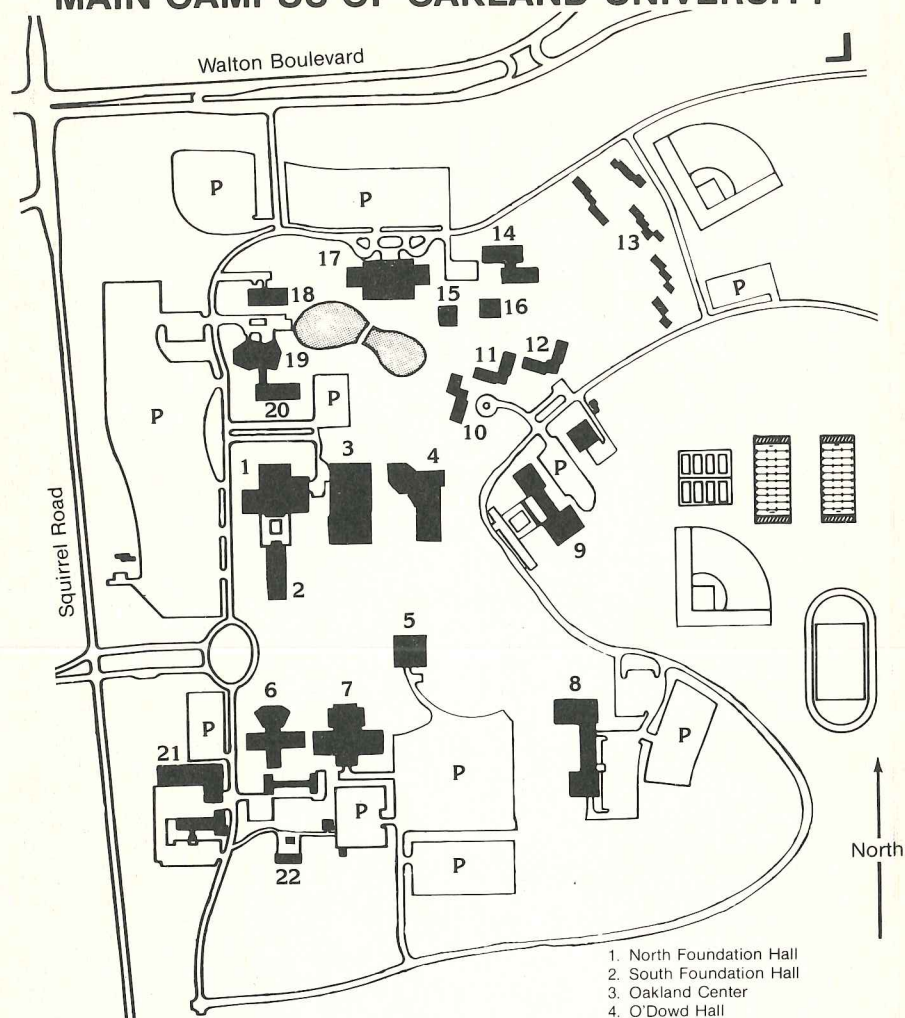
Economics courses (ECN)
 (economics and management), 89
 Education courses (ED), 132
 Education specialist degree, 120
 Electrical and computer
 engineering, 102
 courses (ECE), 107
 Elementary education, Master of Arts
 in Teaching, 122
 Elementary education, planned
 program, 128
 Elementary teaching mathematics
 courses (MTE), 55
 Employment, part-time, 23
 Endorsement, education:
 early childhood, 130
 learning disabilities, 130
 special education, 127, 130
 Energy Engineering, 105
 Engineering courses (EGR), 107
 Engineering Management, Master of
 Science, 105
 Engineering, Master of Science, 101
 Engineering, doctoral program, 96
 Engineering, School of, 95
 English courses (ENG), 39
 English, Department of, 35
 English language concentration,
 Master of Arts with, 37
 English, Master of Arts, 36
 English, Master of Arts in Teaching, 37
 Enrollment fee, 21
 Ensembles courses (MUE), 61
 Equality of Opportunity, 11
 Evaluation and grading (economics
 and management), 88
 Exception, petition of, 17
 Exercise science courses (EXS), 146
 Facilities
 biology, 27
 centralized, 12
 chemistry, 33
 medical physics, 150
 physics, 66
 Family Educational Rights and
 Privacy Act, 11
 Fees, 21
 Finance courses (FIN), 90
 Financial aid, 23
 Foreign students, admission of, 16
 General information, 8
 Grading, 19
 Graduate degrees offered, 10
 Graduate Management Admission
 Test, 83

Handicapped student services, 16
 Health, physical education, and
 recreation planned program, 131
 Health Sciences, Center for, 149
 History courses (HST), 42
 History, Department of, 40
 History, Master of Arts, 41
 Housing fees, 21
 Human and Educational Services,
 School of, 116
 Inactive status, 16
 Infancy specialization, early
 childhood, 122
 Institute of Biological Sciences, 12
 Institutional Research, Office of, 14
 Institutes, Department of English, 35
 Jobs, part-time, 23
 Late registration fee, 21
 Learning disabilities endorsement,
 Master of Arts in Teaching
 (reading/language arts), 130
 Library, 13
 Linguistics courses (LIN), 49
 Linguistics, Department of, 45
 Linguistics, Master of Arts, 46
 Loans, 23
 Management courses, 91
 Management information system
 courses (MIS), 92
 Management, School of Economics
 and, 81
 Marketing courses (MKT), 92
 Master of Arts:
 clinical psychology, 73
 counseling, 123
 English, 36
 history, 41
 linguistics, 46
 sociology, 77
 Master of Arts in Teaching:
 early childhood, 120
 elementary education, 122
 English, 37
 mathematics, 51
 reading, 129
 special education, 125
 Master of Business Administration, 82
 Master of Music, 59
 Master of Public Administration, 70
 Master of Science:
 applied mathematics, 52
 applied statistics, 52
 biology, 26
 chemistry, 32
 computer and information
 science, 106

electrical and computer engineering, 102
 engineering management, 105
 mechanical engineering, 102
 medical physics, 149
 nursing, 147
 physics, 66
 systems and industrial engineering, 103
 Master's theses, 20
 (see also department and school entries)
 Mathematical Sciences, Department of, 50
 Mathematics courses (MTH), 54
 Mathematics for elementary teaching courses (MTE), 55
 Mathematics for secondary teaching courses (MTS), 54
 Mathematics, Master of Arts in Teaching:
 elementary education, 55
 secondary education, 51
 Mechanical engineering, 109
 Mechanical engineering courses (ME), 109
 Medical physics courses (MPH), 150
 Medical physics, Doctor of Philosophy, 64
 Medical physics, Master of Science, 149
 Medical review program, 151
 Michigan Intercollegiate Graduate Studies (MIGS), 12
 Microcomputer applications in education certificate, 128
 planned program, 131
 Midwestern Association of Graduate Schools affiliation, 11
 Music, Department of, 58
 Music education courses (MUS), 62
 Music ensemble courses (MUE), 61
 Music education program, 62
 Music history, literature, and appreciation courses (MUS), 62
 Music, Master of, 59
 Music theory courses (MUT), 62
 Nursing program, 147
 Organizational behavior courses (ORG), 93
 Out-of-state tuition regulations, 22
 Part-time status, economics and management, 83
 Pediatric play specialization (early childhood), 122
 Performing Arts Library, 13
 Petition of exception, 17
 Physics courses (PHY), 67
 Physics, Department of, 64
 Physics, Master of Science, 66
 Physics, medical, 64, 149
 Planned programs (education), 128
 Political Science, Department of, 69
 Post-baccalaureate status, 16
 Post-master's status, 16
 Privacy Act, 11
 Probation, academic, 18
 Program transfer fee, 21
 Psychology courses (PSY), 74
 Psychology, Department of, 73
 Public administration courses (PA), 71
 Public Administration, Master of, 70
 Quantitative methods courses (QMM), 93
 Reading, Doctor of Philosophy, 117
 Reading/language arts education, Master of Arts in Teaching, 129
 Reading/language arts planned program, 129
 Reading/language arts specialization (early childhood), 122
 Recital requirements, music, 60
 Records, restriction of, 17
 Refund of fees, 22
 Research facilities:
 biology, 27
 centralized, 12
 chemistry, 33
 medical physics, 150
 physics, 66
 Residence halls fees, 21
 Residence requirements, Ph.D.:
 cellular biology, 26
 chemistry, 32
 engineering, 98
 reading, 117
 Resource Center, SHES, 14
 Role and mission, institutional, 8
 Scholarships, 23
 Science studies courses (SCS), 143
 Secondary teaching mathematics courses (MTS), 54
 Sociology and Anthropology, Department of, 77
 Sociology courses (SOC) (sociology program), 78
 Sociology, Master of Arts, 77
 Special education, Master of Arts in Teaching, 125
 Special education M.A.T. with early childhood and special education endorsements, 130

Special education, planned program, 131
 Special education specialization (early childhood), 122
 Special fees, 21
 Special graduate status, 15
 (see also department and school entries)
 Specializations
 early childhood, 122
 linguistics, 47
 Statistics courses (STA), 57
 Statistical methods, certificate, 53
 Summer institutes, Department of English, 38
 Systems and industrial engineering Master of Science, 101
 Systems engineering, doctoral program, 98
 courses (SYS), 111
 Terminal projects, 20
 Theses, 20
 Time limit, 17 (see also individual department and school entries)
 Transcripts, 17
 Transfer credit, 17
 (see also department and school entries)
 Transfer from post-master's to regular status, engineering Ph.D. program, 97
 Tuition, 21
 Tuition regulations, out-of-state, 22
 Undergraduate, courses taken as, 18
 Vocational education courses (VTE), 145
 Vocational education planned program, 131
 Withdrawal, 18

MAIN CAMPUS OF OAKLAND UNIVERSITY



1. North Foundation Hall
2. South Foundation Hall
3. Oakland Center
4. O'Dowd Hall
5. Kresge Library
6. Hannah Hall of Science
7. Dodge Hall of Engineering
8. Varner Hall
9. Lepley Sports Building
10. Fitzgerald House
11. Anibal House
12. Pryale House
13. University Apartments
14. Hamlin Hall
15. Hill House
16. Van Wagoner House
17. Vandenberg Hall
18. Graham Health Center
19. Meadow Brook Theatre and Art Gallery
20. Wilson Hall
21. Public Safety and Services Building
22. Barn Theatre