

OAKLAND UNIVERSITY

GRADUATE STUDY CATALOG

1981-1983

Rochester, Michigan

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NOTICE

All data in this catalog applies to the 1981-83 academic years and reflects information as it was available on the publication date. Oakland University reserves the right to revise all announcements contained in this publication and at its discretion to make reasonable changes in requirements to improve or upgrade academic and nonacademic programs.

June 1981

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Academic Calendars

Fall, 1981

Registration	W, Th, F	September 2, 3, 4
Labor Day Holiday	M	September 7
Classes Begin	8 a.m. T	September 8
Fall Commencement	Saturday	September 19
Thanksgiving Recess Begins	10 p.m. W	November 25
Classes Resume	8 a.m. M	November 30
Classes End	5:30 p.m. M	December 14
Exams Begin	6 p.m. M	December 14
Exams End	12 noon S	December 19

Winter, 1982

Registration	M	January 4
Classes Begin	8 a.m. T	January 5
Winter Recess Begins	10 p.m. S	February 27
Classes Resume	8 a.m. M	March 8
Classes End	3:30 p.m. M	April 19
Exams Begin	4 p.m. M	April 19
Exams End	12 noon S	April 24

Spring, 1982

Registration	M	May 3
Classes Begin	8 a.m. T	May 4
Memorial Day Holiday	M	May 31
Spring Commencement	Saturday	June 5
Classes End	10 p.m. T	June 22
Final Exams	W, Th	June 23, 24

Summer, 1982

Registration	M	June 28
Classes Begin	8 a.m. T	June 29
Independence Day Recess	5:30 p.m. F	July 2
Classes Resume	8 a.m. T	July 6
Classes End	10 p.m. T	August 17
Final Exams	W, Th	August 18, 19

Fall, 1982

Registration	W, Th, F	September 1, 2, 3
Labor Day Holiday	M	September 6
Classes Begin	8 a.m. T	September 7
Fall Commencement	Sunday	September 19
Thanksgiving Recess Begins	10 p.m. W	November 24
Classes Resume	8 a.m. M	November 29
Classes End	5:30 p.m. M	December 13
Exams Begin	6 p.m. M	December 13
Exams End	12 noon S	December 18

Winter, 1983

Registration	M	January 3
Classes Begin	8 a.m. T	January 4
Winter Recess Begins	10 p.m. S	February 26
Classes Resume	8 a.m. M	March 7
Classes End	3:30 p.m. M	April 18
Exams Begin	4 p.m. M	April 18
Exams End	12 noon S	April 23

BOARD OF TRUSTEES

David Handleman	David B. Lewis
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ACADEMIC ADMINISTRATION

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George L. Gardiner	Dean of the Library
Mohammed S. Ghausi	Dean, School of Engineering
Laszlo J. Hetenyi	Acting Dean, School of Performing Arts
Ronald M. Horwitz	Dean, School of Economics and Management
W. David Jaymes	Faculty Director, Center for Community and Human Development
G. Philip Johnson	Dean of the Graduate School
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Gerald J. Pine	Dean, School of Human and Educational Services
John E. Tower	Acting Director, Center for General and Career Studies

GRADUATE COUNCIL

The Graduate School	G. Philip Johnson
College of Arts and Sciences	Isaac Eliezer
Area Studies	Vincent Khapoya
Biology	Virinder Moudgil
Chemistry	Jeffrey Rosenthal
English	Nigel Hampton
History	Carl Osthaus
Linguistics	Peter Binkert
Mathematics	J. Curtis Chipman
Medical Physics	Michael Chopp
Physics	Norman Tepley
Psychology	Algea Harrison
Public Administration	Sharon Thomas
Sociology	Peter Bertocci
School of Economics and Management	Ronald Horwitz
Management	Robbin Hough
School of Engineering	Mohammed Ghausi
Computer and Information Science	Dhiraj Pradhan
Electrical and Computer Engineering	Peter Stavroulakis
Mechanical Engineering	Joseph Der Hovanesian
Systems Engineering	Ronald Mourant
School of Human and Educational Services	Gerald Pine
Early Childhood	Kenneth Smith
Education Specialist	Marc Briod
Elementary	Jacqueline Lougheed
Guidance and Counseling	Robert Brown
Reading	Robert Christina
Special Education	Carol Swift
School of Nursing	Andrea R. Lindell
Nursing	Nadia Boulos
School of Performing Arts	Laszlo Hetenyi
Music	Lyle Nordstrom
Kresge Library	Janet Krompart

GENERAL INFORMATION

OAKLAND UNIVERSITY

Oakland University is a medium-size 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, Nursing, and Performing Arts, a Center for Community and Human Development, a Center for General and Career Studies, 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 with emphasis on the professional performing arts. Meadow Brook Theatre, a professional theatre, is located on the campus. 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.

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 recreation facilities and a modern physical plant that houses the university's academic and public service programs.

GRADUATE PROGRAMS

The College of Arts and Sciences offers programs leading to the degrees of Master of Arts in area studies, English, history, linguistics, psychology and sociology; Master of Science in biology, chemistry, applied mathematics, applied statistics, and physics; and Master of Public Administration. 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 guidance and counseling, and to the Master of Arts in Teaching degree in early childhood education, 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 offers the Doctor of Philosophy degree in systems engineering and the Master of Science degree in computer and information science, electrical and computer engineering, mechanical engineering, and systems and industrial engineering. The School of

Economics and Management offers the degree of Master of Business Administration. The School of Performing Arts offers a Master of Music degree. Additional master's and doctoral programs are in prospect.

In each program the university seeks to provide its students with intellectual challenge and opportunity for scholarly and professional growth. Its substantial resources in faculty, research facilities, and support functions are all directed to these ends. A graduate program should not be solely a collection of courses and certainly should not be such if the courses are only casually related to each other. Rather, it should be a carefully structured combination of studies and research designed in the aggregate to serve specific needs of the student. Students share responsibility with their advisers for constructing programs of study manifesting this character. They can expect close attention from the faculty while planning their studies and while pursuing them. In turn they should ask of themselves wholehearted commitment to the programs' demands.

Equality of Opportunity

Oakland University, as an equal opportunity and affirmative action institution, complies with federal and state laws prohibiting discrimination, including 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 no person, on the basis of race, sex, color, religion, national origin or ancestry, age, marital status, handicap, or veteran status shall be discriminated against in employment, admissions, educational programs or activities. Inquiries or complaints may be addressed to the Affirmative Action Officer, 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 assistant dean for student life, 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 for student life), in the appropriate *Schedule of Classes*, and the undergraduate and graduate Oakland University catalogs. The assistant dean for student life 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 Association of Colleges for Teacher Education; American Assembly of Collegiate Schools of Business; American Chemical Society; American Council on Education; American Institute of Physics; American Mathematical Society; Council of Graduate Schools in the United States; Institute of International Education, Incorporated; Midwestern Association of Graduate Schools; 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 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 in Dodge Hall. These facilities were constructed with the aid of a matching-funds grant from the National Institutes of Health.

The facilities of the institute include six main research units, each with an office for the principal investigator, and central facilities consisting of a cold room, a computer facility, a radioactive isotope laboratory, an animal holding room, an animal surgery room, an instrument room for major pieces of apparatus, and a conference room.

In this modern and well-equipped center a group of research scientists performs grant-supported basic research having applications to medicine and centering on living systems. The aim of the institute is to bring together many disciplines to concentrate on biological problems. A broadly interdisciplinary program of research in molecular biology, biochemistry, physiology, and pharmacology draws on the combined insights of specialists in engineering, chemistry, physics, and mathematics. Current research is related to eye neurology, eye chemistry, and ophthalmology.

Library Facilities

Most university library materials and services are housed in Kresge Library. Preliminary plans for expansion within several years have been approved. The expanded facility will have the capacity for some 360,000 volumes, 520,000 units of microfilm, and 2,200 study stations.

The Performing Arts Library provides books, journals, acting editions of plays, musical scores, and recordings supporting area studies, communication arts, dance, English, film concentration, music, and theatre programs. The facility is located in Varner Hall.

The Audio Visual Services Center, in Varner Hall, provides media services for the university's instructional programs. These services include selecting and presenting instructional films as well as designing and producing instructional programs ranging from slide presentations to audio-video tape presentations requiring the television studio.

Library Collections

The University Library holds 889,399 pieces of library material, plus unprocessed materials, manuscripts, memorabilia, and museum pieces. Included are 418,464 microforms, 9,225 records and phonotapes, 44,670 periodical volumes, approximately 165,217 government documents, and 251,823 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 2,000 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*.

Several of the library's special collections are listed below:

William Springer Collection of Lincolnia and Civil War Materials, secondary source materials.

Hicks Women in Literature Collection, 900 volumes written by or about women in the seventeenth through twentieth centuries.

James Folklore Collection, 550 folklore monographs, some very scarce.

Anglo-Irish Collection, rare monographs, journal runs, literary works in the original typescripts, signed poems and reviews, and original letters to and from literary figures.

Billie Sunday Farnum Collection, papers from Farnum's terms in Congress and as Michigan auditor general and other public and political offices.

Alternative (Underground) Press Collection, one of the largest anywhere, focuses on the Midwest.

University Archives Collection, materials of historical or legal significance to Oakland University.

Faculty Publications Collection, monographs produced by Oakland University faculty.

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.

The Instructional Materials Center

The Instructional Materials Center is a teaching and resource agency of the School of Human and Educational Services. The center 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, tape, 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.

Child Care

The School of Human and Educational Services early childhood program operates the Matthew Lowry Early Childhood Center for students, faculty, and staff with child care needs. Located at Adams and Butler roads at the southeast corner of campus, the center houses four programs: Preprimary, Preschool, Toddler, and Infant-Parent. The Preprimary Program is for kindergarten-age children who need a full-day program. The Toddler Program is for children who are walking to 3 years old, while the Preschool Program serves children from 3 to 5 years old. These programs are designed to stimulate the developmental growth of children. The Infant-Parent Program requires parent participation. Student parents participate in the weekly sessions during 12 weeks of a regular semester. The Early Childhood Center operates weekdays from 7:45 a.m. to 5:30 p.m. Registration for the programs coincides with university registration days, and parents are assessed an hourly rate that varies for students, faculty, and staff.

University-Community Counseling and Psychological Center

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 strictly confidential 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 Graduate School. Detailed instructions are included in the "Application for Admission to Graduate Study," available from this office. Additional admissions 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 certificate status is confined to teachers working on an 18- or 20-credit planned program to meet the state requirements for continuing certification, for additional endorsements or for provisional certification after award of a bachelor's degree. An application for admission, official transcripts, letters of recommendation, and a \$15 application fee are required. Admission into the certificate program will be granted by the School of Human and Educational Services on recommendation by the department concerned. The graduate dean will notify the student of the admission decision and send copies of the planned programs to the student and the certification office. Records will be maintained by the Graduate School. Credit earned in certificate status may be applied toward degree requirements if the student is subsequently admitted to a degree program, if the credit is appropriate to the program, and if it is within the six-year time limit. If a student in this status wishes to apply to a degree program, a request for change of status must be submitted to the Graduate School. Admission as a certificate student does not assure future admission into a degree program.

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 a student in this status wishes to apply for admission to a program, he/she must file a request for change of status with the Graduate School, 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 filing a request for a change of status with the Graduate School 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 Graduate School 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 Aptitude Test (GRE), including scores from Advanced 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.

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 will be reviewed by the appropriate admissions committee.

All application material and correspondence in the graduate folder is retained for five years, after which the material is destroyed. 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 \$2 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, he/she may appeal 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 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, U, S, R and Z.
2. The first two weeks of a semester are a "no-grade" period for dropping and adding full semester courses. (For "first-half" or "second-half" courses, this period is the first week of the appropriate "half-term.") Courses dropped during these periods are not indicated on the student's transcript.
3. Numerical and "U" grades only can be removed from a transcript through course repetition.
4. The meanings of non-numeric grades are as follows:
 - a. "W" is assigned by the registrar if a student withdraws officially from a course or all courses between the end of the no-grade period and the end of the refund period.
 - 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 satisfactory work. "P" grades must be removed within two calendar years of the date of assignment; otherwise the "P" converts to an "I" which remains on the transcript. This rule does not apply to doctoral thesis work.

- d. The grade of "S" is given in certain selected courses and is meant to imply 3.0 or better. Courses in which S/U grading is used must be approved by the appropriate committee on instruction and the graduate dean, who will notify the registrar.
- e. The grade of "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.
- f. 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

Spring 1981
Summer 1981
Fall 1981
Winter 1982
Spring 1982
Summer 1982
Fall 1982
Winter 1983
Spring 1983
Summer 1983
Fall 1983

Last Date for Applying for Degree

May 18, 1981
July 14, 1981
October 9, 1981
February 5, 1982
May 17, 1982
July 12, 1982
October 8, 1982
February 4, 1983
May 16, 1983
July 11, 1983
October 7, 1983

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 \$15 must accompany an application for admission to a degree, a certification, or an endorsement program. This is a nonrefundable 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 \$50.00 per credit while nonresidents are assessed \$100.00 per credit. The fee for off-campus courses is \$52.00 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 \$15 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 \$15 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 10 or more credits are charged an additional \$27 (\$5 health service allocation, \$16 Oakland Center fee, and \$6 transportation use allocation). Those who register for less than 10 credits are assessed one-half these fees.

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 1980-81 rate for room and board is \$1,888 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-

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 will be available on campus by summer 1981. 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 net an early withdrawal assessment of \$30. Formal notice of withdrawal must be given to the residence halls office.

Out-of-State Tuition Regulations

Students enrolling at Oakland University are classified as in-state or out-of-state students for purposes of assessing tuition charges. It is the student's responsibility to register each semester under the proper in-state or out-of-state classification. For the purpose of these regulations, an in-state resident is defined as a person who has a Michigan domicile and has resided in Michigan 12 months immediately preceding 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 U.S. shall not, by reason of that status alone, be disqualified from classification as a resident, provided, however, that aliens who are present in the U.S. 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 after being classified as an out-of-state student may apply for reclassification to in-state status by obtaining an application for reclassification from the university registrar. The student shall complete the application and list in detail the reason(s) he/she is a bona fide domiciliary of Michigan, primarily as a permanent resident and not merely as a student, and attach documentary data in support thereof, and return the application to the university registrar 30 days prior to the beginning of classes of the semester for which the reclassification shall be effective. The following facts and circumstances, although not necessarily conclusive, have probative value in support of a claim of a residence reclassification:

1. Continuous presence in Michigan when not enrolled as a student;
2. Reliance upon Michigan sources for financial support;
3. Domicile in Michigan of family, guardian, or other relative or persons legally responsible for the student;
4. Former domicile in the state and maintenance of significant connections therein while absent;
5. Ownership of a home;
6. Long-term military commitments in Michigan;
7. Acceptance of offer of permanent employment in Michigan; and
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 registration for voting; 2. Employment in any position normally filled by a student; 3. The lease of living quarters; 4. A statement of intention to acquire a domicile in Michigan; 5. Domicile in Michigan of student's spouse; 6. Automobile registration; 7. Other public records 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 tuition 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 and fees 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, the Katke Scholarship in Engineering, 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:

Jack R. Moeller, Acting Dean
Sheldon Appleton, Associate Dean for Advising
Robert C. Howes, Associate Dean and Director of the Honors College
Isaac Eliezer, Associate Dean
Robert E. Simmons, Associate Dean

AREA STUDIES

Chairperson: Carlo Coppola

(Italics in the following list designate departmental affiliation)

Professors:

Sheldon L. Appleton, *Political Science*, Ph.D., University of Minnesota
William C. Forbes, Jr., *Biological Sciences*, Ed.D., Columbia University, Ph.D., University of Connecticut
Karl D. Gregory, *Economics and Management*, Ph.D., University of Michigan
Edward J. Heubel, *Political Science*, Ph.D., University of Minnesota
Robert C. Howes, *History*, Ph.D., Cornell University
James W. Hughes, *Education*, Ed.D., University of New Mexico
Helen Kovach-Tarakanov, *Russian*, Ph.D., Elizabeth University (Hungary)
Richard A. Mazzara, *French and Portuguese*, Ph.D., University of Kansas
Amitendranath Tagore, *Chinese*, Ph.D., Visva Bharati University
S. Bernard Thomas, *History*, Ph.D., Columbia University

Associate Professors:

Peter J. Bertocci, *Anthropology*, Ph.D., Michigan State University
Richard W. Brooks, *Philosophy*, Ph.D., University of Minnesota
William C. Bryant, *Spanish*, Ph.D., University of California (Berkeley)
Carlo Coppola, *Hindi-Urdu and Linguistics*, Ph.D., University of Chicago
James W. Dow, *Anthropology*, Ph.D., Brandeis University
Alice C. Gorlin, *Economics*, Ph.D., University of Michigan
James D. Graham, *History*, Ph.D., Northwestern University
William D. Jaymes, *French*, Ph.D., University of Kansas
Mary Karasch, *History*, Ph.D., University of Wisconsin
Janet A. Krompart, *Library*, M.L.S., University of California (Berkeley)
John Marney, *Chinese*, Ph.D., University of Wisconsin
Kathryn McArdle-Pigott, *Spanish*, Ph.D., Universidad Central de Madrid
Paul M. Michaud, *History*, Ph.D., University of Chicago
Lawrence C. Orton, *History*, Ph.D., Indiana University
James R. Ozinga, *Political Science*, Ph.D., Michigan State University
Munibur Rahman, *Hindi-Urdu*, Ph.D., University of London
Richard B. Stamps, *Anthropology*, Ph.D., Michigan State University
Richard P. Tucker, *History*, Ph.D., Harvard University
Robert J.J. Wargo, *Philosophy*, Ph.D., University of Michigan

Assistant Professors:

Brian W. Coyer, *Political Science*, Ph.D., Michigan State University
Vincent B. Khapoya, *Political Science*, Ph.D., University of Denver
C. Franklyn Sayre, *Art History*, Ph.D., Yale University
Charlotte V. Stokes, *Art History*, Ph.D., University of Washington

Special Instructor:Marvin D. Holladay, *Music*, M.A., Wesleyan University**THE MASTER OF ARTS IN AREA STUDIES**

Area studies are concerned with the understanding of living civilizations whose physical bases and cultural manifestations—art, government, history, language, literature, music, philosophy, religion, and social organizations—are the subject of study of a number of departments in a university. The interdepartmental area studies faculty of Oakland University offers coordinated programs of instruction in many aspects of the civilizations of five major geographical-cultural areas of the world: East Asia (China and Japan), South Asia (India, Pakistan, Bangladesh), Africa, Latin America, and the Slavic world.

The Master of Arts in area studies is designed to meet the needs of two types of students: those who desire cross-cultural breadth of study and those who prefer to specialize in one geographical-cultural area. To this end, two tracks, or concentrations, are offered: the concentration in comparative area studies and the concentration in a major civilization. Successful completion of either concentration leads to the degree of Master of Arts in area studies.

Admission to Course

An applicant for admission to the Master of Arts program in area studies must hold a bachelor's degree from an accredited institution. Admission decisions are based on transcripts and recommendations, which must show evidence of academic distinction and promise. A grade-point average of 3.0 in undergraduate work will ordinarily be the minimum standard for admission, although other candidates of superior promise may be admitted if their academic deficiencies are corrected. Credentials should be submitted to the Graduate School at least six weeks before the beginning of the term in which the student wishes to enter the program. Students will be admitted for any semester or session during the academic year. After acceptance into the program, each candidate will select two area faculty members who are willing to serve as a program committee. One of these members will accept primary responsibility for advising and assisting the student in planning the individual program.

THE CONCENTRATION IN COMPARATIVE AREA STUDIES

This concentration is designed for persons who wish to emphasize geographical and cultural breadth through interdisciplinary study of two or more areas. Although designed especially for secondary school teachers, the program is open to other qualified candidates.

Each candidate's program will be organized, in consultation with a program committee, along a broad integrating concept or theme. Possible themes are classical civilizations, revolutions, peasants and urbanization, comparative literature, development, and modernization.

Requirements for the Degree

Nine courses (36 credits) are required. Of these, seven—including AS 690—must be from the list below. With permission of the candidate's program committee, two related courses may be taken for credit. Each candidate must complete AS 690 (The Master's Project), consisting of either an independent research paper or a curriculum design. Language study, although strongly recommended as the most basic and reliable means for penetrating a foreign culture, is not a formal requirement. The alternative to a reading knowledge of an appropriate foreign language is satisfactory completion of at least two courses in an appropriate foreign literature in translation.

THE CONCENTRATION IN A MAJOR CIVILIZATION

This concentration is designed for research-oriented students who wish to specialize in advanced, interdisciplinary study of a major geographical-cultural area. Presently, this concentration is available in Latin American studies and in Slavic studies. All candidates' programs will be organized in consultation with their program committees.

Requirements for the Degree

Nine courses (36 credits) are required. Of these, eight must be from the list below and must deal with the area of the student's primary interest (Latin America or the Slavic world). One elective is allowed.

A reading knowledge of a foreign language appropriate to the student's area of concentration is required. Each candidate must complete a graduate seminar and AS 690 (The Master's Project). The latter includes preparation of a detailed research thesis.

Overseas Studies and Tours

The Area Studies Program sponsors overseas study and/or tours in China, Japan, Mexico, and the Soviet Union. Students interested in participating in one of these programs or tours for graduate credit should consult the Office of Area Studies.

PLANNED PROGRAM FOR CONTINUING CERTIFICATION

The Area Studies Program, in cooperation with the School of Human and Educational Services, offers a planned program for Continuing Certification, which is as follows: AS 590 (6 credits); one course chosen from ED 581, 586, 587, and 603 (4 credits); and any two courses listed in the area studies course offerings in this catalog. Students wishing to pursue this program must consult with the area studies graduate adviser before taking courses.

Course Offerings

Most of the courses listed below are offered by Oakland University academic departments as part of their degree programs. As such, many of them have prerequisites. Therefore, all area studies M.A. candidates wishing to register for any of these courses must secure permission of their program committee and of the course instructors before registering. Forms for recording instructor's permission are available in the area studies office.

ART HISTORY COURSES**AH 300****Chinese Art (4)**

The development of architecture, sculpture, and painting in China from the Shang Dynasty, ca. 1550 B.C., until the founding of the Chinese Republic, A.D. 1912.

Prerequisite: AH 104.

AH 301**Japanese Art (4)**

The development of architecture, sculpture, and painting in Japan from the fifth to the nineteenth century A.D.

Prerequisite: AH 104.

AH 305**African Art (4)**

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

Prerequisite: AH 102.

AH 307**Pre-Columbian Art (4)**

The arts of the Indians of Mexico, Central America, and South America before the Spanish Conquest.

Prerequisite: AH 102.

AH 320 Islamic Art (4)

The development of architecture and painting in Islam from the seventh to the eighteenth century with reference to the countries of the Fertile Crescent, North Africa, Arab and Moorish Spain, Egypt, Persia, Turkey, and Muslim India.

AH 322 Early Medieval, Byzantine, and Romanesque Art (4)

The development of architecture, sculpture, and painting in Christian Europe from A.D. 330 through the apex of monasticism, ca. A.D. 1150.

Prerequisite: AH 100.

AH 490 Problems in Art History (4 or 8)

Seminar in specific subject areas of, or approaches to, art history. May be taken in different semesters under different instructors for a total of 8 credits. With permission of instructor and department chairperson, may be taken in one semester for a total of 8 credits.

Prerequisite: 12 credits of art history.

ANTHROPOLOGY COURSES**AN 361 Peoples and Cultures of India (4)**

A survey of contemporary society and culture on the Indian subcontinent, with focus on India, Pakistan, and Bangladesh; emphasis on social structure, folk religion, and the problems of socio-cultural change.

Prerequisite: AN 102 or AS 240.

AN 362 Peoples and Cultures of China (4)

An anthropological study of China, stressing the variety of cultural and ecological adaptations characteristic of that complex society.

Prerequisite: AN 102 or AS 210.

AN 370 Archaeology of Mesoamerica (4)

The pre-Hispanic culture of Mexico and Guatemala, the Aztecs and Mayas, and their neighboring and derivative cultures. Detailed discussion of the major archaeological sites.

Prerequisite: AN 101 and 102.

AN 371 Cultures of Mesoamerica (4)

Anthropological studies of Indian and Mestizo societies in Mexico and Guatemala, including their separate socio-economic patterns and their integration into a dualistic social system.

Prerequisite: AN 102.

AN 372 Indians of South America (4)

A survey of the native South Americans. Includes warriors of the jungles, peasants and herders of the mountains, nomads of the plains and forests, and subsistence fishermen of the southern coasts.

Prerequisite: AN 102.

CHINESE COURSES**CHE 310 Literary Chinese (4)**

Studies based on literary texts of Confucius, Mo Tzu, etc.

Prerequisite: CHE 215.

CHE 320 Readings in Chinese Newspapers (4)

Selections from newspapers of mainland China, Taiwan, and Southeast Asia.

Prerequisite: CHE 215.

CHE 330 Readings in Chinese Political Essays (4)

Studies in the documentary style of Chinese, selected mainly from writings of twentieth-century political leaders of China.

Prerequisite: CHE 215.

CHE 340 Twentieth-Century Chinese Literature (4)

Studies in modern pai-hua literature, including short stories, poems, essays, and pamphlets.

Prerequisite: CHE 215.

CHE 410 Chinese Fiction and Drama (4)

Studies in texts and criticism of fiction and drama, modern or classical.

Prerequisite: CHE 310 or 312.

CHE 421 Selected Classical Texts (4)

Studies of texts in advanced literary Chinese.

Prerequisite: CHE 310.

CHE 431 Classical Chinese Stories (4)

Studies of selected stories from different classical Chinese sources.

Prerequisite: CHE 310.

CHE 440 Chinese Poetry (4)

Selections from either classical T'ang and Sung Dynasty poems or from the post-May-fourth movement of poetry.

Prerequisite: CHE 310.

CHE 490 Directed Readings and Research in Chinese (2, 4, or 8)

For students with a high degree of competence in the language. May be conducted either in literary or modern Chinese. May be repeated for a total of 8 credits.

Prerequisite: Permission of instructor.

ECONOMICS COURSES**ECN 323 International Economic Relations (4)**

Introduction to elementary international trade theory, the international monetary mechanism, exchange-rate regimes, the balance of payments, and economic interdependence.

Prerequisite: ECN 201.

ECN 326 Economic Development (4)

Application of the tools of economic analysis to the problems of economic development and growth.

Prerequisite: ECN 201.

ECN 327 African Economic Development (4)

Application of the tools of economic analysis to the historical development of African economies, the evaluation of current strategies for their economic development, and the role of the developed countries.

Prerequisite: ECN 201.

ECN 350 Comparative Economic Systems (4)

Comparative analysis of alternative forms of economic organization. The relationships between the economic system and resource allocation, pricing, income distribution, and growth. Capitalism, market socialism, and central planning are emphasized.

Prerequisite: ECN 301.

ECN 418 Selected Topics in Economic Policy (4)

Selected topics in the application of economic theory to the analysis of economic policy. Economic policy areas may include resource allocation, macroeconomic stability, economic growth, energy, and the environment. Topics change from time to time.

EDUCATION COURSES

(Descriptions of the following education courses are listed in the education section in this catalog.)

ED 581

Teaching about Black Africa in the Public Schools (4)

ED 586

Bilingual Education: Theories and Practices (4)

ED 587

Social Studies in the Elementary School (4)

ED 603

Cross-Cultural Studies in Education (4)

HISTORY COURSES

(Descriptions of the following history courses are in the history section of this catalog.)

HST 521

American Diplomatic History in the Twentieth Century (4)

HST 552

Kiev and Muscovy (4)

HST 553

Imperial Russia (4)

HST 554

Soviet Russia (4)

HST 559

Russian Intellectual History to Peter the Great (4)

HST 560

Russian Intellectual History since Peter the Great (4)

HST 563

History of Southern South America (4)

HST 565

The Response to European Colonialism (4)

HST 566

Slavery and Race Relations in the New World (4)

HST 567

History of Mexico (4)

HST 570

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

HST 571

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

HST 573	China: The Final (Ch'ing) Imperial Phase, 1644-1912 (4)
HST 574	China: The Nationalist Republican Period, 1912-1949 (4)
HST 575	Topics in Chinese Intellectual History (4)
HST 576	History of Chinese Communism: 1921 to the Present (4)
HST 581	History of Early India (4)
HST 583	British Imperialism and Hindu Nationalism in India, 1740-1947 (4)
HST 585	Environment and Politics in Modern Asia (4)
HST 586	Contemporary African 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 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)

PHILOSOPHY COURSES

- PHL 351 Chinese Philosophy (4)**
Systematic study of the rise and development of Chinese philosophy with emphasis on the classical (Chou) period, especially Confucianism and Taoism. The impact of Buddhism on Chinese philosophical thinking will be examined. Reference to modern developments as time permits.
Prerequisite: PHL 250 or AS 20.
- PHL 352 Indian Philosophy (4)**
Examination of the presuppositions and doctrines of India's major philosophic systems. Both Indian logic and metaphysical speculation are covered. Realistic, idealistic, pluralistic, dualistic, and monistic systems are considered, with some reference to contemporary developments.
Prerequisite: PHL 250 or AS 240.
- PHL 353 Japanese Philosophy (4)**
Examination of Japan's major philosophical and religious systems including Shinto, Buddhism, and Confucianism in the premodern era as well as the impact of European philosophical thought on Japanese tradition. Offered every other year.
Prerequisite: PHL 250 or AS 220.

POLITICAL SCIENCE COURSES

- PS 330 Political Development (4)**
Examination of the various approaches and theories used in comparative political research, including theories of development and modernization.
Prerequisite: PS 131 and 222.
- PS 332 Politics of the Middle East and North Africa (4)**
Examination of the politics of the Middle East and North Africa. Cultural and historical factors that influence contemporary politics of the era will be emphasized. Topics include religion, social structures, economic problems, the impact of the West, and the Arab-Israeli conflict.
Prerequisite: PS 131.
- PS 333 African Politics (4)**
Examination of politics of selected African states. Primary focus is on political development, with attention to traditional and colonial politics as well as to individuals, groups, and institutions that make up the present political process.
Prerequisite: PS 131.
- PS 334 Political Systems of Southern Asia (4)**
Examination of the elements of political life in India, Bangladesh, and Pakistan. Studies include the cultural, historical, social, and economic factors that influence contemporary political institutions and the issues and processes by which political conflicts are resolved.
Prerequisite: PS 131.

PS 335 Politics of Latin America (4)

Latin American political systems and the historical, social, and economic factors underlying them. The major countries are studied intensively, and a comparative approach is used to examine variations from democracy to dictatorship and political instability.
Prerequisite: PS 131.

PS 337 The Soviet Political System (4)

A descriptive analysis of the Soviet society as a political system: its origins, institutions, and political behavior. Trends and developments in the system will be assessed, and comparisons with other political systems will be undertaken. Offered winter semester.
Prerequisite: PS 131.

PS 338 Modern Chinese Politics (4)

Analysis of the rise of social movements in China after the breakdown of the traditional order; the emergence of the Nationalist and Communist regimes and the triumph of the Communists; and the political processes of the People's Republic of China.
Prerequisite: PS 131.

RUSSIAN COURSES

RUS 320 Applied Linguistics of Russian (4)

Treats the essential linguistic principles which affect foreign language learning: phonological, morphological, and syntactic interference; sound/spelling correspondences; and language learning, error analysis, and remediation. Language-specific drills and exercises included. Identical with ALS 320. Offered in alternate years.
Prerequisite: RUS 215.

RUS 370 Introduction to Russian Literature (4)

A sampling of critical approaches to the study of some masterpieces of Russian literature. Conducted in Russian. Offered fall semester.
Prerequisite: RUS 215.

RUS 380 Survey of Russian Literature (4)

A survey of the highlights of Russian literature. Intended to supplement the work of RUS 370. Conducted in Russian. Offered winter semester.
Prerequisite: RU

RUS 400 Special Topics in Language (4)

Special problems or topics selected by the instructor. May be repeated for credit.
Prerequisite: RUS 318, or 370 and 380.

RUS 408 Advanced Oral Practice in Russian (2)

Practice in speaking at an advanced level, which may include style and delivery appropriate to formal and informal speaking situations. Course work may include oral presentations, self-recording, and critique.
Prerequisite: RUS 316.

RUS 416 The Nineteenth Century: First Half (4)

A study of works in all genres by leading Russian authors of the period, including Pushkin, Lermontov, and Gogol. Conducted in Russian.
Prerequisite: RUS 370 and 380.

RUS 417 The Nineteenth Century: Second Half (4)

A study of works in all genres by leading Russian authors of the period, including Tolstoj, Dostoevsky, and Chekhov. Conducted in Russian.
Prerequisite: RUS 370 and 380.

RUS 418 The Twentieth Century (4)

A study of works in all genres by Russian authors of the period, including Bunin, Lamiatin, and Solzhenitsin. Conducted in Russian.
Prerequisite: RUS 370 and 380.

RUS 455 Translation Into Russian (4)

Translation from English into Russian of a wide variety of materials ranging from commercial and technical to literary. Individual students may emphasize area of interest. Offered fall semester in alternate years.
Prerequisite: RUS 314, 318, and 355.

RUS 490 **Independent Reading and Research (2, 4, or 8)**
Directed individual research and reading for advanced Russian majors. May be repeated for a total of 8 credits.
Prerequisite: Two 400-level Russian literature courses and permission of department.

SOCIOLOGY COURSE

SOC 300 **Social Stratification in Cross-Cultural Perspective (4)**
The concepts of class, caste, and race in relation to social conflict and social integration studied in a cross-cultural perspective, emphasizing comparative materials.
Prerequisite: SOC 100.

SPANISH COURSE

SPN 421 **Spanish-American Literature (4)**
Masterworks of twentieth-century Spanish-American literature, including Fuentes, Asturias, Neruda. Conducted in Spanish.
Prerequisite: SPN 370 and 380.

AREA STUDIES COURSES

AS 361-362 **Japan Exchange Program (16-18)**
Course work is taken at Nanzan University in Nagoya; includes Japanese language study and additional appropriate courses with English as the language of instruction.

AS 500 **Special Problems in Area Studies (4)**
Interdisciplinary study of a foreign area, or a particular aspect of a foreign area, for which no regular course offerings exist.
Prerequisite: Permission of department.

AS 537 **Mexico, Cuba, and Puerto Rico: A Cultural Perspective (4)**
Departing from a general study of Latin America, this course will concentrate on historical, geographical, and cultural aspects of Mexico, Cuba, and Puerto Rico.
Prerequisite: Permission of department.

AS 568 **Summer Program in Mexican Studies (8)**
Oakland faculty cooperate with Mexican faculty to present summer courses focusing on Mexican culture, intensive language, and Mexican literature. Courses conducted in both Spanish and English. May be repeated once for additional credits with consent of the Latin American coordinator.

AS 581 **Graduate Seminar in East Asian Studies (4)**
Advanced intensive study of selected topics dealing with East Asia.
Prerequisite: Permission of department.

AS 582 **Graduate Seminar in South Asian Studies (4)**
Advanced intensive study of selected topics dealing with South Asia.
Prerequisite: Permission of department.

AS 583 **Graduate Seminar in Slavic Studies (4)**
Advanced intensive study of selected topics dealing with the Slavic world.
Prerequisite: Permission of department.

AS 584 **Graduate Seminar in African Studies (4)**
Advanced intensive study of selected topics dealing with Africa.
Prerequisite: Permission of department.

AS 585 **Graduate Seminar in Latin American Studies (4)**
Advanced intensive study of selected topics dealing with Latin America.
Prerequisite: Permission of department.

AS 590 **Graduate Readings in Area Studies (2, 4, 6, or 8)**
Advanced readings from diverse disciplines with focus on the student's area of specialization in East Asian, South Asian, African, Latin American, Slavic, or comparative studies.
Prerequisite: Permission of department.

AS 690 **The Master's Project (4 or 8)**
An independent research project culminating in a formal paper or a curriculum design.
Prerequisite: Permission of department.

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
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
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
Daphna R. Oliver, Ph.D., University of California, Los Angeles
Ann K. Sakai, Ph.D., University of Michigan

Adjunct Professor:

Clifford V. Harding, Ph.D., University of Pennsylvania

Adjunct Associate Professors:

Nasirul Haque, M.D., Dacca Medical College; M.A.C.P., Royal College of Physicians of United Kingdom
James R. Wells, Ph.D., Ohio State University

THE MASTER OF SCIENCE IN BIOLOGY

The program leading to a Master of Science degree in biological sciences is designed to provide students with a broad background in four major areas of biology: biochemistry-biophysics, cell physiology, developmental biology-morphology, and genetics. The program satisfies the needs of students seeking further professional training for an advanced degree, for employment in governmental agencies, and for students seeking additional training for teaching at the secondary school or two-year college level.

Admission to Course

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 admitted but will be asked to correct them. Applicants should have transcripts of all college-level work,

two letters of reference, and scores on the Graduate Record Examination (the advanced test should be in biology) sent to the Graduate School

Requirements for the Degree

The candidate for the degree of Master of Science in biology 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, biochemistry-biophysics, cell physiology, and genetics). At least 8 credits must be a combination of credits received in graduate laboratory courses and credits received in graduate research (BIO 690). 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 completed thesis must be approved by a thesis committee appointed by the departmental graduate committee in consultation with the student's thesis adviser. These requirements may be modified for special cases by petitioning the departmental graduate committee. Undergraduate courses which may be used to satisfy the overall credit requirements are listed below.

Research Fields and Facilities

The Department of Biological Sciences is composed of faculty whose research interests are in the areas of cell biology, molecular biology, biochemistry, developmental biology, biophysics, virology, neurophysiology, microbial physiology, genetics, parasitology, ecology, invertebrate physiology, and botany. Research in these areas is being conducted at the cellular and molecular level and is supported by adequate equipment, space, and library facilities.

These facilities include six teaching laboratories, twelve research laboratories, a large common laboratory for advanced student research, cold rooms, an incubation room, a sterile room, an electron microscopy laboratory, three darkrooms, a radio-active isotope room, preparation and storerooms, an instrument shop, animal quarters, and marine aquaria. Both in functional design and specialized equipment these facilities constitute a major research resource of the university. In addition, the faculty in the Institute of Biological Sciences is performing basic research on biochemistry and physiology of mammalian vision.

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 the 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.

Prerequisite: BIO 321.

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 611 Graduate Biology Seminar (1)

Graduate student presentation of scientific data dealing with biological problems.

BIO 690 Graduate Research (4 or 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.

DEPARTMENT OF CHEMISTRY

Chairperson: Paul Tomboulia

Professors:

Gottfried Brieger, Ph.D., University of Wisconsin
Isaac Eliezer, Ph.D., Hebrew University (Jerusalem)

Kenneth M. Harmon, Ph.D., University of Washington
Frederick W. Obear, Ph.D., University of New Hampshire
Lewis N. Pino, Ph.D., University of Buffalo
Paul Tomboulia, Ph.D., University of Illinois

Associate Professors:

Denis M. Callewaert, Ph.D., Wayne State University
Julien Genyey, Ph.D., Cornell University
Steven R. Miller, Ph.D., Massachusetts Institute of Technology
Joel W. Russell, Ph.D., University of California (Berkeley)
Parbury P. Schmidt, Ph.D., University of Michigan
Michael D. Sevilla, Ph.D., University of Washington
Robert L. Stern, Ph.D., Johns Hopkins University
R. Craig Taylor, Ph.D., Princeton University

Assistant Professors:

Kathleen Moore, Ph.D., Wayne State University
Jeffrey Rosenthal, Ph.D., Purdue University
Willard St. John, Ph.D., Johns Hopkins University

Adjunct Professor:

Philip Weiss, Ph.D., New York University

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 to Course

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 377.

CHM 442 Physical Chemistry II (4)

Microscopic studies of chemical systems with basic principles of quantum and statistical mechanics, and properties related to molecular structure.

Prerequisite: CHM 441.

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 304 or 335.

CHM 457 Biochemistry Laboratory (1 or 2)

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

Prerequisite or corequisite: CHM 453.

CHM 458 Biochemistry Projects (2)

Advanced project-oriented instruction in biochemical laboratory techniques.

Prerequisite: CHM 457 and permission of instructor.

CHM 462-463 Inorganic Chemistry (2 each)

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 442.

CHM 466 Inorganic Synthesis Laboratory (2)

Synthesis, analysis and characterization of inorganic and organometallic compounds.

Prerequisite: CHM 339; 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 304 or 334.

CHM 477 Macromolecular Laboratory (2)

Introduction to the synthesis and physical characterization of synthetic polymers.

Prerequisite: CHM 339, and 307 or 338.

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 441.

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 441.

CHM 534 Advanced Organic Chemistry (3)

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

Prerequisite: CHM 335.

CHM 535 Topics in Organic Chemistry (3)

Selected subjects drawn from modern research fields.

Prerequisite: CHM 335.

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 442.

CHM 541 Advanced Physical Chemistry (3)

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

Prerequisite: CHM 442.

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 442.

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 335.

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

Prerequisite: Permission of department.

DEPARTMENT OF ENGLISH

Chairperson: Joseph W. DeMent

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
Donald E. Morse, Ph.D., University of Connecticut
William Schwab, Ph.D., University of Wisconsin
Gertrude M. White, Ph.D., University of Chicago

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
Daniel H. Fullmer, Ph.D., University of Michigan
Nigel Hampton, Ph.D., University of Connecticut
David W. Mascitelli, Ph.D., Duke University
Brian F. Murphy, Ph.D., University of London
Joan G. Rosen, M.A., Wayne State University
Helen J. Schwartz, Ph.D., University of Washington

Assistant Professor:

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

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

Admission to Course

Admission to either of 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 letters. 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. The M.A.T. 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.

When students of specially recommended ability, but with insufficient background—in extent or balance of previous studies—are admitted, they will be advised on improving 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 a graduate English adviser.

THE MASTER OF ARTS IN ENGLISH

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

The basic curriculum is rather prescriptive, directing the student's attention not so much to literary materials or specialization in a historical period, but to major critical approaches. Opportunity is offered for scholarly, pedagogical, and creative application of basic approaches to literature and language. The program is of use to those whose eventual goal is the Ph.D. degree, but it is primarily directed to the needs of English teachers in advanced high school classes and to those preparing for teaching in junior and community colleges.

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.

THE MASTER OF ARTS WITH ENGLISH LANGUAGE CONCENTRATION

The program leading to the degree of Master of Arts with English language concentration is not a separate degree program but a concentration within the

Master of Arts in English program. The Master of Arts with English language concentration is provided for students who wish to study linguistic theory and the structure and history of the English language on the graduate level.

Admission to Course

Any students admitted into the M.A. program may, in consultation with their advisers, arrange a program with English language concentration. The only added 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 also be accepted.

Requirements for the Degree

Nine courses (36 credits) are required, six of which are specified in the normal program: the two undergraduate courses from the above list (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 other three courses will be elected from graduate offerings in English literature. The standard program may be modified for an individual student depending on background and interests.

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, five of which are specified: ENG 510, two 600-level courses in English; one course chosen from the following five alternates: ED 601, ED 602, ED 603, ED 604, or ED 605, described on page 123, and 65. The four remaining English courses are to be chosen in consultation with the student's program 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)

Core courses are designed to familiarize the student with principal approaches to language and literature and with methods and tools appropriate to those approaches. The department considers these courses to be central to the graduate program and recommends that the student take at least four of them. They should be considered as helpful aids in coping with the more specialized work of the seminars. Each of these courses will be offered at least once a year. (ENG 500, 510, and 597 are specialized courses, 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 modest 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, and candidates are advised to register for ENG 690 any time after they complete 12 credits. The course is open only to students who can propose an independent project and have made arrangements with a member of the department interested in supervising it. Applications for ENG 690 are available in the department office. They must be used by students submitting a conspectus of the project and seeking approval to proceed.

4. Summer Institutes

Concentrated four-week institutes on literature, language, writing, and other topics of interest to high school teachers and post-baccalaureate students are offered in summer session. They are designed as refresher courses or as introductions to topics of particular contemporary concern. Institutes grant four hours of graduate credit 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 (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 (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 course for M.A. in English.

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.

ENG 543 Literary History: 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 Literary History: 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 Literary History: 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 Literary History: Special Topics (4)

As designated by instructor.

ENG 563 Literary Kinds: 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 Literary Kinds: Drama (4)

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

ENG 565 Literary Kinds: Poetry (4)

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

ENG 566 Literary Kinds: 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.

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 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

PSY 510

PSY 512

Politics in Education (4)

Developmental Psychology (4)

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
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

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

THE MASTER OF ARTS IN HISTORY

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

Admission to Course

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 gradu-

ate 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 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 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 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.

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

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 TO COURSE

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, 3, and 5 (below) must demonstrate knowledge of a foreign language normally equivalent to completion of the 214-215 sequence at Oakland University (second-year proficiency) before admission to candidacy.

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.

DEGREE REQUIREMENTS

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 five: linguistic theory, teaching language arts, teaching English to speakers of other languages, language development in children, and teaching other languages to native speakers of English. At least 20 credits (five courses) of work must be in the area of specialization. The specialization in teaching language arts is designed primarily for secondary school teachers; the specialization in language development in children is designed primarily for elementary school teachers.

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.

The department will offer LIN 501 each fall and LIN 580 each winter, in the late afternoon or evening. LIN 680 will be offered as necessary. Since there is no minimum enrollment in LIN 690, students may arrange for the course on a tutorial basis.

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 3) 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 601 The History of Linguistic Theory
LIN 603 Advanced Phonology
LIN 604 Advanced Syntax
LIN 610 Contrastive Studies in Language
Elective at the 500 level
2. **Teaching Language Arts (24 credits)**
LIN 500 Practical Linguistics for English and Language Teachers
LIN 601 The History of Linguistic Theory
ENG 647 Studies in the Structure of English
or LIN 604 Advanced Syntax

- ALS 535 Psycholinguistics
 or ALS 576 Sociolinguistics
 ED 500 Foundations of Reading Instruction
 or ENG 510 Literature and Composition
 Elective
3. **Teaching English to Speakers of Other Languages (26 credits)**
 ALS 428 The Teaching of English as a Second Language
 and concurrently
 ALS 429 Practicum
 ALS 528 Bilingualism or ALS 576 Sociolinguistics
 LIN 401 Phonetics
 LIN 500 Practical Linguistics for English and Language Teachers
 LIN 610 Contrastive Studies in Language
 Elective at the 500 level
4. **Language Development in Children (24 credits)**
 ALS 420 Linguistics and Reading
 ALS 534 Language Development in Children
 ALS 535 Psycholinguistics, ALS 540 The Biology of Language,
 or ALS 560 Neurolinguistics
 ED 500 Foundations of Reading Instruction
 PSY 510 Developmental Psychology
 Elective
5. **Teaching Other Languages to Native Speakers of English (24 credits)**
 LIN 500 Practical Linguistics for English and Language Teachers
 LIN 502 Historical Linguistics
 ALS 520 Applied Linguistics
 LIN 600 Special Topics in Linguistics
 or LIN 610 Contrastive Studies in Language
 One 400-level LIN course
 Elective

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 520 Applied Linguistics (4)

A series of sections in French, German, Russian, and Spanish are offered. Identical with FRH, GRM, RUS, and SPN 320.

Prerequisite: Completion of foreign language at 215 level or equivalent.

ALS 528 Bilingualism (4)

Survey of cultural and psycholinguistic aspects of bilingualism. Topics include bilingualism and intelligence, bilingual-bicultural education, maintenance of individual and communal bilingualism. The course will examine world-wide examples, but will be of special relevance to minority language groups in the U.S.

Prerequisite: One course in ALS or LIN.

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 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. Identical with SCN 401.

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 580.

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 Studies in Language (4)

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

Prerequisite: LIN 580.

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
J. Curtis Chipman, Ph.D., Dartmouth College
Jon Froemke, Ph.D., University of California (Berkeley)
Jerrold W. Grossman, Ph.D., Massachusetts Institute of Technology
Louis J. Nachman, Ph.D., Ohio State University
Irwin Schochetman, Ph.D., University of Maryland

Assistant Professors:

Beth Barron, Ph.D., Michigan State University
Charles Ching-an Cheng, Ph.D., Rutgers University
David J. Downing, Ph.D., University of Illinois
Subbaiah Perla, Ph.D., University of Rochester
Darrell P. Schmidt, Ph.D., Montana State University
Nancy Shoemaker, Ph.D., Rensselaer Polytechnic Institute
Sze-kai Tsui, Ph.D., University of Pennsylvania
J. Barry Turett, Ph.D., University of Illinois
Stuart Wang, Ph.D., Cornell University
Stephen J. Wright, Ph.D., Indiana University

Visiting Assistant Professors:

K.H. Lin, Ph.D., Wayne State University
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 Master of Arts in Teaching program is jointly sponsored by the College of Arts and Sciences and the School of Human and Educational Services. It has two tracks: one to serve teachers in secondary schools and community colleges, and the other for teachers in elementary schools.

THE MASTER OF ARTS IN TEACHING IN MATHEMATICS— SECONDARY EDUCATION OPTION

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 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 mathe-

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

THE MASTER OF ARTS IN TEACHING IN MATHEMATICS—ELEMENTARY EDUCATION OPTION

The program leading to the M.A.T. in mathematics for teachers with K-8 certification serves teachers in elementary and middle schools in southeast Michigan. It prepares people for leadership positions in mathematics teaching in those schools and in determining directions of curriculum development.

Students normally pursue this program on a part-time basis. During the fall and winter semesters they generally take a single course which meets in the late afternoon or evening. Participation in the eight-week summer session, on the other hand, is usually full-time. Following this schedule, a student can satisfy the degree requirements in about two and one-half years.

Requirements for the Degree

The requirement for the degree is 36 credits of graduate work. In general, the candidate will take six 4-credit courses arranged by the department's Committee on Graduate Programs and three 4-credit courses in education and psychology (see below). Among the courses arranged by the committee there must be 4 credits in independent study (MTH 590), either in mathematics or an interdisciplinary area involving mathematics, to be concluded with a written report. Candidates orally present their reports before a joint committee of mathematics and education faculty, and the presentation and defense of the project are integral parts of the independent study. This committee is formed when candidates begin their independent study.

Each candidate's program is supervised by the committee, which assists in formulating a meaningful plan of action for the candidate.

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.

Mathematics courses designed for the program include MTE 610, 614, 615, 617, 618, 621-622, 625, and 628. The program assumes that students have had the equivalent of MTE 511 and 512 as prerequisites. Students without this background must take these courses or their equivalents before entering the degree program.

The education and psychology courses are chosen to suit the needs and interests of the degree candidate. The candidate will take a total of three courses from the following groups, including at least one course from each of group one and group two.

Group 1 (Psychology)	Group 2 (Curriculum)	Group 3 (General)
PSY 510	ED 512	ED 500
PSY 512	ED 513	ED 503
PSY 513	ED 583	ED 571
ED 562	ED 584	ED 580
ED 501		ED 585
ED 591		ED 589

Other education and psychology courses may be elected with permission of the adviser.

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 to the Program

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 530, and CIS 511

Alternative 1. (32 credits)

APM 535-536, APM 563-564, STA 525-526, CIS 530, 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 531 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 to the Program

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.

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)

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 461-462 Topology (4 each)

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.

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 to the Program

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.

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)

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

MTH 461-462 Topology (4 each)

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 516 Computers and Secondary Mathematics (4)

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 431 Elements of Partial Differential Equations (4)**

Derivation of partial differential equations of physics, characteristic surfaces and classification, Fourier methods, Laplace transforms, orthogonal functions, initial and boundary value problems, the Reimann method, and numerical methods.

APM 435 Introduction to Mathematical Science (4)

The mathematical structures of scientific phenomena, differential equations and dynamical systems, partial differential equations of the physical and life sciences, and 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)

An introductory course in 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 The Master's Project (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 442-443 Mathematical Methods of Operations Research (4 each)

Decision problems in operations research, classical optimization techniques, mathematical programming, queueing theory, game theory, graphs, and networks.

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)

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 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 590 Directed Reading and Research (2, 3, 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 Reading Development in Junior and Senior High Schools (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 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 Professor:

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
Michael Chopp, Ph.D., New York University

Adjunct Professors:

Adrian Kantrowitz, M.D., Long Island College of Medicine
Gifford G. Scott, Sc. D. (Honorary)

Adjunct Associate Professor:

Norman H. Horwitz, Ph.D., Wayne State University

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 to Course

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.

THE MASTER OF SCIENCE IN MEDICAL PHYSICS

The Department of Physics, in conjunction with the Center for Health Sciences, offers a Master of Science program in medical physics. Approximately half the work is in physics and half in a clinical setting. Details, requirements, and course descriptions begin on page 137.

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 cerebral spinal fluids, 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 CO_2 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, CO_2 chamber which simulates the Martian atmosphere. Research facilities of neighboring hospitals are also available for medical physics topics. Supporting facilities include an electronics shop staffed by experienced instrument makers. Computer facilities include a Honeywell DPS-2 time-sharing computer, a Nova II mini-computer, two Tektronix 4051 graphics computers, and two Apple-2 micro-computers.

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. Offered winter only. 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 oscil-

lations, 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 (2)**

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 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 Research (2 to 12)

DEPARTMENT OF POLITICAL SCIENCE

Chairperson: Thomas W. Casstevens

Director of Public Administration Program: Roger H. Marz

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:

Thomas W. Church, Ph.D., Cornell University
Robert J. Goldstein, Ph.D., University of Chicago
James R. Ozinga, Ph.D., Michigan State University

Assistant Professors:

Brian W. Coyer, Ph.D., Michigan State University
Vincent B. Khapoya, Ph.D., University of Denver
William A. Macauley, Ph.D., University of Houston
Nathan H. Schwartz, Ph.D., Cornell University
Donald S. Schwerin, Ph.D., University of Minnesota

Instructors:

John Alford, M.A., University of Iowa; M.P.A., University of Houston
Sharon T. Thomas, M.A., University of Houston

Visiting Instructors:

Karen L. Beckwith, M.A., Syracuse University
John R. Hibbing, M.A., University of Iowa

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 Requirements

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 602	Public Administration: Issues and Problems	4
	A course in quantitative techniques*	4
PA 621	Government Information Systems	4
PA 653	Public Budgeting and Finance	4
PA 654	Public Personnel Administration	4
PA 655	Public Policy Evaluation	4
Core Total		28

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

Electives	8
Internship or Project	4
Total M.P.A. Credits	40

The student is expected to complete two 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 602	Elective
	Quantitative techniques	PA 621	
Year II	PA 653	PA 655	Internship or Project
	PA 654	Elective	

Conditional and Special Graduate Status

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

Course Offerings

PA 503 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 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

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
Donald C. Hildum, Ph.D., Harvard University
Boaz Kahana, Ph.D., University of Chicago

Associate Professors:

Daniel N. Braunstein, Ph.D., Purdue University
Max Brill, Ph.D., University of Cincinnati
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
Irving Torgoff, Ph.D., University of Rochester

Assistant Professors:

Ranald D. Hansen, Ph.D., University of Connecticut
I. Theodore Landau, Ph.D., University of California, Berkeley
Keith E. Stanovich, Ph.D., University of Michigan
Robert B. Stewart, Ph.D., Pennsylvania State University
Harold Zepelin, Ph.D., University of Chicago

Visiting Assistant Professors:

Melanie Hwalek, Ph.D., Wayne State University
Cindy Marriott, Ph.D., University of West Virginia

Instructor:

Kim Dietrich, M.A., Wayne State University

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 to the Program

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

Jaqueline 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
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; 523; 525; and 537.

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

Concentration in Aspects of Health and Welfare: SOC 504; 505; 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
	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 504 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 505 Sociology 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 522 Sociology of Law (4)

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

SOC 523 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 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 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 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 540 Sociology of Youth (4)

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

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 contem-

porary 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

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Ronald M. Horwitz

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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 Hough, Ph.D., Massachusetts Institute of Technology
Sid Mittra, Ph.D., University of Florida

Associate Professors:

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Alice C. Gorlin, Ph.D., University of Michigan
Oded Izraeli, Ph.D., University of Chicago
An-lon Lin, Ph.D., University of Rochester
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Alphonso R. Bellamy, Ph.D., Purdue University
Badie Farah, Ph.D., Ohio State University
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Paul O. Kingstrom, Ph.D., Wayne State University
Howard S. Schwartz, Ph.D., Cornell University
Leonard C. Schwartz, J.D., Wayne State University
Frederic B. Shipley, Ph.D., Northwestern University
David D. Sidaway, M.Acc., Ohio State University, CPA
Diane B. Stricker, Ph.D., Cornell University

Instructors:

Lizabeth A. Barclay, M.S., Wayne State University
James E. Mallett, B.A., West Virginia Wesleyan University
Thomas R. McCarthy, Ph.D., University of Maryland
Theresa M. Spinelli, M.B.A., University of Detroit

Visiting Professor:

Jacobo A. Varela, M.A., Princeton University

Visiting Assistant Professor:

Dharam Kapil, Ph.D., University of California (San Diego)

Visiting Instructor:

George R. Hallemann, M.S., St. Louis University

Adjunct Professors:

Paul F. Lorenz, Ph.D., University of Chicago
Theodore O. Yntema, Ph.D., University of Chicago

Adjunct Associate Professor:

Douglas D. Gregory, Ph.D., Northwestern University

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. The program stresses recognized common elements in management rather than concentrating on narrow traditional specialties. 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 students who did not major in management or business administration as undergraduates. A typical entering class may consist of undergraduate majors from the social and natural sciences, engineering, and the humanities as well as from other majors. The program is based on the belief that management education should:

1. Prepare students for careers involving problem identification, problem solving, decision making, and leadership in any type of organizational setting.
2. Emphasize determination of goals and effective utilization of scarce resources to achieve these goals.
3. Help students to understand and participate in their physical and social environments.
4. Stress understanding of human behavior and organizational settings, for much of management relates to people—understanding them, communicating with them, working with them, and leading them.

Admission to Program

Admissions are selective and depend on several elements, including scholarship and an ability to communicate and interact effectively. A bachelor's degree or equivalent from an institution of recognized standing is required, except for Oakland University students admitted into the "Five-Year Track." Since the program is designed especially for students with little or no academic background in business administration, applications are welcome from students with bachelor's degrees in all arts and sciences fields, engineering, nursing, education, and other professional schools.

Students are expected to possess certain skills in basic mathematics and in the social sciences, or to demonstrate an ability to acquire these skills early in their programs. The applicant must also meet the general admission requirements for graduate study at Oakland University for the year in which he/she applies. All applications are considered by the Graduate Admissions Committee of the School of Economics and Management, which takes into account an applicant's qualifications as evidenced by his/her undergraduate record, responses to questions in the supplementary application, and scores on the Graduate Management Admission Test (GMAT). Letters of recommendation are optional but highly recommended.

There are two types of admissions made by the graduate admissions committee: 1.) to a Special Graduate status in order to complete M.B.A. pre-core course(s) and 2.) directly to the M.B.A. core program. The complete application process is required for both types of admission.

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 or more

times a year, usually in October, January, March, and July. No other test may be substituted. Information about specific examination dates and locations may be obtained by writing Educational Testing Service, Box 966 Princeton, New Jersey 08540.

Full-Time and 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 necessity of coordinating graduate study with commitments to work and/or family.

Students may begin the core program in fall semester on a full-time (usually days) or part-time (usually evenings) basis or the winter semester on a part-time basis. Full-time students normally take 12 credits (four courses) per semester in fall and winter for two years. Part-time students take six credits (two courses) per semester in fall and winter, plus one course in each spring and summer session, for three years. Because of the sequential, integrative nature of the program, students will not be permitted to take courses on a piecemeal basis. The "part-time" label should not mislead students about the workload or the commitment required for successful completion of the M.B.A. degree. All students must complete their M.B.A. requirements within six years, in keeping with Graduate School regulations.

Five-Year Track

The School of Economics and Management, in conjunction with other university schools and departments, offers a five-year track leading simultaneously to a baccalaureate in a field other than management and to the M.B.A. Under this program, a student applies for acceptance during the second semester of the junior year to allow him/her to start the M.B.A. courses in the senior year. Any student who participates in this track must satisfy all undergraduate degree requirements and can do so in part by counting the M.B.A. courses taken during the senior year as "free" undergraduate electives.

Requirements for the Five-Year Track

1. The student will apply at least a term before he/she plans to take M.B.A. courses. The student's major adviser must approve the application.
2. At the time of application for admission to the program, a student must have a GPA approximately in the top 15 percent of his/her class in the major field, as determined through consultation with the major department.
3. Upon acceptance into the program, a student is considered an undergraduate (paying undergraduate tuition) until the baccalaureate is earned and a graduate student (paying graduate tuition) thereafter.
4. Formal admission to the M.B.A. program at the end of the senior year is presumed, subject to satisfactory performance in courses taken in the fourth year.
5. Up to 18 credits applicable to the M.B.A. program may be taken in the senior year as "free" undergraduate electives. The student must take at least 33 credits after receiving the baccalaureate degree. Additional information and applications may be obtained from the M.B.A. office, School of Economics and Management.

Length of Program

The program varies from 51 to 60 credits, depending on the student's prior preparation. The core program consists of 51 credits, which must be completed by all degree candidates. In addition, students may be required to take up to 9 additional credits depending on their backgrounds:

Pre-Core Course Number and Title	Credits	Who Will Probably Need It?
MGT 500 Conceptual Foundations of Management	3	Applicants with no prior experience in business or no prior course(s) in economics or business.
QMM 501 Quantitative Methods for Management	3	Applicants with no calculus background or who need a refresher and review in math.
QMM 502 Computer Methods for Management	3	Applicants with no prior computer experience.
OR		
QMM 503 Computer Orientation	1	Applicants with knowledge of a computer language, but needing familiarization with the local computing environment.

Applicants may be required to take one or more M.B.A. pre-core courses before being admitted to the core M.B.A. program, depending on prior preparation. If so, the student will be admitted as a Special Graduate in order to complete pre-core course work. Admission to the pre-core courses requires the complete application process, including submission of GMAT scores.

In some cases, applicants may be directed to enroll in appropriate undergraduate courses prior to admission, e.g., to obtain mathematical skills. 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.

Program of Study

The core program consists of 51 credits; of these, 12 are elective credits. The School of Economics and Management does not offer formal majors within the program. However, through selection of electives or work on the optional second-year project, a student may concentrate his/her efforts in one of several areas. Resources permitting, a student may pursue advanced work in computer science, accounting, economics, finance, health care management, human resource management, marketing, quantitative analysis, or international management.

A Typical Part-Time Program (fall or winter* entry)

FIRST YEAR

Semester 1 (fall)

QMM 510 Statistical Analysis for Managers

ACC 511 Financial Accounting

Semester 3 (spring and summer sessions)

QMM 521 Operations Management

ACC 512 Managerial Accounting Systems

SECOND YEAR

Semester 4 (fall)

FIN 533 Managerial Finance

QMM 524 Management Info Systems

Semester 6 (spring and summer sessions)

ECN 522 Macroeconomic Analysis

ORG 531 Human Resources Management

Semester 2 (winter)

ECN 520 Microeconomic Decision Analysis

ORG 530 Organizational Behavior

Semester 5 (winter)

MGT 550 Legal Environment of Business

MKT 560 Marketing

THIRD YEAR

Semester 7 (fall)

MGT 535 Policy, Strategy, and Goals

ELECTIVE

Semester 8 (winter)

ELECTIVE

ELECTIVE

Semester 9 (spring session)
ELECTIVE

*This example schedule applies to entering fall semester students; for students entering winter semester appropriate modifications should be made.

A Typical Full-Time Program (fall entry)**

FIRST YEAR

Semester 1 (fall)

QMM 510 Statistical Analysis for Managers
ACC 511 Financial Accounting
ECN 520 Microeconomic Decision Analysis
ORG 530 Organizational Behavior

Semester 3 (spring and summer sessions)
ELECTIVE(S)

SECOND YEAR

Semester 4 (fall)

FIN 533 Managerial Finance
QMM 524 Management Info Systems
MKT 560 Marketing
ECN 522 Macroeconomic Analysis

Semester 2 (winter)

ACC 512 Managerial Accounting Systems
MGT 550 Legal Environment of Business
QMM 521 Operations Management
ORG 531 Human Resources Management

Semester 5 (winter)

MGT 535 Policy, Strategy, and Goals
ELECTIVE
ELECTIVE
ELECTIVE

**If a full-time student wishes to advance the program completion date, it is possible to take more electives in the spring and summer sessions after the first year.

Time of Admission

The part-time core program begins in both fall and winter semesters. The full-time core program begins only in the fall semester. Please note that only students with appropriate backgrounds and skills may expect to start the core program immediately. Pre-core preparatory courses are offered in spring, summer, fall, and winter terms.

Applicants who wish to enter the core program in fall are advised to complete their applications before March 31. To start the core program in winter, applications should be submitted by July 31. However, qualified students may be admitted through the week before classes start if space is available.

Candidates should take the GMAT at least one month before submitting their applications for admission to allow time for the scores to be sent to Oakland University.

Master's Project (Optional)

The guiding principle behind the optional master's project (equal to six elective credits) is that it is to be a meaningful experience within the professional and educational goals of the M.B.A. program for students who choose to go beyond the list of available electives. The project requires 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. It is not conceived as a theoretical master's "thesis." It should not be directed at a specific academic discipline, but rather should be organized around a management problem which probably has input from more than one academic source, although one discipline may still be dominant.

The student designates a faculty project adviser, with the adviser's approval, as well as a second faculty person to act as the reader. The reader may be from another discipline. A copy of a project proposal with their signatures should be delivered to the project course coordinator during the first week of the semester in which the project course is taken. The proposal should contain a brief description of the problem, the host organization and the name and telephone number of the contact person, expected analytical techniques, anticipated difficulties, if any, and strategies

for overcoming them, a preliminary outline, and required method of data collection.

Student joint projects are acceptable if each team member identifies a specific aspect of the problem for which he/she will be responsible and writes an individual report. Such allocations of problem areas should be identified in proposals of joint projects. Proposals involving teams of more than two members will be accepted only after careful scrutiny.

An interim progress report signed by the student's advisers will be submitted to the project coordinator by the end of the seventh week of the semester in which the student has enrolled for the project.

No projects will be accepted to satisfy graduation requirements for a particular semester after the Friday two weeks before the last day of classes. A project is deemed acceptable and complete when the adviser and reader have signed the title page. Three final copies of the project report containing these signatures are submitted to the graduate program coordinator. One is kept on file in the School of Economics and Management, one is sent to the Graduate School, and one is returned to the project adviser.

The project is graded "S" (satisfactory) or "U" (unsatisfactory). A grade of "P" (progress) may be assigned if the project is not completed at the semester's end, and if sufficient progress has been made to warrant the "P" grade.

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. Even if students leave the program voluntarily and in good standing, readmission is not automatic.

Course Exemptions

The M.B.A. program permits exemption of specific courses for qualified students. Generally, the minimum requirement for exemption is a grade of 3.0 or better earned recently in an equivalent graduate-level course. This is not automatic, however, and the method of evaluation may include an examination. Course exemption forms are available in the M.B.A. office. If a student is exempted from a course, the student must replace this course with electives to meet the credit requirement for the degree.

COURSE OFFERINGS

PRE-CORE COURSES

MGT 500 Conceptual Foundations of Management (3)

Lectures and essays designed to provide an overview of the economic, legal, and financial management decision-making environments. Includes discussion of the role of theory in approaching unstructured problems.

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

QMM 501 Quantitative Methods for Management (3)

Theory and application of mathematical skills required for core courses in the graduate program. Includes general review of linear models, calculus, probability, and their applications

in management.

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

QMM 502 Computer Methods for Management (3)

Introduction to computing concepts and the BASIC program language. Familiarization with the local computing environment, including software packages such as EXPLORE, SPSS, BMDP, and MINITAB.

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

QMM 503 Computer Orientation (1)

Familiarization with the local computing environment, including software packages such as EXPLORE, SPSS, BMDP, and MINITAB.

Prerequisite: Admission to the M.B.A. program and knowledge of a computing language.

CORE COURSES

All core courses require successful prior completion of above pre-core courses or equivalents. The core courses must be taken by all M.B.A. students.

ACC 511 Financial Accounting (3)

Focus is on financial accounting for external reporting; communications addressed to shareholders, government agencies, potential investors, and the public.

ACC 512 Managerial Accounting Systems (3)

Emphasizes recording, reporting, and use of data within the enterprise. Cost accounting, budgeting, and internal control systems are stressed. The approach is strongly influenced by current research on the behavioral impact of accounting instruments, rather than solely on their mechanics.

Prerequisite: ACC 511.

ECN 520 Microeconomic Decision Analysis (3)

Analysis of microeconomic decision makers in a market environment. Includes consumer theory, models of the firm, production processes, costs, pricing, resource allocation, markets, and industry structure. Models of decision making under certainty, and introduction to decisions under uncertainty.

Prerequisite: QMM 510.

ECN 522 Macroeconomic Analysis (3)

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

Prerequisite: QMM 510.

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: QMM 510, ACC 512, ECN 520.

MGT 535 Policy, Strategy, and Goals (3)

Application of management tools of economics, statistics, organizational behavior, accounting, marketing, finance, and quantitative methods to the systematic analysis of organizational case studies.

Prerequisite: Completion of 36 credits in the M.B.A. core program.

MGT 550 The Legal Environment of Business (3)

The legal framework in which business decisions are made, and the types of economic conflict and political activity which created this framework. Topics include contracts, antitrust legislation, conflict resolution, and regulatory agencies.

Prerequisite: ECN 520.

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 orientation.

Prerequisite: QMM 510, ECN 520, ORG 530.

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: 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: QMM 510, ECN 520, ORG 530.

QMM 510 Statistical Analysis for Managers (3)

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

QMM 521 Operations Management (3)

Economic problems of production management in manufacturing and service industries, such as inventory management, quality control, plant and equipment investment, facility location, optimization, and operations scheduling. Qualitative problems of the production environment are also considered.

Prerequisite: QMM 510, ECN 520

QMM 524 Management Information Systems (3)

Evolution of an information system; elements and operation of the management information system; what the manager should know about the computer; computer-based information systems for decision making; planning management information systems, and management information system selection.

Prerequisite: ACC 512, ECN 520, ORG 530.

ELECTIVE COURSES

Depending on student interests and availability of resources, electives may be offered from the following list. Except by permission of instructor, all electives require prior completion of at least 24 M.B.A. credits numbered 510 or higher plus whatever specific prerequisites may be listed.

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: 24 M.B.A. core credits, including ACC 511 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: 24 M.B.A. core credits, including ACC 511 and ACC 512.

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

The nature, origin, and workings of the SEC, ICC and others as related to the accounting profession are examined. The characteristics and objectives of not-for-profit entities are analyzed and used to identify and define the basic concepts of accounting for funds.

Prerequisite: 24 M.B.A. core credits, including ACC 511 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) and similar standard-setting committees of the accounting profession will be examined.

Prerequisite: 24 M.B.A. core credits, including ACC 511 and ACC 512.

ACC 615 Tax Accounting (3)

The concepts of taxation. The essential logic underlying the federal tax laws will be developed. The class will analyze individual and corporate income tax laws rather than train students to prepare current-year tax returns.

Prerequisite: 24 M.B.A. core credits, including ACC 511 and ACC 512.

ACC 616 Contemporary Accounting Issues (3)

This course considers implications of recent scholarly infusions from disciplines such as

organizational behavior, economics, sociology, and anthropology. Topics include the changing role of the accountant in response to current social and legal demands for nonfinancial reporting.

Prerequisite: 24 M.B.A. core credits, including ACC 511 and ACC 512.

ACC 618 Computer-Based Accounting and Systems (3)

Examination of computer applications in accounting integrated with related operating and sales data procession. Internal control features are stressed. Also an introduction to computer hardware, software, and data systems analysis, development, and implementation.

Prerequisite: 24 M.B.A. core credits, including ACC 511, ACC 512, and QMM 502 or its equivalent.

ACC 690 Independent Study in Accounting (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

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. There follows a discussion of the relative merits of obtaining funds for company growth through stocks, bonds, and retained earnings.

Prerequisite: 24 M.B.A. core credits, including FIN 533.

FIN 618 Portfolio Analysis (3)

Comprehensive treatment of important aspects 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: 24 M.B.A. core credits, including FIN 533.

FIN 620 Money and the Financial System (3)

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: 24 M.B.A. core credits, including ECN 522.

FIN 627 Multinational Finance and Accounting (3)

Capital markets, ownership strategies, project evaluation, account consolidation, and auditing across national and currency boundaries.

Prerequisite: 24 M.B.A. core credits, including FIN 533 and ECN 522.

FIN 642 Cases in Managerial Finance (3)

Cases in financial management applying and expanding the principles taught in FIN 533.

Prerequisite: 24 M.B.A. core credits, including FIN 533.

FIN 690 Independent Study in Finance (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

MGT 611 Master's Project (6)

Independent elective project undertaken to fulfill degree requirements.

Prerequisite: 24 M.B.A. core credits and permission of instructor.

MGT 624 International Management Environment (3)

Deals with the diverse economic, political, cultural, and legal environments confronting the multinational firm. National controls, conflict management, extraterritoriality, foreign-exchange exposure, ownership strategies, and planning are emphasized.

Prerequisite: 24 M.B.A. core credits, including ECN 522.

MGT 626 Managing the Multinational Enterprise (3)

Analysis of the scope, structure, and strategies of the multinational enterprise. Strategic planning, production and distribution logistics, selection of technology, shifting targets, transfer prices, political risk forecasting, and control of international strategy.

Prerequisite: 24 M.B.A. core credits, including ECN 522 and FIN 533.

MGT 630 Legal Environment of Personnel Decisions (3)

Summarizes major bodies of law which affect personnel-related business decisions. Included in this survey is wage and hour law, equal employment opportunity law, occupational health and safety law, and employees' personal rights.

Prerequisite: 24 M.B.A. core credits, including MGT 550 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: 24 M.B.A. core credits, including ORG 531.

MGT 640 Visiting Managers Forum (3)

Informal discussions with leaders of industry, labor, government, and not-for-profit organizations. With faculty consultation, students will organize and carry out the forum. Includes class time for planning the forum and making reports and analyses.

Prerequisite: 24 M.B.A. core credits.

MGT 660 Launching and Managing Small Businesses (3)

The role of small businesses in the U.S. economy, and the role and functions of the small business administration. Evaluating franchise opportunities, consulting as a business, and launching, financing, and managing a small enterprise. A significant term project is required.

Prerequisite: 24 M.B.A. core credits.

MGT 667 Health Care Organization (3)

Application of the tools of economic analysis to the health care industry and government health care policy. Proposed changes in the current system, such as national health insurance, and benefit/cost analysis applied to public policy problems such as the public funding of medical research are examined.

Prerequisite: 24 M.B.A. core credits, including QMM 521.

MGT 670 Nonprofit Sector Management (3)

Managerial principles for and cases on the management of nonprofit institutions. Goal setting, progress evaluation, cost-benefit analysis, program design, and financing.

Prerequisite: 24 M.B.A. core credits.

MGT 690 Independent Study in Management (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

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 economic factors, and culture are also examined.

Prerequisite: 24 M.B.A. core credits, including 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: 24 M.B.A. core credits, including MKT 560.

MKT 680 Seminar in Marketing (3)

Applications of recent theoretical and empirical findings in marketing. Student works on a project in cooperation with local firms, where he applies the tools acquired in marketing and related courses to a current managerial problem.

Prerequisite: 24 M.B.A. core credits, including MKT 560.

MKT 690 Independent Study in Marketing (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

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: 24 M.B.A. core credits.

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: 24 M.B.A. core credits.

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: 24 M.B.A. core credits.

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: 24 M.B.A. core credits, including ORG 531.

ORG 690 Independent Study in Organizational Behavior (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

QMM 605 Advanced Systems Analysis (3)

Topics in the modeling, instrumentation, and control of complex systems. Emphasis is on specification, testing, and implementation of policies in environments in which direct controls must be foregone in favor of educational control policies.

Prerequisite: 24 M.B.A. core credits.

QMM 650 Operations Research I (3)

Topics in deterministic modeling of managerial decision problems from advanced linear programming. Designed to refine the student's scientific problem-solving skills with emphasis on applications of these techniques.

Prerequisite: 24 M.B.A. core credits, including QMM 521.

QMM 651 Operations Research II (3)

Topics in modeling of decisions under uncertainty from Bayesian analysis, personal assessment of probability distributions and utility function, simulation, chance-constrained programming, queueing theory, and Markovian analysis. Designed to refine the student's scientific problem-solving skills with emphasis on applying these techniques.

Prerequisite: 24 M.B.A. core credits, including QMM 650.

QMM 652 Forecasting and Simulation (3)

Survey of forecasting methods and introduction to simulation. Attention is given to evaluation forecast accuracy and managerial uses of forecast information. Introduction to simulation and dynamic modeling with extensive computer applications and econometric case studies.

Prerequisite: 24 M.B.A. core credits.

QMM 655 Econometric Data Analysis (3)

Formulation, estimation, and testing of statistical models with standard computer packages such as SPSS. Students undertake independent investigations with in-class discussion of findings. Topics include specification problems, analysis of residuals, recognition of common regression problems and their cures, and dummy variable techniques.

Prerequisite: 24 M.B.A. core credits.

QMM 690 Independent Study in Quantitative Methods (3)

Independent individual research on a topic chosen by the student. The student must contact and receive approval from a faculty member in the subject area prior to registering for this course. Offered every semester.

Prerequisite: 24 M.B.A. core credits and prior approval of the instructor.

SCHOOL OF ENGINEERING

Office of the Dean:

Mohammed S. Ghausi, *Dean and John F. Dodge Professor of Engineering*
Howard R. Witt, *Associate Dean*

Professors:

David H. Evans, Ph.D., Brown University
Mohammed S. Ghausi, Ph.D., University of California (Berkeley)
William G. Hammerle, Ph.D., Princeton University
Richard E. Haskell, Ph.D., Rensselaer Polytechnic Institute
John Carroll Hill, Ph.D., Purdue University
Joseph D. Hovanesian, Ph.D., Michigan State University
Keith R. Kleckner, Ph.D., Cornell University
Nan K. Loh, Ph.D., University of Waterloo
Gilbert L. Wedekind, Ph.D., University of Illinois
Howard R. Witt, Ph.D., Cornell University

Associate Professors:

David E. Boddy, Ph.D., Purdue University
Robert H. Edgerton, Ph.D., Cornell University
Donald R. Falkenburg, Ph.D., Case Western Reserve University
Yau Yan Hung, Ph.D., University of Illinois
Glenn A. Jackson, Ph.D., University of Michigan
Ronald R. Mourant, Ph.D., Ohio State University
Dhiraj Pradhan, Ph.D., University of Iowa
Peter Stavroulakis, Ph.D., New York University
Sarma R. Vishnubhotla, Sc.D., Washington University
Tung H. Weng, Ph.D., University of Missouri

Assistant Professors:

Osman D. Altan, Ph.D., University of California (Berkeley)
Bhushan L. Bhatt, Ph.D., Oakland University
Mohammed A. Zohdy, Ph.D., University of Waterloo

Special Instructor:

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

Visiting Associate Professors:

Janusz W. Laski, Ph.D., Technical University of Gdansk
Kajiyo Watanabe, Ph.D., Tokyo Institute of Technology

Visiting Assistant Professor:

Ahmed N. Tantawy, Ph.D., University of Grenoble

Adjunct Professors:

Martin A. Erickson, M.M.E., Chrysler Institute of Engineering
Ralph M. Grant, Ph.D., Technical University of Netherlands
Michael Marcotty, B.S., University of Reading
Kenneth A. Meade, Sc.D. (Honorary), Eastern Michigan University and Oakland University

Adjunct Assistant Professors:

Ronald R. Beck, Ph.D., University of Iowa
Frank W. Bliss, Ph.D., Case Western Reserve University
Susanne M. Gatchell, Ph.D., University of Michigan
Josette Morel, Ph.D., Illinois Institute of Technology
Ranjit K. Roy, Ph.D., University of Missouri

The School of Engineering offers work leading to the Master of Science degree in electrical and computer engineering, mechanical engineering, systems and industrial engineering, and computer and information science, and the Doctor of Philosophy degree in systems engineering.

The School of Engineering is housed in the Dodge Hall of Engineering, 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 and computer-aided design. Students have access to the various computing facilities of the School of Engineering and the university's Honeywell 68/DPS-2 MULTICS system which is used in both time-sharing and batch modes. Fully equipped and staffed electronics and machine shops complement these facilities.

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 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 to Course

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 Aptitude and Advanced Engineering 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 change of status/curriculum form, available from the Graduate School, 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. After completing 12 credits toward the Ph.D. at Oakland, the student must form an advisory committee which will direct and guide the progress of his/her program. 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.
2. One member appointed by the dean of engineering.
3. Upon recommendation of the advisory committee, following successful completion of the 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 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. The student must formulate a Plan of Study and secure the approval of his/her doctoral advisory committee. 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, the doctoral student has been required to be a full-time student for the one or two years of his/her 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. The student must plan his/her research program 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 the student and his/her 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.

Preliminary Examination: After admission to the Ph.D. program and before earning more than 12 credits toward the Ph.D., the student must pass a preliminary examination administered by the advisory committee. The examination has both oral and written components and covers basic engineering concepts. This examination assesses the student's analytical reasoning ability which is essential to later Ph.D. research. The advisory committee may ask a student to repeat the examination in a subsequent semester if his/her performance is deemed inadequate. No additional repeat examinations are 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. The candidate must orally present the proposal to his/her advisory committee and any other interested faculty, at which time the committee may question his/her preparedness 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 799. At least 24 credits in EGR 799 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.

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 to Course

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.

Admission to master's study is selective; applicants should have a GPA of 3.0 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 Aptitude 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 92.

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.

Probationary 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. Probationary status may be granted for one semester; the minimum requirement for continuation in the program is a GPA of 3.0 for the probationary 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. Credits earned as a special student do not apply toward the Master of Science from Oakland University unless the student subsequently trans-

fers 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 a "change of status/curriculum form," available from the Graduate School, 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 heavily the applicant's performance at Oakland. A 3.0 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 his/her master's adviser, who is a School of Engineering faculty member nominated by the student and approved by the dean of engineering. 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 engineering graduate committee, 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 16 credits per semester. Students holding half-time assistantships in the School of Engineering normally register for 8 to 12 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.

Review of Progress

In the semester following completion of 16 graduate credits, each student's progress will be reviewed by the Office of the Dean of Engineering. Students whose cumulative grade point averages at this point are below 3.0 will be recommended for termination from the program unless excepted by special petition.

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 training 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 one of these 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 3.0 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. As part of the requirements the student must complete two courses in at least two of the depth areas appropriate to the program.
4. complete at least 4 credits in mathematics as follows: mechanical engineering—MTH 531 or 532; electrical and computer engineering and systems and industrial engineering—APM 431, MTH 531, 532, or 555-556.

Electrical and Computer Engineering Requirements

Depth Area: A minimum of two depth areas with at least two courses in each depth area.

Devices

ECE 584	Solid-State Electronic Devices
ECE 682	Field-Effect Devices
ECE 784	Microwave Solid-State Devices

Controls

SYS 520	Signal and System Representation
SYS 630	Optimal Control Theory

Communication Systems

ECE 534	Principles of Data Communications
ECE 535	Information Theory and Coding in Digital and Computer Communications
ECE 633	Signal Detection and Estimation Theory

Microprocessors

ECE 570	Microprocessors and Microcomputers
ECE 571	Microprocessor Systems Applications

Computer Design

ECE 518	Switching Theory and Sequential Machines
ECE 564	Computer Organization and Architecture
ECE 568	Fault-Tolerant Computing

Computer Systems

CIS 550	Operating Systems
ECE 567	Computer Networks
ECE 665	Parallel and Distributed Processing

Mathematics: At least 4 credits but not more than 8 credits from the approved list of mathematics courses.

Electives: Remaining courses must be taken from those listed under the ECE depth areas or from the following approved electives (24 credits in the program must be in EGR, ECE, SYS or CIS courses): EGR 594, 595, 690, 794, 795; ECE 587, 588, 625, 633, 637, 725, 726, 741, 745; SYS 517, 532, 558, 569, 634, 722, 731, 732, 734; CIS 513, 517, 518, 542; PHY 562, 574, 583, 673.

Mechanical Engineering Requirements

Depth Area: Minimum of two two-course sequences.

Energy Systems

ME 582* Fluid and Thermal Energy Systems
and one of the following:

ME 554* Solar and Alternate Energy Systems
ME 555* Combustion Processes
ME 556* Energy Systems Analysis

Thermal Energy Transport

ME 548* Thermal Energy Transport
ME 648 Thermal Transport Phenomena

Fluid Transport

ME 538* Fluid Transport
ME 638 Convective Transport Phenomena

Solid Mechanics

ME 663 Applied Elasticity
and one of the following:
ME 524 Vibration Analysis
ME 569 Finite Elements

Experimental Stress Analysis

ME 565 Stress Analysis
ME 665 Experimental Stress Analysis

Required Course: ME 521 Dynamics or ME 582 Fluid and Thermal Energy Systems

Mathematics: MTH 531 or MTH 532 Mathematical Methods in Engineering I or II.

Electives: Remaining courses must be taken from those listed under the ME depth areas or from the following approved electives (24 credits in the program must be in EGR, ME, SYS or CIS courses): EGR 594, 595, 690, 794, 795; ME 561, 572, 610; SYS 520, 557, 630; CIS 517, 518.

Courses in engineering, mathematics, physics, and chemistry appropriate to the student's plan of study, but with 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

Depth Area: Minimum of two depth areas with at least two courses in each depth area.

Control Systems

SYS 520 Signal and Systems Representation
SYS 630 Optimal Control Theory

Industrial Engineering/Operations Research

SYS 569 Simulation in Engineering
SYS 581 IE/OR: Deterministic Systems
SYS 682 IE/OR: Stochastic Systems

Digital Systems

ECE 570 Microprocessors and Microcomputers
ECE 571 Microprocessor Systems Applications

Stochastic Systems

SYS 517 Probability and its Engineering Uses
SYS 634 Stochastic Processes and Noise Characterization

STA 525 Multivariate Statistical Methods

Dynamic Systems

ME 521 Dynamics
ME 524 Vibration Analysis
ME 569 Finite Elements

Communication Systems

ECE 534 Principles of Data Communications
ECE 535 Information Theory and Coding in Digital and Computer Communications
ECE 633 Signal Detection and Estimation Theory

Energy Systems

SYS 557 Energy Conservation Systems
SYS 558 Electrical Energy Systems
ME 554 Solar and Alternate Energy Systems
ME 582 Fluid and Thermal Energy Systems

Mathematics: Minimum of 4 credits and not more than 8 credits from the approved list of mathematics courses.

Electives: Remaining courses must be taken from those listed under the systems and industrial engineering depth areas or from the following approved electives (24 credits in the program must be in EGR, ECE, ME, SYS or CIS courses): EGR 594, 595, 690, 794, 795; SYS 532, 685, 721, 722, 731, 732, 734, 746, 764, 788; ECE 518, 564, 625, 637, 725; ME 556; CIS 517, 518.

Energy Engineering

Master of Science students in electrical and computer engineering and in mechanical engineering can elect courses within their specialization which focus on power and energy engineering. However, the student interested in an interdisciplinary approach focusing on energy systems can find such a program within the systems and industrial engineering program. This course of study cuts across disciplines and provides the student with a broad perspective of energy problems. At the same time, it provides the analytical base and problem solving skills for coping with the many facets of a complex energy crisis.

Energy System 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
SYS 746 Transportation Systems
EGR 595 Special Topics in Energy Systems
EGR 690 Graduate Engineering Project
EGR 799 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 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. Students with no formal course work in these areas but who feel they have sufficient background in them through work or self-study may request an examination to determine their competency.
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.
2. complete the following 12 credits of graduate core courses:
CIS 542 Data Structures
CIS 550 Operating Systems
and one of:
CIS 535 Run-Time Structures in Programming Languages
ECE 564 Computer Organization and Architecture
3. complete APM 563, Applied Mathematics: Discrete Methods I
4. complete 16 credits of approved graduate electives. At least 12 credit hours of these must be in CIS or approved ECE courses. Typical electives are: CIS 511, 513, 517, 518, 545, 565, 570, 571, 595, 690; ECE 518, 567, 568, 637, and SYS 569.
A maximum of 8 credits of project courses can be used toward satisfying degree requirements. Either CIS 535 or ECE 564 may be taken as an elective if not taken as part of the core. Other graduate electives that relate to the student's individual interests may be approved by petition.
5. complete at least one of the following course combinations:
CIS 511 and 542 CIS 542 and 545
CIS 517 and 518 CIS 550 and ECE 564
CIS 535 and 565 CIS 570 and 571
6. have earned a cumulative grade point average of at least 3.0 in courses 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. The student must have approval of the supervising instructor before registration.

EGR 595 Special Topics (2 to 4)

Advanced study of special topics in engineering.

EGR 690 Graduate Engineering Project (2 to 12)

Independent work on an advanced project. Topic to be chosen jointly by student and instructor before registration. May be taken more than once.

EGR 794 Independent Study (2 to 4)

Advanced independent study in a special area. The student must have approval of the supervising instructor before registration.

EGR 795 Special Topics (2 to 4)

Advanced study of special topics in engineering. May be taken more than once.

EGR 799 Doctoral Thesis Research (2 to 12)

Directed research toward the thesis.

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 Sequential Machines (4)

Different classes of combinatorial switching, functions such as threshold, unate, and symmetric; synchronous and asynchronous sequential machines, experiments on sequential machines, properties of definiteness and information lossness, Turing machines, deterministic and non-deterministic automata and languages.

Prerequisite: Permission of instructor.

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)

Interchangeability between software and hardware; automatic parsing stacking and list structure management; near-term future structures for miniprocessors and networks; Boolean models for sequential control in processor systems; exercises in microprogramming of the CPU and input/output flows.

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.

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.

Prerequisite: ECE 570.

ECE 584 Solid-State Electronic Devices (4)

Crystal structure of important electronic materials, band theory of solids, particle statistics, transport phenomena and conductivity, p-n junctions, and junction devices. Included are light-emitting diodes, IMPATT diodes, bipolar and junction field-effect transistors.

Prerequisite: SYS 517.

ECE 587 Integrated Electronics (4)

Crystal growth-bulk and epitaxial techniques. Fabrication of p-n junctions. Ion implantation. Integrated circuits technology. Semiconductor materials. Tunnel diodes, photodiodes, light-emitting diodes, semi-conductor lasers, switching devices.
Prerequisite: ECE 584.

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—Illiack 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; transistors and electroluminescent devices. Silicon integrated device technology; oxidation, diffusion, and epitaxy.
Prerequisite: ECE 584.

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 584.

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, 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: Courses in thermodynamics and fluid mechanics.

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. Uses of brittle coatings, strain gauges, two-dimensional photoelasticity, and photoelastic coatings. Emphasis on optimal designs. With laboratory.

ME 569 Finite Elements (4)

Structural analysis through matrix formulation using direct and variational methods; stiffness and flexibility matrices for triangular, quadrilateral and isoparametric elements in two- and three-dimensions. Finite element programs and available graphics hardware for data preparation.

ME 572 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 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, momentum, and charge; ideal and viscous fluids with mass transfer. Approximation techniques for solution of the conservation equations. Convective transfer of momentum, mass, and charge. Introduction to turbulent transport processes.

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.

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)

The application of optimization methods for minimum cost systems design. Economic modeling; partial optimization and monotonicity analysis; estimates and cost bounds, geometric lower bounding constant, condensation and partial invariance; conditional design and constraint activity, profit. The formulation and solution of an optimal design problem is a major component of the course.

SYS 517 Probability and Its Engineering Uses (4)

Fundamental probability and statistics applied to a variety of engineering situations. Probability: axioms, conditional events, independence, random variables, distributions, expectations, generating functions. Statistics: sampling, estimation, hypothesis testing, special distributions.

SYS 520 Signal and System Representation (4)

Analytical foundations of the characterization and behavior of dynamic systems. Causality and state, formulation of the describing equations, linearization, and stability. Solution of the state equations, eigenvectors, and the state-transition matrix. Controllability and observability.

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)

Technology of generation, transmission and distribution of electric energy. AC and DC power; operational considerations; system model for synchronous machine; power transformers; high energy transmission lines; steady state load flow analysis; optimum operating strategies.

SYS 569 Simulation in Engineering (4)

Modeling of networks, discrete event systems and dynamic systems with continuously changing variables. A FORTRAN based simulation language, SLAM is used. On-line (user interactive) and graphical output are used for statistical analyses and simulation validation.

Prerequisite: A course in statistics.

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 630 Optimal Control Theory (4)

Modern control theory applied to linear dynamical systems. Continuous-time and discrete-time systems will be considered. Topics include: differential equations; controllability and observability of linear dynamical systems; observer theory; dynamic programming; calculus of variation and Pontryagin's minimum principle.

Prerequisite: SYS 520.

SYS 634 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, characterization of noise as a random process, sources of noise.

Prerequisite: SYS 517.

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 Systems (4)

Stochastic systems; waiting-line models and queueing theory, decision trees and decisions under uncertainty. Markov chains, dynamic programming under uncertainty; simulation of stochastic systems.

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; and stability of linear dynamical systems.

Prerequisite: SYS 520.

SYS 731 Stochastic Optimal Control Theory (4)

The 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; and

nonlinear filtering, smoothing and prediction theory.
Prerequisite: SYS 630.

SYS 732 Estimation Theory (4)

Modern estimation theory for both deterministic and stochastic linear systems will be considered. Topics include: observer theory, analysis and design of Luenberger observers; analysis and design of the Kalman-Bucy filters, square root filtering; smoothing; prediction; and parameter identification and adaptive estimation.
Prerequisite: SYS 630.

SYS 734 Statistical Communication System Theory (4)

Harmonic analysis, sampling theory, stochastic processes and correlation functions, linear systems response to random inputs, optimum linear systems (matched filters, Wiener filters) coherent and noncoherent filtering, modulation theory, interference consideration.
Prerequisite: ECE 633

SYS 746 Transportation Systems (4)

Topics related to the interactions of vehicles operating in a mass-transportation mode. Descriptions of traffic flow and congestion, automated rights-of-way. Simulation of vehicles and controlled roadways. Economic considerations for automated transportation systems.
Prerequisite: SYS 517 and 520.

SYS 764 Modelling/Management of Ecological Systems (4)

Population growth models with and without saturation, age-dependent growth models. Interaction between two species, predation and competition, the many-species problem. A statistical mechanics for interacting populations, regulation, and controlled growth in population systems, optimal harvesting.
Prerequisite: SYS 520.

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 517.

COMPUTER AND INFORMATION SCIENCE

For additional computer courses students should refer to the course offerings in Electrical and Computer Engineering.

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 517 Applied Numerical Methods: Approximations (4)

Application of various numerical methods with emphasis on programming techniques, software library documentation, and software testing and evaluation. Methods include: introduction to linear systems; nonlinear equations; methods of approximation applied to least squares; splines, quadrature, ordinary and partial differential equations.
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 524 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. Exploration of the future role and the societal impact of personal computers. Enrollment limited to majors in the School of Human and Educational Services. Identical with ED 594.

CIS 525 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. Identical with ED 595.

Prerequisite: CIS 524.

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 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: Knowledge of assembly and PL/1 programming languages.

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 constructed 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.
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.
Prerequisite: CIS 570.

CIS 594 Independent Study (2 to 4)

Advanced independent study in a special area. The student must have approval of the supervising instructor before 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 to be chosen jointly by student and instructor before registration. May be taken more than once.

SCHOOL OF HUMAN AND EDUCATIONAL SERVICES

Office of the Dean:

Gerald J. Pine, Dean

Department of Teacher Education:

Patrick J. Johnson, Chairperson

Professors:

Edward A. Bantel, Ed.D., Columbia 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
 George F. Feeman, Ph.D., Lehigh University
 Sidney W. Graber, Ed.D., Wayne State University
 Harry T. Hahn, Ed.D., Temple University
 W. Dorsey Hammond, Ph.D., University of Delaware
 Donald C. Hildum, Ph.D., Harvard University
 James W. Hughes, Ed.D., University of New Mexico
 Jacqueline I. Loughheed, Ed.D., Wayne State University
 Donald G. Malm, Ph.D., Brown University
 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
 Jane M. Bingham, Ph.D., Michigan State 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 J. Christina, Ph.D., Syracuse University
 F. James Clatworthy, Ph.D., University of Michigan
 Robert L. Donald, M.A., University of Detroit
 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
 Cheryl Maglischo, Ed.D., University of Oregon
 Kathryn M. McArdle-Piggott, Ph.D., Universidad Central de Madrid
 J. Shawn McCormick, Ph.D., Indiana University
 David P. Meyer, Ph.D., Arizona State University
 Billy Joe Minor, Ph.D., Indiana University
 Robert G. Payne, Ph.D., University of Michigan
 James C. Schmidt, Ph.D., Wayne State University
 Alfred W. Stransky, Ph.D., Florida State University
 Ronald M. Swartz, Ph.D., New York University

Assistant Professors:

Robert Brown, Ph.D., Wayne State University
 Anne Cairns-Federlein, Ph.D., University of Michigan

Gena Jos. D'Alessandro, Ph.D., Wayne State University
 Janice M. Guerriero, Ph.D., Wayne State University
 Anne Jaworski, Ph.D., Wayne State University
 William H. Jones, Ph.D., University of Michigan
 Thomas Lambric, Ph.D., University of Northern Colorado
 Linda Lentz, Ed.D., Temple University
 Mary L. Otto, Ed.D., Indiana University
 Diane E. Petway, Ed.D., Western Michigan University
 Robert M. Schwartz, Ph.D., University of Illinois
 Kenneth E. Smith, Ed.D., Loyola University
 Carol A. Swift, Ph.D., University of Arizona

Instructor:

David Housel, M.A., Arizona State University

Adjunct Professor:

William I. Martin, Jr., Ph.D., Northwestern University

Visiting Assistant Professor:

Carlos Olivarez, Ph.D., Michigan State University

Visiting Instructors:

Sandra Andringa, M.A.T., Oakland University
 Steven J. Keteyian, M.A., University of Northern Colorado

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 education, elementary education, reading and language arts education, and special education. The Master of Arts degree is offered in guidance and 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 once each semester for admission the following semester. Students whose applications are incomplete on the review date may take classes as special graduates. They should be careful about the number of courses taken, 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 to Course

Admission to the Ph.D. program is a two-step process. First the screening

committee evaluates candidates in four areas: letters of recommendation, prior course work at the undergraduate and graduate levels, writing ability as revealed through two personal statements, and scores on the Miller Analogies Test. Second, 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. Other full-time employment is not permitted during the residence year.

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 advisory committee. 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 Committee

Upon acceptance into the program, a student is assigned an interim academic adviser 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 before forming the doctoral advisory committee.

After completing one year (24-36 credits) toward the Ph.D. at Oakland, the student must form an advisory committee to direct the thesis, determine transfer credit, and guide the student in preparing a final program. The final program is an agreement between the faculty and the student which specifies the transfer credit accepted and the course work the student must complete for the Ph.D. degree.

The doctoral advisory committee consists of five Oakland University faculty members, including three members from the reading area, one member from the student's area of minor concentration, and one member from the faculty at large.

The student may nominate his/her own thesis adviser, who serves as advisory committee chairperson, as well as the other advisory 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 reading area chairperson, the dean of the School of Human and Educational Services, and the dean of the Graduate School must approve the selection of an advisory 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 3.0 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 twice per academic year. The advisory committee, in conjunction with the student, decides when the student should take the qualifying examination. However, it should be taken prior to the completion of 68 credit hours applicable to the degree program and it must be completed successfully before students engage in the dissertation defense. In special circumstances, students may request (via written petition) a waiver of the 68-hour rule, pending approval of the advisory committee and the reading area.

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 advisory committee assembles the examination questions and evaluates the student's work. The oral examination, administered by the advisory 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 advisory committee faculty members. Election of this option will result in, at the committee's discretion: (a) reduction in the number of questions in each area to be tested, or (b) 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 advisory 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 does 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 advisory committee chairperson will direct the candidate through the stages of thesis preparation.

When the advisory 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 advisory committee and any other interested faculty, insuring that all questions relevant to the selected topic, justification, and procedures are considered ahead of time. Once the advisory committee approves the proposal, the candidate may initiate the study.

A draft of the thesis must be submitted to the advisory committee for modification and approval before the final copy is prepared and approved by the advisory 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 candidates. 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 advisory committee and the dean of the Graduate School.

Oral Examination

Each candidate must orally defend the thesis before his/her advisory committee. The examination is scheduled after the advisory 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 advisory committee may permit reexamination 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.

THE EDUCATION SPECIALIST DEGREE

The Education Specialist degree (Ed.S.) 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. The program offers curricular diversity and flexibility for students with a wide range of educational concerns in elementary and secondary teaching, consulting and counseling, and school administration. The central theme of the program is educational leadership. This theme is approached through one or more academic perspectives on education: curriculum and instruction, communications, behavior, development, management, and the social context. These perspectives provide an interdisciplinary context for the selection of courses early in the planning of the student's program. They also help the student to select an academic focus for the elective portion of the curriculum. Students entering this program are expected to assume greater professional responsibilities, and to use this program to help them function more effectively as educational leaders.

Admission to Course

Admission to the Ed.S. program will be considered when the following have been received by the Graduate School: 1) an application for admission to graduate study or transfer to a graduate program, 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 1000 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? What type of academic concerns does the applicant now have, and what general curricular theme(s) might tie those concerns together in a planned degree program? 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 3.5 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 individually selected courses subject to faculty adviser approval. 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 planned and selected as part of a faculty approved program. Courses are selected at the 500, 600, and 700 levels from among many of the graduate offerings in the School of Human and Educational Services as well as throughout the university. The following are a sampling of planned programs that students may design for themselves: educational consultation; educational administration; curriculum development; creative, gifted and talented; advanced reading; the teacher as a person; children's literature; evaluation and assessment; the life cycle.

Advising

Advising in the specialist program is especially important because much of the curriculum is individually planned. The instructor of the initial course ED 770 (Perspectives in Education) also becomes the student's program adviser. A major function of that course is to help the student develop a planned course of study, considering courses throughout the School of Human and Educational Services as well as the university at large. The instructor of ED 770 assists the student in selecting an academic focus in preparation for a field project later in the program. This focus serves as a guideline for selecting appropriate courses as background to the field project. After completion of ED 770, the student may request assignment of a new adviser, if this seems appropriate under the student's plan of courses.

THE MASTER OF ARTS IN TEACHING: EARLY CHILDHOOD EDUCATION

The graduate program in early childhood education leads to the Master of Arts in Teaching (M.A.T.). The program trains persons to work with children 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 education 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 education, 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 Education

Degree requirements are 36 credits, distributed as follows:

EARLY CHILDHOOD FOUNDATIONS (16 credits—all required):

- ED 540 Theories of Early Childhood Education (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 Education (4)

EDUCATIONAL FOUNDATIONS (4 credits):

- ED 503 Major Theorists in Education (4)
- ED 504 Literary Portrayals of Educational Encounters (4)
- ED 509 School and Disadvantaged Students (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/consultation, early childhood programming, reading/language arts, infancy, 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.

Infancy: ED 544, 547, and 548.

Pediatric Play: ED 544, 550, and 644.

Administration/Consultation: ED 544, ED 545 or 546, and one additional course from specific options.

Reading/Language Arts: ED 532 or 574, ED 544 or 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

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 supervision.

After completing an introductory seminar (ED 510), participants elect one of the following focus areas: curriculum and instruction; youth advocacy; educational leadership and supervision; social studies; science-mathematics; or an individually planned program. In addition, students may select from the following concentrations: health education, physical education, dance and recreation; middle school with endorsement; and education of talented and gifted (see specific description of focus and concentration).

Students selecting one of the focus areas must take the four courses listed under course requirements. Along with ED 510, these requirements include ED 512, 554, and 611. After completing some or all of the required courses, students will plan the remainder of their degree program with an adviser and select one of two exit plan options, ED 699 (terminal project) or ED 555 (practicum).

Exit Plan Options

Students choosing ED 699 option complete either a terminal project or a thesis (4 credits) directed by their academic advisers. Under this plan, students complete the M.A.T. requirements in 36 credits. Those selecting ED 555, the practicum option, must take an additional course of 4 credits from prescribed electives. Under this plan, students complete the M.A.T. requirements in 40 credits.

Course Requirements

- 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 611 Issues in Education (4)
- 16 credits from one focus area (see below)
- or ED 555 Practicum (4) and a 4-credit elective
- ED 699 Terminal Project (4)

Focus Areas

Focus A: Curriculum and Instruction (16 credits)

This area concentrates on principles, patterns, and procedures of curriculum development and factors affecting the organization and improvement of elementary school instruction. Requirements are:

1. ED 612.
2. One course from: SCS 505, ED 587, ED 589.
3. Choice of ED 509 or 580.
4. One course from ED 511, 517, 553, 583, 585, 594.

Focus B: Youth Advocacy (16 credits)

This area concentrates on legal, diagnostic, legislative, and other critical issues in providing less restricted educational environments and programs of prevention, intervention, and reintegration for students experiencing difficulty in school. Requirements are:

1. ED 509, 585, and 593.
2. Choice of ED 580 or 590.

Focus C: Educational Leadership and Supervision (16 credits)

This area concentrates on curriculum improvement, inservice education, personnel supervision, and teaching competence improvement. Requirements are:

1. ED 580, 585, and 588.
2. One course from ED 511, 553, 583, or 590.

Focus D: Social Studies (16 credits)

This area develops competence in problems and trends of current programs as

well as skill in developing a balanced and articulated program of social studies. Requirements are:

1. ED 587 and 597.
2. Choice of ED 581 or 590.

Focus E: Science-Mathematics (16 credits)

This area concentrates on current trends in science and mathematics curricula as well as unified approaches to elementary curriculum. Methods of teaching in the outdoors, environmental education, and materials management are included.

Requirements are:

ED 589, ED 590, SCS 505, and SCS 506.

Focus F: Individually Planned Program (16 credits)

This area is a planned special focus to meet students' specific professional needs. Adviser's consent and faculty approval are required.

M.A.T. in Elementary Education with Health Education, Physical Education, Dance, and Recreation Concentration

Core courses in education (all required): ED 510 (must be one of first two courses); ED 512 or course from curriculum and instruction focus area: ED 585 or course from educational leadership/supervision focus area; ED 593 or 611 or course from youth advocacy focus area; and ED 699, or 555 plus 4 elective credits.

Core Courses in Physical Education: ED 506, 507, 508.

Elective Courses in Physical Education: Choose at least two courses from ED 518, 528, 551, 552, 556, 557.

M.A.T. in Elementary Education with a Concentration in the Area of Gifted and Talented

The gifted and talented program is designed for teachers who are presently assigned to gifted classrooms or who will be reassigned to those classrooms. In addition, it is designed for teachers who have a few gifted students in their classrooms for whom they wish to individualize programs.

The following core courses are required: ED 510, 512, 554 or 611, and either 699 or 555 and one additional course (selected with adviser approval). In addition to the core, students must choose five courses from the following gifted and talented courses: ED 606, 608, 651, 652 653, 654, 656 and 657.

M.A.T. in Elementary Education With Middle-School Endorsement

The middle-school endorsement program is designed: (a) for persons holding secondary permanent certificates who wish to extend their 7-12 certificate to include grades 5 and 6; (b) to provide elementary permanent certificate holders an opportunity to enhance their qualifications for specialization at the middle-school level; (c) to provide persons holding the K-8 certificate the opportunity to secure certification for grade 9, and (d) to serve as a planned program for continuing certification by holders of either elementary or secondary level provisional certificates.

The program responds to current needs in some school districts to qualify teachers for shifts to the middle-school level due to enrollment fluctuation. Of greater importance is the fact that the program provides specialized preparation for persons contemplating working with young people during unique formative years—ages 10-14.

Middle-school endorsement program competencies include a recognition of the critical needs of teachers for: (1) skill in interpersonal relationships and humanistic approaches to deal with emotional and behavioral adjustments; (2) capability to

assist students in developing their reading abilities in all curricular areas; (3) skill in providing for the needs of exceptional children in the middle-school; (4) effective instructional methods for students at this stage of development; and (5) a total school program and climate uniquely designed for the middle-school learner.

The following core courses are required: ED 510, 512, 554 or 611, and either 699 or 555 and one additional course (selected with adviser approval). In addition to the core, the following middle-school courses are required: ED 520, 525, 533, 553 and 569.

THE MASTER OF ARTS: GUIDANCE AND COUNSELING

The guidance and counseling program is dedicated to educating and training persons to work in helping roles with children, youth, parents, and other adults in school and community settings.

Admission Requirements

All applicants must submit a written statement which explains reasons for wanting to enter the guidance and 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 guidance and counseling must have at least 24 undergraduate or graduate credits in behavioral disciplines such as psychology, sociology, economics, 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 guidance and 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 guidance 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 guidance and counseling must take three core courses as follows:

- | | |
|--------|--|
| ED 562 | Measurement and Evaluation in Counseling (4) |
| ED 563 | Group Procedures (4) |
| ED 565 | Counseling Theory and Practice (4) |

Upon completion of the core courses, each student must select an emphasis either in counseling or in guidance and career development and must select either the school or the community as the setting for their course work and internship or research. The courses required for each emphasis and setting are listed below.

Counseling Emphasis in School Settings

The following courses are for persons preparing for a position as a school counselor and seeking school counseling endorsement. In addition to the three core courses, students must take ED 561 or 566, ED 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 ED 576, 661, 664, 665, 666, and an elective (4 credits as approved by the adviser).

Guidance and Career Development Emphasis in School Settings

The following courses focus on the guidance and career education needs of educators who assist in areas such as self-analysis, development of interpersonal skills, and social-emotional growth for eventual application. This emphasis does not lead to endorsement as a school counselor. In addition to the three core courses, students must take ED 561 or 566, ED 667, 668, 675, 699, and an elective (4 credits as approved by the adviser).

Guidance and Career Development Emphasis in Community Settings

The following courses focus on the needs of community agency and personnel workers engaged in the delivery of guidance and related human services for youth and adults in areas such as: job development and placement, occupational, educational, and community information for career planning, advising, vocational rehabilitation, and organization, coordination, supervision, and evaluation of guidance programs. In addition to the three core courses, students must take ED 564, 665, 671, 678, 676 or 699, and an elective (4 credits as approved by the adviser).

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 Graduate School. 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 and one year's teaching experience in a regular general education or special education classroom before admission to the program. 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.

Course Work

The following course sequences are possible options to fulfill master's degree requirements and endorsement in emotionally impaired 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 admissions interview by the special education admissions adviser.

GENERAL SPECIAL EDUCATION CORE (24 credits—all required)

ED 500	Foundations of Reading Instruction (4)
ED 501	Introduction to the Education of Exceptional Children (4)
ED 502	Legal Challenges in Educating Exceptional Children (4)
ED 522	Behavior Modification Techniques for Classroom Management (4)
ED 619	Theoretical Foundations of Exceptionality (4)
ED 625	Transactional Analysis in the Classroom (4)

Emotionally Impaired Core (8 credits—all required)

ED 620	Social Deviancy in Special and Regular Education (4)
ED 621	Management and Curriculum for Emotionally Impaired Children (4)

Prekindergarten Option (16 credits): ED 540, 542a, 544, and 655. One course in the general special education core will be eliminated during advising for students electing this option.

Elementary Option (12 credits): ED 622 and two courses from PSY 513, ED 528, 529, 561, and 612.

Secondary Option (12 credits): ED 622 and two courses from ED 525, 538, 553, 583, 675, and PSY 513.

Learning Disabilities Core (4 credits required)

ED 523	Education Procedures for Children with Learning Disabilities (4)
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Prekindergarten Option (16 credits): ED 540, 542a, 544, and 655.

Elementary Option (16 credits): ED 524, 626, 632, and 633.

Secondary Option (16 credits): ED 626, 632, 633, and one course from ED 525, 526, 529, 538, 553, 583, or 675.

When necessary, students may be required to take additional courses to make up for deficiencies in background, training, and experience.

In addition to the regular M.A.T. special education program, students may elect one of the following program options: post-master's endorsement in emotionally

impaired or learning disabled, M.A.T. in special education with no endorsement, or M.A.T. in special education with early childhood endorsement and either emotionally impaired or learning disabled endorsement.

THE MASTER OF ARTS IN TEACHING: READING/LANGUAGE ARTS EDUCATION

The M.A.T. program in reading/language arts education is one of the broadest of its kind in the nation. Most students enrolled in the program are teachers who intend to remain with their classroom responsibilities. Their reasons for enrolling in the program vary, but a major one is that relatively few other fields of study relate so directly to daily teaching concerns.

Although the program is classroom-teacher centered, students may choose to prepare for other positions. A number of graduates are now reading specialists, consultants, college teachers of reading, special project directors, supervisors, and principals.

Degree Requirements

The requirement for the M.A.T. is 36 credits, including a 24-credit base sequence with required blocks and a 12-credit specialization or elective sequence. The base sequence meets standards for reading specialists set by the International Reading Association and assists in attaining basic competencies in three areas.

Base Sequence for Reading/Language Arts (16 credits—all required)*

ED 500	Foundations of Reading Instruction
ED 632	Diagnosis of Reading Disabilities
ED 633	Correction of Reading Disabilities
ED 699	Terminal Project

or
Two courses approved in advance by student's adviser and the reading area faculty.

*An additional 4 credits are required if the student elects the two-course option for the terminal project.

Required Blocks—Reading

The student must select 8 credits (two courses) from the following blocks, with no more than one course from any block.

Block I (Educational Foundations): ED 503, 504, 601, 602, 603, 604, 605, 606.

Block II (Psychological Foundations): ED 505, 523, 591, PSY 510, 512, ALS 534.

Block III (Language Arts and Children's Literature Foundations): ED 534, 571, 573, 574, 575, 670.

Specialization Sequence—Reading

The specialization sequence consists of 12 credits in an area of personal interest. Specializations are currently offered in elementary reading, secondary reading, literature for children, early childhood education, and language arts. If students do not choose to specialize, they may select the 12 credits required to complete the program with adviser approval.

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 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

With adviser's consent, choose four courses from the following:

ED 500	Foundations of Reading Instruction
ED 501	Introduction to the Education of Exceptional Children
ED 502	Legal Challenges in Educating Exceptional Children
ED 522	Behavior Modification Techniques for Classroom Management
ED 619	Theoretical Foundations of Exceptionality
ED 625	Transactional Analysis in the Classroom

Early Childhood Core

ED 540	Theories of Early Childhood Education
ED 542a	Applied Developmental Principles—Early Childhood
ED 543	Teacher as Child Advocate and Adult Educator
ED 544	Play as a Learning Medium

Emotionally Impaired Option: ED 547 or 548, 549, 621, 645, and 655.

Learning Disabled Option: ED 523, 542b, 549, 645, and 655.

M.A.T. in Reading/Language Arts and Certificate Endorsement in Learning Disabilities

The reading/language arts area and the special education area of the School of Human and Educational Services offer a combined program leading to the M.A.T. in reading/language arts and a Michigan teaching certificate endorsement in learning disabilities. The dual program consists of 48 credits.

Courses are selected from four blocks:

Block I: Reading Foundations (16 credits—all required): ED 500, 632, 633, and 699 (candidates may substitute two adviser-approved courses for ED 699).

Block II: Learning Disabilities Approval (24 credits—all required): ED 501, 502, 522 or 524, 523, 621, 626.

Block III: Reading Electives (4 credits): Choose one course from ED 514, 531, 532, 536, 537, 538, 630, 634.

Block IV: Educational Foundations (4 credits): Select one course from either of the following groups:

Language Arts/Literature: ED 534, 571, 573, 574, 575, 670.

Philosophical/Social Foundations: ED 503, 504, 601, 602, 603, 604, 605.

This program involves a dual admissions/advising process. Following admission to graduate studies, an advising interview should be scheduled with reading and special education. Failure to arrange such interviews may result in loss of completed credits or suspension from the program.

MICHIGAN CONTINUING CERTIFICATE PLANNED PROGRAMS

To meet the continuing certification requirements of the state of Michigan, persons must complete three years of experience and 18 credit hours of course work in a planned program after the provisional certificate is awarded.

Candidates for the continuing certificate may select either a master's degree program or an 18-credit planned program. The student who chooses either of these should follow the normal admission procedure through the Graduate School. For additional advice, the student should contact the teacher certification adviser in the department offering the master's degree or 18-credit planned program.

Oakland University sponsorship for the 18-credit continuing certificate will be awarded to students who present evidence that they have:

1. Completed 18 credits in an approved master's program, planned with the student's adviser, or
2. Completed an 18- to 20-credit planned program as a continuing certificate student.
 - a. Planned programs have been specified by the following areas in the Department of Teacher Education: early childhood education, elementary education, foundations, guidance and counseling, middle school, physical education, reading/language arts, and special education.
 - b. Programs have been developed by various departments in the College of Arts and Sciences. For further information about such programs, the student should contact the department's teacher certification adviser, or
3. Completed a course of study at another institution after securing written approval of the dean of the School of Human and Educational Services and the chairperson of the area in which he/she is pursuing a planned program of study (this option is provided for students who begin, but are not able to complete, their programs at Oakland University).

The programs outlined below are for students who wish to meet certification requirements without enrolling in a master's program. Students enrolling for continuing certification only may apply only a limited number of credits earned at another institution toward Oakland University sponsorship for the continuing certificate. Department advisers may accept or reject any proposed transfer credit. Acceptability and limitations are based on individual program design. Also, the 18- to 20-credit planned program in which they enroll must be more tightly structured than if one were earning credits as a master's student. Finally, because of possible shifts in master's program requirements, there is no guarantee that courses taken as a continuing certificate student will apply if one later wishes to transfer to a degree program. For these reasons, students are urged to consider earning the continuing certificate as part of a master's degree program. For those who reject this alternative, the following options are available.

Planned Program in Early Childhood Education

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, 554 or 611. Students then elect 8 credits from one of the program focus sequences and 4 credits from a second program focus sequence. Students should examine the M.A.T. elementary education program for program focus requirements and course options.

Planned Program in Guidance and Counseling

Core Courses (all required): ED 562, 563, 565.

Electives: ED 665 or 675, and one course from ED 561, 566, 667, 668.

Planned Program in Health, Physical Education, and Recreation

Core Courses (all required): ED 506, 507, 518.

Electives: Choose at least 12 credits from ED 508, 528, 551, 552, 556, 558.

Planned Program for Middle School Endorsement

The middle school endorsement program is designed for persons who hold secondary permanent certificates and wish to extend their grade 7-12 certificate to include grades 5 and 6. The program is also for elementary certificate holders who wish to enhance their qualifications for middle-school specialization, and for those with grade K-8 certificates to include grade 9. Finally, the curriculum serves as a planned program for continuing certification by holders of either elementary or secondary provisional certificates.

Required courses are ED 520, 525, 533, 553 or 583, 569.

Planned Program in Reading/Language Arts

1. Required: ED 500.
2. One course (4 credits) in philosophical foundations of education (ED 503, 504, 591, 601, 602, 603, 604, 605) or psychological foundations of education (ED 505, 523, ALS 534, PSY 510, 512).
3. Three courses (10-12 credits) in reading language arts education and/or related areas (subject to adviser approval).

Planned Program in Special Education

Required courses are ED 501, 502, 619, 522 or 625, 523 or 621.

Foundations (The Teacher as Person: A Planned Program in Educational Studies)

This is an 18-credit program of graduate education leading to continuing certification featuring:

1. A humanistically oriented program, focusing on the structure of the school and the teaching profession and their relationship to the growth of the teacher as a person.
2. A distinctive style of coordinated teaching and planning by the faculty in all program courses.
3. A personalized advising system, using the development of an individualized portfolio in which faculty help students integrate their academic program with their personal and professional experience.
4. The possibility of matriculating in a master's degree program in other areas within the Department of Teacher Education upon completion of the program.

As an alternative to other graduate programs that emphasize the nature of students and the techniques of teaching, this program emphasizes self-understanding through interdisciplinary studies. As a complex human being, the teacher will be guided by a rich variety of perspectives in the disciplines of philosophy, psychology, sociology, political economy, anthropology, history, literature, and the arts. As a professional educator, the student will explore ways in which the structures of the school and of the teaching profession affect personal satisfaction and growth.

Congruent with the intellectual focus of the program, the teaching and advising style of the faculty maximize the student's opportunity to integrate academic work with personal experience. The heart of the advising program is development of a continuing portfolio, including sample academic work, a journal of experienced relations between study and professional possibilities, and other related material. Faculty work as a unit in planning courses, team teaching, and continuous advising.

Upon completion of the 18-credit program, faculty will assist students who desire to continue for one of the master's degrees in the School of Education.

Core Courses: Select 12 credits from ED 503, 504, 601, 602, 603, 604, 605, 606.

Electives: Choose at least 6 credits in consultation with an adviser from the foundations area.

Course Offerings

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 Challenges 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 504 Literary Portrayals of Educational Encounters (4)

Study of educational themes through novels, plays, personal accounts, and other literary modes. Themes include education as conflict resolution: problems of authority and freedom, value differences, and language barriers; and education as autobiography: problems of alienation, repression, and future orientation.

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 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.

ED 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.

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 Disadvantaged Students (4)

Examines strategies for achieving educational equity in the regular classroom for students who have been disadvantaged due to economics, social status, cultural background, sex, aptitude, achievement, emotional impairment, or disruptive, delinquent behavior.

Prerequisite: Permission of instructor.

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 515 The Modern British Primary School (2 or 4)

Examines the theories and experiences of Britain's 1944 education law which provided an ambitious goal for individualizing instructional programs and changed the major concern of schools from "what should be taught" to "how children learn."

ED 516 The Latino in the United States (4)

Examines stereotypes and common misconceptions about Latinos by analyzing cultural and geographical background. Contributions of the Latino to the development of the U.S. and sociopolitical issues will be covered. Emphasizes alternate strategies of teaching cultural awareness to young children.

Prerequisite: Admission to graduate study.

ED 517 Simulation Gaming—An Interdisciplinary Mode (4)

Introduction to the interdisciplinary field of simulation gaming. After playing a variety of games, students apply the course methodology to their own work settings by operating games and designing their own games.

ED 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.

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 Perception and 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 525 The Exceptional Child in the Middle School (4)

Introduction to special education for the regular middle school classroom teacher. Emphasizes special problems of identification, assessment, and management of the middle-school child with learning and behavior problems.

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 527 Problems in Educating Mentally Handicapped Children (4)

Reviews research, describes causes, and explores school programs for mentally handicapped children. Methods of teaching mentally handicapped children and use of classroom materials are also covered.

Prerequisite: Admission to graduate study.

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 537 Teaching Learning Strategies for Reading and Related Language Arts Instruction (4)

Focuses on a student-centered language arts curriculum. Teaching-learning strategies concerned with divergent, elaborative, critical, and creative thinking are stressed. Teachers develop materials and methods for practical classroom applications.

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.

Prerequisite: ED 500 or permission of the instructor.

ED 539 Substitute Teaching—Practices 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 Education (4)

Views of education discussed from perspectives of Montessori, Piaget, Bereiter-Englemen, British Infant Schools, behavior modification, and developmental or "traditional" schools. Analyzes diverse contemporary theories of early childhood education and broader issues such as "education for future vs. education for immediate needs."

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 topics.

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 education, 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 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 curriculum materials for safety education.

ED 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.

ED 560 Special Problems in Guidance 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.

ED 561 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, intra- and interpersonal skills, and valuing and decision-making skills. (Required for K-9 counseling endorsement.)

ED 562 Measurement and Evaluation in Counseling (4)

Application of assessment procedures with children, adolescents, and adults for educational and career planning including subjective and objective methods of measurement and evaluation.

ation. Covers commonly used statistical procedures, various assessment instruments, comprehensive assessment programs, evaluation techniques, and basic research methodology.

Prerequisite or corequisite: ED 565. (Required for core program.)

ED 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: ED 565.

ED 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.

Prerequisite: ED 562, 563, and 565 or permission of instructor.

ED 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 guidance and counseling programs.

ED 566 Guidance in Secondary and Adult Education (4)

Study of issues, trends, and models for guidance and counseling with adolescents and adults in educational settings. (Required for 7-12 counseling endorsement.)

ED 567 Workshop in Guidance and Personnel Services (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.

ED 569 Personal Growth and Interpersonal Skills (4)

Developmental, competency-oriented laboratory course in personal growth and interpersonal skills designed as an opportunity to discover, explore, and understand your personal resources (values, beliefs, feelings, perceptions, needs, and effects of same on learning environments).

ED 571 Children's Literature in the Elementary and Middle School Curriculum (4)

Presents criteria for selecting and evaluating children's literature. Presents specific ways of incorporating worthwhile literature into the school curriculum to enhance children's understanding and enjoyment of literature.

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 Creative Writing in the Elementary and Secondary Schools (4)

Focuses on teaching writing to elementary and secondary level children. Topics include: language development, writing skills, story writing, poetry, writing as therapy, revision, evaluation of writing, and other related topics.

ED 576 Developmental Guidance and 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: ED 562, 563, and 565 or permission of instructor.

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 582 Play Production for Secondary School Teachers (4)

Aids secondary school instructors in staging effective dramatic productions. Technical, philosophical, and economic phases of dramatic production are examined. Instructors receive manuals detailing skills required for implementing each primary area of play production.

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 584 The Open Classroom (2 or 4)

An in-depth examination of the open classroom as a philosophic and practical reordering of the traditional elementary classroom. Teachers study and evaluate the open classroom within the contexts of psychological, ecological, social, and curricular foundations.

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 586 Bilingual Education—Theories and Practices (4)

Familiarizes teachers and other educators with aspects of Latino education. Lectures, readings, and discussions cover background about the Spanish-speaking in the U.S.; the problems that confront Latinos in the educational system, and approaches to educating the Spanish-speaking.

ED 587 Social Studies in the Elementary School (SS 570) (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 588 Supervisory Skills for Cooperating Teachers (4)

Strengthens and/or develops the supervisory skills of teachers who will be working with student teachers, as well as students in prestudent teaching experiences. Special emphasis is on observation and feedback techniques.

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. Identical with CIS 524.

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. Identical with CIS 525.

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 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. (May be graded S/U.)

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 or 8)

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. Students may register for a total of 8 credits.

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 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)

Investigates the characteristics of emotionally impaired students and related screening, identification, and diagnostic-evaluation processes. 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 instruction.

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.

Corequisite: ED 623.

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.

Corequisite: ED 622.

ED 624 Directed Teaching in Special Education (6)

Supervised full-time teaching experience in classrooms corresponding to the student's special education concentration. Those qualifying for exemption from the supervised teaching requirement in the certification code may not take this course.

Prerequisite: Admission to master's program in special education and approval by director of special education program.

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 Physical and Social Competencies of Handicapped Children (4)

Identifies the physical and social competencies necessary for mentally handicapped children to become productive citizens. Work skills and vocational opportunities are also explored.

Prerequisite: Admission to graduate program in special education 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 629 Bilingual/Bicultural Education Practicum/Project (4)

Planning and execution of significant research or project in accordance with student's advisory committee. Specialized field work in a bilingual/bicultural classroom setting. Observation, tutoring, diagnostic-prescriptive teaching, and use of bilingual materials are included.

Prerequisite: Completion of all other requirements for credentials in bilingual education and/or permission of instructor.

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 634 Advanced Study of Classroom Strategies in an Integrated Language Arts Curriculum (4)

Focuses on instructional strategies in all curriculum areas. Topics include language growth, language evaluation, materials preparation, curriculum planning, and the integration of language activities with content subjects.

ED 635 Organization of Elementary and Middle School Reading Programs (4)
Focuses on the role of reading specialists and consultants in elementary and middle grades. Topics include needs assessments, program planning, staff development, materials procurement and analysis, and techniques for working with classroom teachers.

ED 636 Organization of Secondary School Reading Programs (4)
Focuses on the role of reading teachers or consultants in grades 7-12. Topics include needs assessment of secondary programs, program planning and evaluation, materials procurement and analysis, and techniques for working with classroom teachers.
Prerequisite: ED 500 or 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 Education (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 652 Classroom Strategies for Gifted and Talented Students (4)
Explores theory, literature, research and practice concerned with strategies for developing the academic and artistic growth of gifted, talented and creative students. Examines varying teaching approaches and individualizing learning progression, recognizing that students are not equally capable in all areas.

ED 653 Science and Mathematics for the Gifted (4)
Deals with the special needs of gifted and talented children in mathematics and science and provides a framework to deal with these needs. Topics include: learning and teaching strategies; curriculum; and evaluation.

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 656 Identification and Programming for the Gifted and Talented (4)
Deals with theories of identification, evaluation, and examination of tests regarding cognitive styles, achievement, interests, special aptitudes, and personality dynamics of the academically gifted and talented. Teachers will adapt the concept of the Individual Education Program in a diagnostic-prescriptive manner.

ED 657 Guidance and Counseling for the Gifted and Talented (4)
Investigates the role of the school counselor and the teacher in developing and implementing counseling and guidance programs for the gifted and talented.

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 661 Techniques of Counseling and Consultation (4)
Systematic 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 review by instructor.
Prerequisite: ED 562, 563, 565 and admission to the guidance and counseling program.

ED 663 Advanced Group Counseling (4)
Problems of group leadership, composition, selection, intervention, termination, evaluation, and follow-up approached through seminar and field experiences. Students develop a written description of their own group counseling approaches and validate the description with concurrent application in a group counseling setting.
Prerequisite: ED 563, 661, and permission of instructor.

ED 664 Consultation and 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. May be elected a second time with instructor's permission for a total of not more than 8 credits.
Prerequisite: Admission to program in guidance and counseling and ED 661.

ED 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: ED 562, 563, 565, and admission to program in guidance and counseling or permission of instructor.

ED 666 Internship in Counseling (4 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.

ED 667 Interpersonal Skills in Guidance (4)
Concepts and skills for effective interpersonal communication which enable the teacher to enter the student's frame of reference and develop the learning relationship. Explores several communications models and examines strategies for analyzing teacher-pupil and pupil-pupil interaction.
Prerequisite: ED 563 and 565 or permission of instructor.

ED 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.

ED 670 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 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: ED 562, 563, 565, or permission of instructor.

ED 675 Career Education (4)

Deals with knowledge and competency in facilitating self-awareness, career awareness and exploration, and career planning and placement. Emphasis is on strategies for infusing career education experiences into the school academic curriculum.
Prerequisite: Teaching experience or permission of instructor.

ED 676 Internship in Guidance (4)

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 are conducted by the university instructor.
Prerequisite or corequisite: Completion of final course work as specified in the student's authorized degree program plan.

ED 678 Guidance Program Planning and Evaluation (4)

Covers programs, materials, and systems for the comprehensive practice of vocational guidance in a broad range of community, business, and industry settings. Includes methods of vocational assessment, vocational rehabilitation, job training, and job development and placement. Emphasizes skills for managing, evaluating, and obtaining funding for government supported human service programs.
Prerequisite: ED 562, 563, 564, 565, and 665 or permission of instructor.

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, guidance 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 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)

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 551, or MGT 653 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 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 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.

ED 777 Seminar in Counselor Supervision (4 or 6)

Topics include theories of supervision, major supervision models, methods of assessing counseling effectiveness, and the role of ethics and values in the supervision process. The lab portion of the course will consist of assisting graduate faculty members in supervising counselor education students enrolled in ED 661 and 664.
Prerequisite: ED 661, 664, 666 and 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 787 Applied Problems in Education (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 (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 (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)

Preparation of a research project culminating in the doctoral thesis.

Special Courses

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.

SCHOOL OF PERFORMING ARTS

Office of the Dean:

Lazlo J. Hetenyi, Acting Dean

Associate Professors:

Raynold Allvin, D.M.A., Stanford University
David W. Daniels, Ph.D., University of Iowa
James E. Dawson, D.M.A., University of Michigan
Robert Facko, Ed.D., Columbia University
Stanley Hollingsworth, B.Mus., Curtis Institute of Music
Lyle Nordstrom, D.M.A., Stanford University

Assistant Professor:

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

Special Instructors:

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

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 to the Program

After application materials have been filed with the Graduate School, 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 592	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 department graduate committee.

Thesis or Recital

A student offering a thesis or recital to culminate his/her program 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

Courses are indicated by the following designations:

MUA—Applied Music

MUE—Music Ensembles

MUS—Music History, Literature, and Appreciation and Music Education

MUT—Music Theory

MUA 501 Applied Music (2 or 4)

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

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.

MUS 503 Solo Performance (2)

Must be taken simultaneously with MUA 501 and must culminate in at least one public performance during the semester. May be repeated for up to 8 credits.

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.

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.

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.

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 592 Introduction to Music Bibliography (2)**

Skill development in rigorous and systematic research of music materials. Includes the study of principal music encyclopedia for content and reliability.

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: Department 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 department graduate committee.

MUS 695 Master's Recital (2 to 6)

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.

CENTER FOR HEALTH SCIENCES

Associate Provost:

Moon J. Pak

MEDICAL PHYSICS PROGRAM

Note: This program is suspended for 1981-82.

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 to Course

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)

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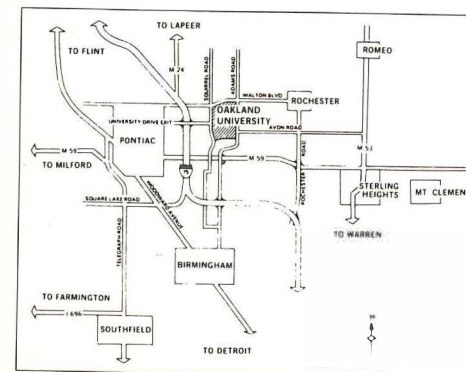
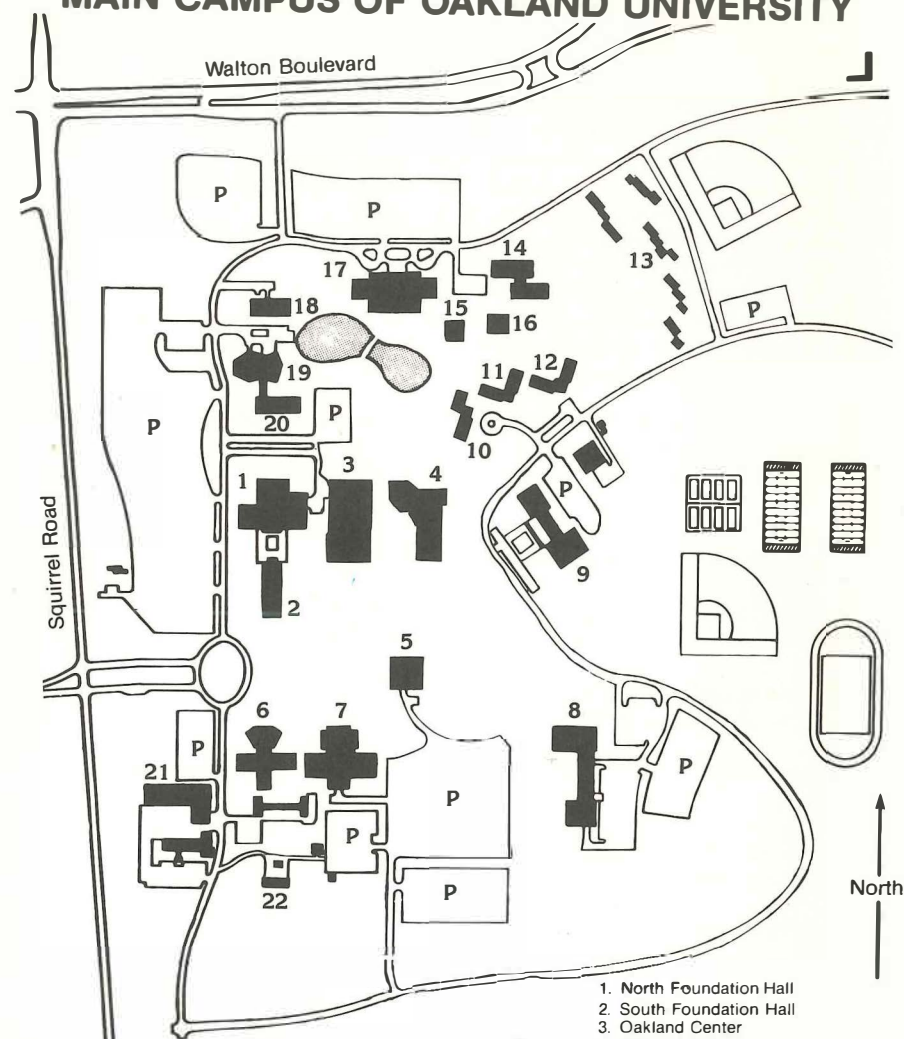
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