

College of Arts and Sciences

Graduate Programs

Department of Biological Sciences

Douglas Leaman, chair

John Plenefisch, associate chair

Lirim Shemshedini, graduate adviser

The department of biological sciences offers graduate degrees at master's and doctoral levels. Students entering the M.S. or Ph.D. programs are expected to have an adequate background in natural sciences and in mathematics. Usually, this will require knowledge of differential and integral calculus, college physics and organic chemistry. Students may be admitted on a provisional basis if they do not have an adequate academic background, but they will be expected to acquire it as rapidly as possible.

Requirements for the M.S. in Biology Program (Cell/Molecular Biology Concentration)

Option A (Thesis): For the degree of master of science in biology (cell/ molecular biology concentration), a student must complete a minimum of 30 semester hours of graduate course work approved by an advisory committee, including BIOL 6000, 6010, 6090, 6100, 6200 and 6930 (two hours) and additional course and research credits for 13 to 17 hours. In some cases, a written comprehensive examination may be required at the end of the first year for students with deficiencies in their coursework. The student must complete six to 10 hours of BIOL 6960, write an original research thesis, and pass an oral examination on the thesis.

Option B (Non-thesis): For the degree of master of science in biology, a student must complete a minimum of 30 semester hours of graduate course work approved by an advisory committee, including BIOL 6010, 6090, 6100 and 6930 (two hours) and additional course and research credits for a total of 30 hours. A maximum of three hours in BIOL 6960, 6980 or 6990 may be included in the minimum 30 hours. The student must write an original research paper based on library research that meets the approval of the student's advisory committee and pass an oral examination defending the research hypothesis. Normally, students choosing Option B will not be encouraged to pursue graduate study beyond the M.S. degree.

Up to 10 hours of graduate credit may be transferred from another accredited institution, as recommended by the student's advisory committee.

Requirements for the Master of Science and Education

For the degree of master of science and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog. In addition, no more than 8 hours may be earned in 5000-level courses. Students doing their theses in biology rather than in education must fulfill the same thesis-related requirements as other biology M.S. candidates.

Requirements for the Ph.D. in Biology Program (Cell/Molecular Biology Concentration)

The doctoral degree in biology (cell/molecular biology concentration) is awarded to a student who has demonstrated mastery in the field of biology and a distinct and superior ability to make substantial contributions to the field. It is not

awarded merely as a result of courses taken, nor for years spent in studying or research. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in research and related activities.

In general, work for the Ph.D. takes five years of study beyond the bachelor's degree. A substantial portion of this time is spent in independent research leading to a dissertation. Up to 30 hours toward a master's degree may apply as part of the student's doctoral program. Normally 90 semester hours of study beyond the bachelor's degree are required for the Ph.D.

Each student must complete an individualized program of study in the area of cell/molecular biology approved by the student's advisory committee and the department. This course of study must include BIOL 8000, 8010, 8090, 8100 8200 and 8930 (three hours) and additional course and research credits to attain the minimum number of semester hours. Ph.D. candidates must pass a written and oral qualifying examination in the spring of their second year of the program and a final oral dissertation defense examination.

Courses numbered at the 5000 and 6000 levels are intended primarily for students at the master's level. Courses numbered at the 7000 and 8000 levels are intended primarily for students at the post-master's (students with a master's degree, or with more than 34 graduate credit hours) and doctoral levels. Courses carrying a dual listing (numbered at both 5000/7000 or 6000/8000 levels) are available to students at both levels. In these cases, there may be substantive differences in the course requirements for students registered at the advanced level.

The department considers experience in teaching to be a vital and significant component of graduate education. Therefore, all graduate students in the Ph.D. program are required to complete at least one semester of formal teaching experience. M.S. students also are expected to acquire teaching experience as part of their graduate programs.

Department of Chemistry

A. Alan Pinkerton, chair

Jon R. Kirchhoff, associate chair

Cora Lind, director of graduate studies

The Master's Program

The master's program in chemistry increases the professional competence of the chemist beyond the bachelor's degree. Course work, independent research and small group discussions are emphasized to achieve this goal. The master of science degree can be viewed as an important professional goal or as preparation for study toward the doctoral degree. A non-thesis M.S. option is available for students with full-time employment whose current work responsibilities preclude the possibility of conducting the requisite research for the thesis-based M.S. degree. School teachers, non-traditional students, and employees of local industry who want to earn an M.S. degree for promotions and/or to meet eligibility requirements for teaching positions at regional community colleges may wish to pursue this option.

Requirements for the Thesis-Based Master's Program

For the degree of master of science or master of science and education, students must meet the following departmental requirements:

- a. The courses presented must total at least 30 hours of graduate credit, including at least four hours of credit in graduate research.
- b. Registration for research seminar is typically required each term the student is enrolled in graduate research.
- c. Each candidate must present a thesis.
- d. Registration for chemistry colloquium is typically required each term, but no more than four hours of credit may

count within the required 30 hours.

- e. Each candidate must demonstrate satisfactory performance on a comprehensive oral examination, in addition to the public defense of the thesis at a colloquium presentation.
- f. Upon choosing a research director, an advisory committee will be appointed to supervise the research, to administer the comprehensive oral examination, and to approve the thesis. Each student, in conjunction with the graduate adviser, the research director, and the student's advisory committee, will prepare a plan of study listing the courses and other requirements for the degree. Upon approval, the plan of study becomes the list of course requirements for the degree. Students typically take four or more 6000-level courses as part of the plan of study.
- g. Each candidate must demonstrate satisfactory performance on a comprehensive oral examination on his or her dissertation research and a public defense of the dissertation at a colloquium presentation.

Requirements for the Non-Thesis Master's Program

For the non-thesis master of science degree, students must meet the following departmental requirements:

- a. The courses presented must total at least 32 hours of graduate credit.
- b. Each student, in conjunction with the graduate advisor, will prepare a plan of study listing the courses and other requirements for the degree. Upon approval, the plan of study becomes the list of course requirements for the degree. Students are required to take five or more chemistry 6000-level courses (minimum 20 credit hours) as part of the plan of study. Up to 8 hours of 6000-level courses in other fields may also be applied towards the degree.
- c. Registration for chemistry colloquium is required during some terms, but no more than two hours of credit may count within the required 32 hours.
- d. Credit for thesis research or research seminar may not be applied towards the required 32 hours.
- e. Each candidate must participate in a Graduate Readings course and demonstrate satisfactory performance on a departmental literature colloquium presentation.
- f. Students are required four subdivisions: analytical, biochemistry, inorganic materials and organic physical chemistry.

Requirements for the Master of Science and Education

For the degree of master of science and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

The Doctoral Program

The doctoral program in chemistry is designed to ensure that the student has the basic foundation of knowledge and is equipped with the tools necessary to do independent research. The emphasis on research recognizes the power of original research to arouse the scientific curiosity of the student, to develop and stimulate creativity, and to encourage further discovery through independent study.

The doctoral program is divided into three stages for the typical student. The first stage establishes, through a set of prescribed courses, the foundation for further training. During this stage, a research director is chosen. During the second stage, the student will pursue research toward the dissertation and undertake comprehensive examinations, including the preparation of the required original research proposals. After meeting the comprehensive examination requirements, the student is admitted to candidacy in the third stage of the program. This stage is devoted to research and completion of the doctoral dissertation. The departmental degree requirements are listed in the following section. Further details on examinations and admission to candidacy may be obtained from the department.

Requirements for the Doctoral Program in Chemistry

Candidates for the doctor of philosophy degree must meet the following requirements:

- a. Each student, in conjunction with the graduate adviser, the research director, and the student's advisory committee, will prepare a doctoral program proposal (plan of study) listing the courses and other requirements for the degree. Upon approval, the program proposal becomes the list of course and other requirements for the degree. Students typically take six or more 8000-level courses as part of the plan of study.
- b. Registration for chemistry colloquium is required each term.
- c. Registration for research seminar is required each term the student is enrolled in graduate research.
- d. Each student must satisfactorily complete two semesters in supervised, half-time teaching.
- e. After admission to candidacy, each student is required to spend a minimum of two consecutive semesters in full-time study at The University of Toledo.
- f. Dissertation research must be carried out primarily in laboratories of The University of Toledo.

Department of Communication

James Benjamin, chair and graduate adviser

Certificate in Communication Studies

The graduate certificate in communication studies is designed to provide advanced study in professional and organizational communication. The certificate of communication studies requires the successful completion of 15 credit hours in communication studies. The certificate can be earned separately or as a part of the master of liberal studies degree. See the master of liberal studies program for details on the master of liberal studies with a certificate in communication studies.

Application

Those applying to work on the certificate alone must be admitted to the Graduate School and submit an application form and letter of interest to the department of communication. Those applying to complete the certificate and the masters of liberal studies should also contact the director of the master of liberal studies program.

Requirements

The certificate consists of 15 credit hours of graduate courses in communication studies. Students may use the courses completed for the certificate in the electives portion of the master of liberal studies degree.

Curriculum

COMM 6210 Principles and Practices of Visual Communication

COMM 6220 Communication, Technology, and Society

COMM 6230 Communication, Propaganda, and Persuasion

COMM 6240 Communication, Ethics, and the Workplace

COMM 6250 Correcting Conflict Communication in Organizations

COMM 6260 Business, Communication and Technology

COMM 6270 Special Topics in Communication Studies

Department of Environmental Sciences

Michael W. Phillips, chair

Allison Spongberg, associate chair

Scott A. Heckathorn graduate adviser

The department of environmental sciences (DES) offers graduate degrees in geology and biology (ecology track) at the master's level and in biology (ecology track) at the doctoral level. Students entering the M.S. or Ph.D. programs are expected to have an adequate background in the natural sciences and mathematics, but may be admitted on a provisional basis if they lack such a background.

Requirements for the Master of Science Programs

Master of Science in Geology

A student must take a minimum of 30 hours of approved graduate course work, including six hours of thesis research and 24 hours of formal lecture courses approved by the student's advisory committee. Up to eight of the required 24 hours of course work may be taken outside the DES, provided they are relevant to the student's research program. At least 12 of the DES hours must be taken in geology. Students who do not have a baccalaureate in geology may be required to take remedial courses, none of which will count toward the 30 hours required for the master's degree. Candidates for the master's degree must prepare a written thesis, which is a report of original and independent research, and present and defend an oral summary of the thesis before a faculty advisory committee.

Master of Science in Geology (Non-Thesis Option)

The non-thesis degree option is intended primarily for students with full-time employment whose current work responsibilities preclude them from conducting the requisite field and/or laboratory research for a thesis-based MS degree. School teachers (both high school and community college), non-traditional students and employees of local industry who want an MS degree in Geology for promotions or to meet eligibility requirements for work positions may wish to pursue this new degree option. The proposed non-thesis option for the MS Geology degree is identical to the non-thesis option for the MS Biology (Ecology-track) degree currently offered by the department, and is very similar to the non-thesis options available for other MS degrees in the College of Arts and Sciences, such as those for Chemistry and Biology (Cell/Molecular-track).

In contrast to the research-intensive thesis option for the Geology MS degree, the non-thesis option is coursework intensive with a minimum of 30 hours of coursework at the 5000 level or higher. The following courses are required of all students: EEES 5200 - Advanced Quaternary Geology (3 hours), EEES 5240 - Soil Science (3 hours), EEES 5410 Hydrogeology (3 hours), EEES 6100 - Glacial Stratigraphy and Geophysics (3 hours), EEES 6930 and Section 003 - Seminar (1 hour), and up to 3 hours of either EEES 6960 (Thesis Research) or 6990 (Independent Study) for a project report. No more than 10 of the remaining 14 hours may be taken outside the Department of Environmental Sciences, and all 14 hours of coursework should be taken for a letter grade and have the prior approval of the student's advisory committee.

Non-thesis option students do a capstone project that will typically be based only on literature research. They will choose a project adviser from among the geology faculty and a project topic prior to the completion of their first semester in the program. The project adviser chairs the student's advisory committee, and has primary responsibility for the student's academic advising and project direction. The advisory committee will consist of at least three members, including the project adviser, with at least two of the members from the faculty in the Department of Environmental Sciences. Students will prepare a written project report and must pass an oral defense of the project results.

Students must make up any undergraduate course deficiencies during their first year (including summer) in the

program, and these courses will not count toward the 30 hours required for the MS degree.

Master of Science in Biology (Ecology Track)

Option A (Thesis): A student must complete a minimum of 30 semester hours of graduate course work approved by the student's advisory committee. A minimum of 19 hours of this requirement must be earned in the major subject area. In addition, each plan of study must include EEES 6400 (Advanced Biostatistics), 6600 (Foundations of Ecology) and 6930 Seminar (one hour) and a selection of at least ten credit hours of formal EEES courses at the 5000 level or above (excluding 6960 or 6990) that must be taken for a letter grade (A–F). The student must write and defend a research thesis consisting of a written report of original and independent research.

Option B (Non-thesis): A student must complete a minimum of 30 semester hours of graduate course work approved by the student's advisory committee. A minimum of 18 hours of this requirement must be earned in the major subject area. In addition, each plan of study must include EEES 6400, 6600, 6930 Seminar (one hour) and a maximum of 3 credit hours of EEES 6960 (Master's Research) or EEES 6990 (Independent Study). Of the remaining 18 credit hours of coursework, at least 12 credits of additional, letter graded (A–F) EEES lecture or laboratory courses (5000 level or higher) should be completed. Remaining coursework may be taken either within or outside DES, should be for a letter grade and must be approved by the student's advisory committee. The student also must write an original paper based on library research that meets the approval of the student's advisory committee. Normally, students choosing Option B will not be encouraged to pursue graduate study beyond the M.S. degree.

Master of Science and Education in Biology (Ecology Track)

Master of Science and Education in Geology

The master of science and education (MSE) is a degree offered by the College of Education in collaboration with the College of Arts and Sciences. Within the degree program, area concentrations are possible in both ecology and geology. The MSE is intended for persons who (1) already have a baccalaureate degree, (2) are already licensed to teach earth science or life science at the junior high or high school level, and (3) want the degree in order to expand their knowledge in the area of their teaching specialization. For the degree of master of science and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog. Within the minimum of 15 hours of course work to be taken in DES and in the selection of the thesis or project topic, students may specialize in either ecology or geology. Students who do not have a baccalaureate in ecology or geology may be required to take remedial courses, which will not count toward the 36 hours required for the master's degree.

Requirements for the Doctoral Program in Biology (Ecology Track)

The doctoral degree in biology (ecology track) is awarded to a student who has demonstrated mastery in the field of biology and a distinct and superior ability to make substantial contributions to the field. It is not awarded merely as a result of courses taken or for years spent in studying or research. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in research and related activities.

In general, work for the Ph.D. takes at least four years of study beyond the bachelor's degree. Normally, 90 semester hours of study beyond the bachelor's degree are required for the Ph.D. A substantial portion of this time is spent in independent research leading to a dissertation. Work done toward a master's degree may apply as part of the student's doctoral program.

Each student must complete an individualized program of study in an area of ecology that is approved by the student's advisory committee and the ecology faculty in the department. This program must include two semesters of statistics (EEES 8400 and an advanced multivariate statistics course such as EEES 8500 or EEES 8650), EEES 8600 and 8930 (one hour), a selection of at least 12 credit hours of formal EEES courses at the 5000 level or above (excluding EEES 8960 and EEES 8990), and additional courses and research credits to meet the minimum required number of semester hours. Ph.D. students must pass a written qualifying examination during the first two years of study and an oral

comprehensive examination involving a defense of their research proposal after gaining admission to candidacy.

Courses numbered at the 5000 and 6000 levels are intended primarily for students at the master's level. Courses numbered at the 7000 and 8000 levels are intended primarily for students at the post-master's (students with a master's degree or with over 34 graduate credit hours) and doctoral levels. Courses carrying a dual listing (numbered at both 5000/7000 or 6000/8000 levels) are available to students at both levels. In these cases, there may be substantive differences in the course requirements for students registered at different levels.

The department considers experience in teaching and professional activity within the academic community to be a vital and significant component of graduate education. Therefore, all graduate students in the Ph.D. program are required to complete at least one semester of formal teaching experience before graduation. In addition, before a student graduates, she or he is to: (1) submit a proposal for extramural funding to help support their research; (2) submit a manuscript on their research to a scholarly, peer-reviewed journal (this manuscript cannot be a product of previous MS work); (3) give either an oral or poster presentation on their research at a professional conference; and (4) make an oral presentation on their research at a scholarly forum.

Department of Economics

Michael Dowd, chair

David Black, director of graduate studies

Requirements for the Master's Program

The economics department offers the master of arts in economics degree, the master of arts in economics degree with an applied econometrics specialization, and the master of arts in economics and education degree. In all cases, students must complete a minimum of 30 hours of graduate work that includes the following:

1. At least 21 hours of graduate credit in economics (excluding ECON 6930) must be included within the total of 30 hours presented for any graduate degree. The minimum of 21 hours in economics must include at least one course from each of two different fields, in addition to the following basic theory requirements (or their equivalents):
 - (a) ECON 5150 Advanced Macroeconomic Theory
 - (b) ECON 5200 Advanced Microeconomic Theory
 - (c) ECON 5300 Introduction to Mathematical Economics
 - (d) ECON 5810 Econometrics Models and Methods I

The graduate adviser may waive the ECON 5300 requirement for students who have an adequate background in mathematics.

2. Credits in excess of seven hours in economics courses numbered 6000 through 6990 will not ordinarily be applicable to the 30 hours.
3. Candidates for either degree are required to pass a comprehensive written examination in macroeconomics and microeconomics. In addition, the department may require an oral examination.
4. In addition to the 30 hours of course work, candidates must satisfy a writing requirement of either a thesis or a seminar paper.

A candidate who elects the thesis option must submit a thesis for review by a committee of at least three faculty members

and satisfy Graduate School thesis requirements. Such a candidate may receive a maximum of seven credit hours following the successful defense of that thesis. A candidate who elects the non-thesis option must submit a seminar paper, or its equivalent, for review by at least two faculty members. No credit hours will be earned for the seminar paper.

Early Admission to Master's Degree Program in Economics

A special opportunity exists for undergraduate students at the University of Toledo interested in pursuing a Master's of Arts Degree in Economics. Being evaluated by the same criteria as graduate students, undergraduate students have the opportunity to apply advanced-level work to their undergraduate degree requirements while, at the same time, securing a significant "head start" toward satisfying the requirements for a master's degree in Economics. Qualifying undergraduate students are allowed to apply particular courses (and associated credit hours) towards **both** their undergraduate and graduate degree requirements.

If accepted into this program undergraduate students may register for up to 3 graduate-level Economics courses (9 credit hours). Because the M.A. degree in Economics requires 30 credit hours of graduate-level work, students who complete 9 of those hours as an undergraduate student have to complete only 21 additional credit hours as a graduate student to receive their master's degree.

Undergraduate students with a declared major or minor in Economics and a cumulative GPA in Economics courses of 3.3 or higher are eligible for this program. Students accepted into this program must consult and receive prior approval from the Department of Economics' graduate director as to which courses at the University of Toledo may be applied for dual credit toward both undergraduate and graduate degree requirements. Students interested in this program are encouraged to speak with the Department of Economics' Chair, graduate director, or undergraduate advisor for additional information and the application form for this program

Specialization in Econometrics

The master's program with an applied econometrics specialization is designed to afford interested, well-qualified candidates for the master's in economics an opportunity to study econometrics on a more intensive and applied basis. The applied econometrics specialization would enable candidates to develop applied econometric skills through hands-on research combined with textbook-lecture learning.

The specialization in applied econometrics is an option in the M.A. program in economics. Students who elect the specialization option will normally need two full years of study to complete the program. In the first year, an M.A. candidate in the specialization will complete the regular M.A. core requirements, an additional econometric course (ECON 5820), and field/related course work. Further, the M.A. candidate is required to pass a written comprehensive examination in econometrics, as well as the usual written comprehensive examinations required of all students. In the second year of the program, the candidate will enroll in a sequence of two applied econometrics seminars (ECON 6810 and ECON 6820) and engage in thesis work.

Internships

The department offers a public service internship, requiring seven credit hours of ECON 6940. In addition to ECON 6940, the intern is allowed to include up to three credit hours of either ECON 6900 or 6990 toward the 30 credit hours required for a master of arts degree.

Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Department of English Language and Literature

Sara Lundquist, chair

Christina Fitzgerald, director of graduate studies

Requirements for the Master's Program

M.A. in English with a Concentration in Literature

The M.A. degree (literature concentration) requires 33 hours of course work. Graduate students who are accepted into the program as teaching assistants are further required to take ENGL 6010 Seminar in English Instruction: Composition, an additional three-hour course, for a total of 36 hours earned separately from the degree.

All students working toward the master of arts with a concentration in literature must satisfy the following requirements:

- (a) The course work shall include ENGL 5100 History of the English Language; **either** ENGL 5750 History of Literary Criticism **or** ENGL 5780 Contemporary Literary Theories and Criticism; ENGL 5790 Approaches to Research in English; and two seminars (excluding instructional seminars – see schedule of classes for seminar listings). Students who have completed any of these course requirements or their equivalents at the graduate level before admission to the Graduate School may petition the director of graduate studies in English for substitutions.
- (b) Of the remaining 18 hours of course work for the degree, students may take a maximum of two courses from other departments in the humanities, fine arts or social sciences, as approved by the director of graduate studies. Students may count two creative writing courses and one independent study course toward the degree.
- (c) Students are required to demonstrate a reading knowledge of at least one foreign language. Passing a special examination administered by the department of foreign languages will satisfy this requirement. International students with a native language other than English will be considered to have satisfied the requirement, as will any student having achieved a grade of C or better in an upper-division or graduate literature course offered by the department of foreign languages (excluding courses where texts are read in English translation). Students may also fulfill this requirement by achieving a B or better in **both** ENGL/LING 5110 Old English **and** ENGL/LING 5120 Middle English.
- (d) Candidates must successfully pass the MA Exam and submit a satisfactory MA Portfolio, details of which can be found on the department web site.

Certificate in the Teaching of Writing

A certificate in the teaching of writing can be earned as part of the master's degree in English (literature concentration). The certificate also can be earned separately from the degree.

The certificate is designed to offer continuing education for regional high school teachers of English and composition; to offer specialized education in composition to those earning master's degrees who wish to pursue work as teachers of writing at regional community colleges and area universities; and to provide graduate students with the opportunity to earn job credentials in composition, as well as in literature.

Application

Those applying for both the M.A. in English and the certificate in the teaching of writing program should submit an application form for each to the Graduate School office, along with their other application materials.

Those applying to work on the certificate alone must hold an undergraduate degree in English and submit an application form, a letter of interest, all college and graduate school transcripts, and two letters of recommendation.

Requirements

Fifteen hours of course work are required for completion of the certificate:

Theory

ENGL 5780 Literary Theories and Criticism

ENGL 5090 Current Writing Theory

Praxis

ENGL 6010 Instruction in Composition

This course assumes experience in teaching. Those not presently teaching will be asked to work with a teacher to gain that experience.

Methods

ENGL 6180 Methods in Composition Course Design and Assessment

Research

ENGL 6890 Certificate Capstone

Those students working on the master's degree also must fulfill all requirements of that degree.

No transfer of credits from other institutions will be allowed, although those students who complete ENGL 4090 while undergraduates at The University of Toledo will not be required to take ENGL 5090 if they received a grade of B or higher.

M.A. in English with a Concentration in English as a Second Language (E.S.L.)

The M.A. in E.S.L. includes 33 to 35 hours of course work.

Students working toward the master of arts degree with a concentration in E.S.L. must satisfy these specific requirements:

- (a) The course work shall include ENGL 5100, 5150, 6940, 6150, 6160 and 6170, and one course to be prescribed by the adviser.
- (b) The remaining 12 hours required for the degree must include CI 5430, ENGL 6190 and an additional six hours (including no more than one additional course outside of English and linguistics) as approved by the graduate adviser. Students who have completed any of the above required courses or their equivalent before their admission to the Graduate School may petition the graduate adviser in the department of English language and literature for substitutions. Students may count up to one independent study course toward the degree.
- (c) Candidates must demonstrate proficiency in a foreign language by having earned a grade of C or better in a course at the 3000-level or above, or by passing an examination administered by the department of foreign languages.
- (d) Candidates must also complete a thesis (ENGL 6960, one to three hours).

Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

M.A. and Ed. Degree in Literature

The master of arts and education in literature degree can include either 30 or 36 hours of course work.

The literature program has the following requirements: a minimum of 18 hours shall include ENGL 5100, either ENGL 5750 or 5780, and two seminars (**excluding instructional seminars**); and the completion of a capstone experience in either the College of Education (a thesis or a project) or the Department of English (the MA Exam and MA Portfolio). They also must satisfy the requirements specified by the College of Education.

M.A. and Ed. Degree in English as a Second Language (E.S.L.)

The M.A. and Ed. degree in E.S.L. includes from 33 to 35 hours of course work.

The English as a second language program requires the following: a minimum of 10 hours in linguistics, including ENGL

5150, 5190, 6150 and 6160 (If any of these were taken on the undergraduate level, appropriate courses may be substituted in consultation with the graduate studies adviser); a minimum of 10 hours in E.S.L. which must include ENGL 6170 and 6060 and CI 5430; a thesis or project (one to three hours); and reading proficiency in one foreign language as required by the master of arts degree. Students also must satisfy the requirements specified by the College of Education.

Students should obtain from the department of English language and literature the appropriate information pamphlet that describes in detail departmental regulations and procedures for the M.A. or the M.A. and Ed. degree, and includes the reading list.

Department of Foreign Languages

Ruth A. Hottell, chair

Ruth Hottell, French graduate adviser

An Chung Cheng, Spanish graduate adviser

Friederike Emonds, German graduate adviser

Requirements for the Master's Program in French, German and Spanish

Students must complete a minimum of 30 semester credit hours for the master of arts and a minimum of 30 semester credit hours for the master of arts and education.

For the degree of master of arts or master of arts and education with a major in French, German or Spanish, students must meet the following departmental requirements: present an undergraduate major in the language of interest from an accredited college or university; satisfactorily complete at least 18 hours of graduate credit in the major language (including courses 5010 and 5020 in French and German, 5010 and 5110 in Spanish); satisfactorily complete an additional 12 hours in the major language or in approved, cognate courses; pass a comprehensive examination; and demonstrate a reading proficiency in a foreign language other than the major. This may be done either by earning a passing grade in a foreign language course at or above the 3000 level, by passing an examination administered by the department of foreign languages, or by successfully completing a graduate reading course offered by the department. A thesis may be presented for an additional six hours of credit in lieu of the comprehensive examination.

Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Department of Geography and Planning

Peter S. Lindquist, chair

Patrick L. Lawrence, graduate adviser

Daniel J. Hammel, internship director

Requirements for the Master's Program

For the master of arts degree, students must meet the following departmental requirements, including 36 credit hours of graduate work:

1. 16 of the 36 minimum hours must be taken in the department at the 6000 level. Fifteen additional elective hours may be taken at the 5000 or 6000 level within the major. The 6100, 6150, 6910, and 6920 courses are mandatory. This 15-hour requirement may not include the following courses: 6700, 6910, 6940 and 6960.
2. A minimum of one graduate-level (at least three hours) course or seminar, approved by the adviser, must be taken in a related area outside the department. This may not include an independent study or research course.
3. The selection of geography and planning courses and related courses should comprise a unified program chosen in consultation with the graduate adviser.
4. At the end of the second semester of full-time work, the student takes a comprehensive written and oral exam upon completion of at least nine course credits, maintaining a B grade or better in 6100 and 6150, and a B average or better for all graduate work. Successful completion of the comprehensive exam entitles the student to become a formal candidate for the M.A. degree.
5. The student then seeks approval of a thesis topic, formulates a thesis committee, and submits the proposal for approval.
6. The student should research and write an approved thesis under the direction of a thesis committee composed of departmental faculty members. The student may select an applied or traditional thesis option.
7. Upon completion of the thesis, an oral examination on the student's research, as it relates to general professional competence, will be required.
8. A minimum enrollment to qualify for the master's degree is two hours of thesis credits, but there may be as many as six hours within the 36 semester hours of graduate work.

The master's program is designed to provide a quality multidisciplinary education, foster theoretical and applied research in geography and planning, promote multicultural understanding, complement interdisciplinary work, and support local community outreach programs and grass-roots organizations. Faculty interests and research facilities offer opportunities to pursue intensive programs in community and urban planning, economic geography, geographic information science, environmental geography and planning, or cultural and behavioral geography.

Certificate in GIS and Applied Geography

Requirements for completion

Student enrolled full-time can complete the requirements for this 15-credit program in one year. Students admitted into the program for the fall semester should be able to enroll in all the necessary courses within the academic year and can complete their final project by the end of the spring semester.

Specific requirements

- Students enrolling in the program will be required to complete a minimum of 12 credits from the list of approved GIS technical courses;
- Students must complete a final three credit project workshop based on a terminal project related to a research problem specific to their discipline;
- Students must maintain a minimum "B" average to complete the certificate program.

- Course selection and the sequence of courses will be agreed upon by the student and the program coordinator to help students complete the program and gain the necessary skills.

Course List

GEPL 5490 Remote Sensing of the Environment
GEPL 5500 Digital Image Analysis
GEPL 5510 Geographic Information Systems
GEPL 5520 Analytical and Computer Cartography
GEPL 5180 Geographic Information System Applications
GEPL 6190 Advanced Geographic Information Systems Seminar
GEPL 6950 Applied Geographics Project Workshop

Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Department of History

William O'Neal, chair

William O'Neal, director of graduate studies

Admission

All students seeking admission to graduate study are required to provide transcripts, GRE scores, three academic letters of recommendation, and a statement of purpose. In addition, students whose native language is not English must submit TOEFL scores. A description of the history program is available from the departmental office or the Web site at www.history.utoledo.edu/GraduateAdmissions.html.

Requirements for the Master of Arts Degree

The student may earn the M.A. degree by completing either 30 graduate credits, including a thesis, of which six credits may, with the approval of the student's committee, be taken outside the department; or 36 graduate credits with an examination in lieu of a thesis, of which 10 credits may, with the approval of the student's committee, be taken outside the department. The choice between the two options will lie with the student's committee and will be made at the time of the student's first advisory conference with the committee. The student must maintain a B average in all graduate work. Each candidate for the M.A. degree must include within the program one course in historiography and two seminars.

Requirements for the Master of Arts and Education Degree

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog. The master of arts and education degree in history requires at least 21 hours of graduate credit in history within the total of 36 hours presented for the degree, including American or European historiography and a seminar. A comprehensive written and oral examination covering all graduate courses also is required.

Requirements for the Ph.D. Degree

The doctor of philosophy degree in history requires a minimum of 62 hours beyond the master's degree, including 24 hours for the dissertation. Doctoral students must complete four seminars, a course in historiography and a teaching workshop.

General Field

The student must stand for examination, written and oral, over one general field, such as U.S. history or Europe since 1600. *See program handbook for additional details.*

Topical Major Area

The student must stand for examination in one major area of concentration. This normally will be the area in which the student will write the dissertation and in which the student has had course and seminar work.

Topical Minor Area

The student will be examined in a minor area outside the general field. Selection of this field will be made by the student and the director of graduate studies.

Additional Study Outside the Department

The student's committee may require additional course work or readings in a department other than history – for example, economics, political science, sociology, geography, English or philosophy. The student will not be examined in the related area, but must satisfy the committee on the quantity and quality of such work. A member of the associated department may participate in the general oral examination.

Foreign Language and Other Tools

Every student in U.S. history, before taking the general or qualifying examinations, must pass an examination in a foreign language – for example, German, French, Spanish, Portuguese, Italian or Russian. The choice of the language required will lie with the student's advisory committee, which also may require a demonstration of competence in other foreign languages or in some appropriate skill, such as computer analysis or statistics. Students in non-U.S. history must demonstrate competence in at least two foreign languages.

Master of Liberal Studies Program

Lawrence Anderson-Huang, director

James Benjamin, adviser for Communication Studies

The master of liberal studies program offers personal enrichment and professional enhancement to individuals with bachelor's degrees who desire additional study in the liberal arts. The program is interdisciplinary in nature, allowing students to do research exploring relationships among traditional areas of study. After a series of core seminars, a student creates his or her own program of study under the guidance of a faculty adviser. The master of liberal studies program works cooperatively with the various departments and undergraduate interdisciplinary studies programs to arrange meaningful experiences for students. For further information, please see the master of liberal studies Web page at <http://mls.utoledo.edu> and/or contact the director.

A certificate in communication studies is available through the master of liberal studies program. See the department of communication for details.

Admission

All students seeking admission to the master of liberal studies program must file an application with the Graduate School. Application materials consist of a cover form, a statement of purpose, post-secondary transcripts (not necessary for applicants with a UT degree), and three letters of reference. Students with an undergraduate GPA of less than 2.70 must also submit GRE scores. Provisional admission that may be upgraded on completing the core seminar series with grades of B or better also is available. Applicants may request or may be requested to have an interview with the director.

Requirements for the Master of Liberal Studies Degree

For the master of liberal studies degree, students must complete the following requirements, totaling 33 hours of study:

1. Core seminars (12 hours):
 - MLS Seminar in the Humanities (MLS 6010).
 - MLS Seminar in the Social Sciences (MLS 6020).
 - MLS Seminar in the Natural Sciences (MLS 6030).
 - MLS Seminar in the Visual and Performing Arts (MLS 6040).
2. Electives, chosen in consultation with the director and an adviser (15-18 hours).
3. Capstone Requirement (3-6 hours)

Thesis option: A thesis is a written report on original independent research conducted by the student under the supervision of his or her thesis adviser. The thesis must be written in scholarly format, with the appropriate citation format and extensive references. The literature review developed for the thesis proposal should serve as the initial component of the thesis. Typical thesis length: 50 to 70 pages including all tables, figures, and references.

Project option: A project is an alternative, creative work. Projects must include an explanatory essay that includes a small research component. A personal memoir must include documentation of the broader context of life experience. The literature review developed for the project proposal may serve as the basis of the explanatory essay. Typical explanatory essay length: 15 to 25 pages including references.

Elective requirements for the MLS / Communication Studies Certificate

The electives above must be chosen from designated courses offered by the department of communication (15 hours).

Department of Mathematics

Paul Hewitt, chair

Biao Zhang, graduate adviser in statistics

Martin Pettet, graduate adviser in pure math

H. Westcott Vayo, graduate adviser in applied math

A full description of programs and requirements, with syllabi for exams, is available from the department office or on its Web site at www.math.utoledo.edu. The paragraphs below represent a synopsis of the essential elements.

Requirements for the Master's Programs

Master of Arts

To obtain the master of arts degree in mathematics, students must complete a minimum of 30 semester hours of graduate credit and meet the following requirements:

1. Complete two-semester sequences in abstract algebra (5330, 5340), real analysis (5820, 5830), and topology (5450, 5460), and a semester course in complex analysis (5880).
2. Complete one, two-semester sequence at the 6000 level in algebra, topology, differential geometry, differential equations or analysis.
3. Complete one of the following courses: Classical Differential Geometry, Ordinary Differential Equations, Partial Differential Equations, Calculus of Variations and Optimal Control, or any course at the 6000 level listed under item 2.
4. The student must pass comprehensive examinations or write a master's thesis. If a thesis is elected, the student

must take an oral examination on the general area of the thesis.

Master of Science

The degree of master of science can be obtained in one of two options.

Option A – Applied Mathematics: To obtain the degree of master of science in the applied mathematics option, the student must complete a minimum of 30 semester hours of graduate.

1. Complete two-semester sequences in numerical analysis (5710, 5720), real analysis (5820, 5830), and differential equations (6500, 6510), and a semester course in complex analysis (5880).
2. Remaining courses may be chosen from the following: Applied Functional Analysis, Linear and Nonlinear Programming, Infinite Dimensional Optimization, Differential Geometry, Differential Equations, Dynamical Systems, Methods of Mathematical Physics, Functional Analysis, Complex Analysis, Discrete Structures and Analysis of Algorithms, Probability, Statistics Probability and Statistics, Operational Mathematics or Calculus of Variations.
3. The student must pass a comprehensive examination or submit and defend a master's thesis.

Option B – Statistics: To obtain the degree of master of science in the statistics option, the student must complete a minimum of 35 semester hours of graduate and meet the following requirements:

1. Complete Applications of Statistics I, Applications of Statistics II, Linear Statistical Methods, Theory and Methods of Sample Surveys, Statistical Computing, Statistical Consulting I, Statistical Consulting II, Categorical Data Analysis, Distribution Free and Robust Statistical Methods, Statistical Inference, and Multivariate Statistics.
2. Complete one of the following: Applied Probability, Measure Theoretic Probability, Theory of Statistics, or Topics in Statistics.
3. Complete one of the following: Linear Algebra I, Applied Linear Algebra, Introduction to the Theory of Probability, Advanced Calculus.
4. Pass a two-part comprehensive examination, one part in probability and statistical theory and one part in applied statistics.

Master of Science and Education or Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

For the degree of master of science and education, the following requirements must be met:

1. A minimum of 32 hours of graduate credit must be completed. Colloquium and proseminar do not count toward the 32 hours. At least 18 hours must be in mathematics and nine hours in education, with an additional six hours to be assigned in conference with the adviser. As part of the additional six hours, the student may elect to write a paper in mathematics education or one of expository character in mathematics.
2. The total graduate and undergraduate program must include the following: at least six hours of abstract algebra and/or linear algebra, six hours in geometry, statistics, probability and/or computer programming, three to six hours of analysis (beyond calculus), three hours of complex analysis and one course in logic and foundations.
3. The student must pass comprehensive examinations in three of the areas of study of mathematics. The exact areas are to be arranged with the adviser.
4. For information on the education course requirements, see the program description provided by the College of Education.

Requirements for the Doctoral Program

The doctorate in mathematics is offered with concentrations in either mathematics or statistics. The broad requirements for these programs are as follows:

1. Each student must pass a qualifying examination within two years of entering the program. Mathematics students must pass two topics chosen from algebra, topology and analysis. For statistics students, the two topics must be analysis and probability and statistics.
2. A minimum of 90 hours of graduate credit must be completed. Colloquium and proseminar do not count in the 90 hours. Of the 90 hours, at least 18 but no more than 36 shall be allotted for the dissertation. Mathematics students must complete two-semester sequences at the 6000 level in algebra, topology, real analysis and complex analysis. Statistics students must complete probability and statistics, real analysis, statistical methods, data analysis and multivariate statistics.
3. The student must pass an oral examination in the general area of the intended thesis research within one year of passing the qualifying examination.
4. The student must demonstrate the ability to read mathematical literature in one foreign language, ordinarily chosen from French, German or Russian. Another language may be substituted if it is necessary for the student's specific program. The language requirement must be met before beginning dissertation research.
5. All doctoral students are expected to participate in a seminar on undergraduate teaching methods and to spend two consecutive semesters in supervised teaching. This requirement should be met before beginning dissertation research.
6. The student must write a Ph.D. dissertation under the direction of a faculty member. Before completing the dissertation, the student must report on it in an open seminar. An outside examiner must approve the completed dissertation, and the student must defend it before a faculty committee appointed for that purpose.

Department of Music

Timothy D. Brakel, chair

Master of Music in Performance Degree

For the master of music in performance degree, students must take a minimum of 30 hours of formal course work. Of the 30 hours, a minimum of 10 hours is required in applied study, leading to a graduate recital. In addition, students will be advised to select a balance of courses (minimum of 10 hours) among music theory, music history and literature, and pedagogy. The remaining 10 hours include the required Graduate Studies in Music course - MUS 5900 (three hours), ensembles (two hours), a document (two hours) and electives (three hours).

Applicants are required to audition for the applied faculty. A diagnostic music theory and history exam will be administered before the first semester of enrollment. Applicants should have the minimum undergraduate GPA (2.70) required by the Graduate School for admission to the program. Applicants who do not have a minimum undergraduate GPA of 2.70 are required to take the GRE and report the results to the Graduate School and the department.

Master of Music in Performance Degree Requirements

1. **Required Music Course (3 hours)**

MUS 5900 Graduate Studies in Music 3

2. **Music Electives (minimum of 10 hours)**

Graduate courses in music theory, music history and literature and pedagogy. The choice of courses will be determined in consultation with the graduate adviser, acting on behalf of the departmental graduate committee.

Courses usually selected include:

MUS 5610 Analytical Techniques 3

MUS 5630 Counterpoint: Comparison of Styles..... 3

MUS 5410	Music History & Literature - World Music	3
MUS 5490	Music History & Literature – 20th Century	3
MUS 5590	Piano Pedagogy	3

Plus special topics and seminars in music theory, history and pedagogy

3. **Applied Music (minimum of 10 hours)**

MUS 6800 Applied Music, two to five credit hours per semester. Students are required to give a graduate recital. Students must be registered for applied music during the semester in which the recital is given.

4. **Ensembles (2 hours)** Ensembles chosen in consultation with the graduate adviser.

5. **Graduate Electives (3 hours)**

Music or nonmusic courses chosen in consultation with the graduate adviser.

6. **MUS 6990 Recital/Document [Independent Study] (2 hours)** A paper of 15 to 20 pages, which covers a theoretical analysis and/or historical review of the music performed on the graduate recital and/or related topics.

7. Students will be required to pass comprehensive and written and oral examinations, normally given during the last semester of work.

Master of Music in Music Education Degree

For requirements of the master of music education degree, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Master of Music in Music Education Degree

For requirements of the master of music education degree, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Department of Philosophy

Benjamin Pryor, chair

Madeline Muntersbjorn, graduate adviser

The Department of Philosophy offers a two-year program of study towards the completion of Master of Arts degree in Philosophy. Admissions are not restricted to students with undergraduate degrees in philosophy. Qualified students from other majors or concentrations will also be considered for admittance. This program is designed to prepare students for higher level graduate work and success within a top flight Ph.D. program in philosophy as well as prepare students to teach philosophy in graduate school or at a community college level.

Requirements for the Master’s Program

Our degree program includes both a thesis option (which includes an extended written treatment of a topic in the candidate’s area of specialization) and a non-thesis option (which involves additional courses and a qualifying exam in an area of specialization). Both tracks require a minimum of 33 credit hours, though students have the opportunity to pursue additional credits. Students may opt for either track, though students who do not pass the thesis qualifying examination must satisfy the non-thesis requirements to complete their MA.

For the degree of master of arts, students must meet the following departmental requirements:

Thesis option: Completion of at least 27 semester hours of graduate credit in courses offered by the department of philosophy, excluding readings and research courses; pass a qualifying or prospectus examination in the area of the

student's thesis; a written thesis for 6 semester hours of credit; and an oral examination covering the material of the student's thesis and a general competency in the subject areas relevant to the thesis.

Non-thesis option: Completion of 33 semester hours of graduate credit in courses offered by the department of philosophy, excluding readings and research courses; and completion of an examination in one sub-field or area of competency in contemporary philosophy chosen by the student in consultation with the faculty.

For both options: Completion of PHIL 3000 or 6000 (or its equivalent or satisfied as an undergraduate); completion of PHIL 3210 and 3230 (or their equivalents or satisfied as an undergraduate); and completion of at least 42 semester hours of graduate and undergraduate credit in philosophy.

Students must also satisfy the requirements of the graduate college as specified in the graduate student handbook.

Department of Physics and Astronomy

Karen S. Bjorkman, chair

Song Cheng, graduate adviser

Requirements for the Master's Degree

For the master of science or master of science and education, a student must complete 30 hours of graduate credit that includes the following:

- (a) PHYS 6140 and an additional 15 hours of graduate course credit in physics, with six of the 15 hours numbered above 6000. Credit in PHYS 5900, 6010 and/or 6020 will not count toward either degree.
- (b) The student must present a satisfactory thesis based on directed research, for no more than eight credit hours.
- (c) The remaining hours within the 30 total may be chosen from graduate courses approved by the student's committee. In some cases students working toward the Ph.D. may earn the M.S. or the M.S.E. degree without formal presentation of the M.S. thesis if they have passed the Ph.D. qualifying examination, satisfied the course requirements for the M.S., and completed a research project under the supervision of a research adviser. Students meeting these requirements may petition the department to grant the M.S. without formal presentation of a thesis.

M.S. in Physics with Materials Science Option

A master of science degree in physics with a materials science option is available. For this degree, a student must complete 30 hours of graduate credit, including the following:

- (a) PHYS 6140, 6540, 6550 and an additional 12 hours of graduate course credit in physics with six of the 12 hours numbered above 6000 (no degree credit for PHYS 5900, 6010 or 6020).
- (b) The student must present a satisfactory thesis based on directed research, for no more than eight credit hours.
- (c) The remaining hours within the 30 total may be chosen from any graduate courses approved by the student's committee.

Master of Science and Education

For the degree of master of science and education, students must meet requirements for the degree as stated in the

College of Education graduate section of this catalog.

Requirements for the Doctoral Program

For the doctor of philosophy degree, a student must complete a total of 90 hours of graduate credit including the following: MATH 6730; PHYS 7220, 7250, 7260, 7320, 7330 and 7450; at least 18 additional hours of credit in physics in courses numbered higher than 6100 approved by the student's committee; and 30 to 48 hours allowed for the dissertation research, depending on the nature of the research and the needs of the student. Credit in PHYS 5900, 6/8010, 6/8020, 6/7030 or 7910 will not count toward degree requirements.

The doctoral degree requirements include a Ph.D. qualifying examination, a comprehensive examination, and a final oral examination. Passing the qualifying examination is a prerequisite for status as a Ph.D. candidate in physics. After passing the qualifying examination, the doctoral student must select a field of specialization. A faculty committee is formed, chaired by the research adviser, to evaluate the student's progress and to establish an appropriate program of course work. This committee administers the oral comprehensive examination, after which only the dissertation research requirement remains. The graduate program ends with the student presenting the dissertation and defending it satisfactorily in an oral examination.

Ph.D. in Physics with Concentration in Astrophysics

The Ph.D. in physics with concentration in astrophysics satisfies all the requirements for the Ph.D. in physics while preparing students for a career in astronomy and astrophysics.

To fulfill the requirement of 18 hours of credit in physics courses numbered above 6100, the concentration requires:

- PHYS 6/7810-20-30-40 [Stellar Astrophysics I and II, Galactic Astronomy I and II]
- Two related elective courses, which may include: PHYS 6/7710 [Atomic Physics], PHYS 6/7720 [Atomic and Molecular Spectroscopy], PHYS 6/7740 [Nuclear Physics], PHYS 8860 [General Relativity], or PHYS 8870 [Cosmology] or other appropriate courses

In addition:

- Three hours of PHYS 6/8980 [Special Topics] on an astrophysics-related topic or PHYS 6/8890 [Current Issues in Astrophysics]
- A satisfactory dissertation in astronomy or astrophysics with a supervisor who is a member of the Ritter Astrophysical Research Center.

Ph.D. in Physics with Concentration in Materials Science

The Ph.D. in physics with concentration in materials science satisfies all the requirements for the Ph.D. in physics while preparing students for a career in materials science.

In addition, the concentration requires:

- Two core courses in the fundamentals of materials science:
 - PHYS 8540 Structure, Defects and Diffusion
 - PHYS 8550 Thermodynamics and Phase Transformation in Condensed Systems;
- Two additional elective courses in materials science and engineering chosen from a list of courses approved by the faculty of the Center for Materials Science and Engineering; and
- A dissertation in a materials-related field with a supervisor who is a member of the Center for Materials Science and Engineering.

Ph.D. in Physics with Concentration in Medical Physics

The Ph.D. in physics with concentration in medical physics satisfies all of the requirements for a Ph.D. in physics degree while preparing students for a career in medical physics. The medical physics-related courses, which total at least 27 credit hours, are provided by the Medical University of Ohio (MUO) College of Medicine. The student's faculty advisory committee will consist of faculty members from the department of physics and astronomy and the medical physics fields. The committee may also include other members appropriate for this degree. A dissertation research project is chosen that will have relevance to both physics and medical physics. The Ph.D. requirement of 18 additional credit hours outside the core courses will be satisfied by the specified additional graduate courses in physics (UT) and in medical physics. (MUO).

Ph.D. in Physics with M.S. in Engineering

The University of Toledo has established a joint program leading to the Ph.D. degree in physics and the master of science degree in computer science and engineering (CSE) or in electrical engineering (EE). The program is designed for physics students who wish to obtain background in either of the engineering fields and for engineering and computer science students who wish further study in physics. It is designed so that the B.S. in computer science and engineering or electrical engineering is not required. In order to complete this program, students must satisfy all the requirements for the Ph.D. in the department of physics and astronomy and the M.S. degree in the department of electrical engineering and computer science. Some courses will satisfy both requirements. Students will normally enter the program after passing the Ph.D. qualifying examination in physics and satisfying the entrance requirements to the electrical engineering and computer science graduate program. The student's Ph.D. dissertation adviser will be in physics and astronomy, and an adviser in electrical engineering and computer science will serve as the outside member on the student's advisory committee. Students will normally take one course per semester in electrical engineering and computer science, along with courses in physics.

Department of Political Science and Public Administration

Mark E. Denham, chair

Lynn Bachelor, director, M.P.A. program

Renee J. Heberle, director, M.A. program

Master of Arts in Political Science (M.A.)

The master of arts program is designed to help students become thoroughly grounded in the knowledge base and research methods of political science. The department offers study in five areas of the discipline -- American government (including state and local politics), comparative government, international relations, political theory and methodology.

Admission Requirements

Requirements for admission are a bachelor's degree from an accredited educational institution, acceptable scores on the GRE General Test, and three letters of recommendation from those in a position to judge the academic qualifications of the applicant. Official results should be sent to the Graduate School. While the Graduate School allows a minimum undergraduate GPA of 2.7, those near this threshold should have demonstrated significant improvement in the last two years of their undergraduate work.

Those admitted to the M.A. program normally begin their study during the fall semester. Applications for admission and financial aid should be submitted by March 15, although applications for admission alone are welcome at any time.

Degree Requirements

The requirements for the master of arts in political science are 30 semester credit hours and include:

- a. One required course: PSC 6110 (3 hours);

- b. Three seminars or lecture courses open only to graduate students: several 5000-level courses (3 hours) and any 6000-level course (3 hours each);
- c. A required master's thesis: PSC 6960 (6 hours); and
- d. Two courses (6 hours) may be taken outside of the department.

Academic Standards

M.A. students must maintain a minimum cumulative GPA of 3.0 overall and in their political science courses. Only those classes with a grade of C or higher may be counted toward the degree. A student receiving two grades below a B (i.e., of 2.67 or less) may be removed from the program.

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

The master of public administration (M.P.A.) is a professional degree for those pursuing administrative careers in government and nonprofit organizations. The program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA), and serves part-time and mid-career, as well as full-time students.

Admission Requirements

Applicants to the M.P.A. program must satisfy the following requirements:

- a. An undergraduate degree with a minimum GPA of 3.0 calculated on a 4.0 basis;
- b. Scores from the GRE. A combined score of 1,000 in the verbal and quantitative portions of the GRE is preferred, and the examination must have been taken in the past two years. With permission, the applicant may substitute scores for the Law School Admission Test (LSAT) or the Graduate Management Aptitude Test (GMAT);
- c. Three or four letters of recommendation, which must be academically or employment related. These should be from individuals familiar with the applicant's academic abilities and professional goals. Applicants who obtained their undergraduate degrees in the last five years must submit at least two academic letters; and
- d. A thoughtfully drafted statement of purpose.

Early Admission to M.A. in Political Science and Master of Public Administration Programs

Description: The Early Admission option allows advanced undergraduates with a major or minor in political science or public administration to enroll for graduate level credit in up to 9 hours of 4/5000 level classes. Students accepted in the Early Admission option receive both graduate and undergraduate credit for these classes; undergraduate instructional fees will apply to these three courses.

Eligibility

To be eligible for the Early Admission program, students must have a major or minor in political science or public administration, be within one year of graduation, have a cumulative GPA of 3.3 or higher, and submit an application no earlier than three semesters prior to expected completion of the B.A. program.

Application process:

To apply for the Early Admission program, students should complete an Application for Early Admission (available from the Department of Political Science and Public Administration), submit three letters of recommendation (from an undergraduate advisor and two undergraduate course instructors), a one page biographical sketch, and a regular graduate application form to the Chair of the Department of Political Science and Public Administration, MS 511, The University of Toledo, Toledo, OH 43606

Students accepted into this option will initially be granted provisional graduate admission to allow them to enroll in 5000-level courses in the Department of Political Science and Public Administration. To receive dual

(undergraduate and graduate credit), the following conditions apply:

- Courses must be taken at The University of Toledo **after** acceptance into the Early Admission option
- Only 5000-level courses in Political Science and Public Administration may be included
- Must complete all graduate level requirements in the course and be evaluated by the same criteria as graduate students
- Must complete graduate plan of study indicating courses that will receive graduate and undergraduate credit

Degree Requirements

All students must satisfy the following University and program requirements:

- Program prerequisites: PSC 3420 (or equivalent), PSC 3110 (or equivalent). b. General course work requirements: 12 graduate courses (36 hours), including at least five courses open only to graduate students, of which three must be at the 6000 level, with a minimum GPA of 3.0. This does not include prerequisites or experiential learning (Research Report for In-Service Students or Internship for Pre-Service Students).
- Common core requirements:

PSC 5140	Intermediate Social Science Statistics	3
PSC 5430	Public Personnel Administration	3
PSC 5440	Budgeting and Financial Administration.....	3
PSC 5470	Public Organization Theory	3
PSC 6410	Proseminar in Public Administration	3
PSC 6420	Quantitative Methods in Decision Making	3
PSC 6430	Seminar in Public Policy Theory & Analysis	3
- Electives: Students must take a minimum of five additional courses (15 hours from the list of elective courses in general management, criminal justice, economics and financial administration, health administration, human resources management, nonprofit organizations and urban administration). Electives should be selected in consultation with the M.P.A. adviser and may be used to develop an area of specialization.
- Experiential learning: All M.P.A. candidates must demonstrate the application of public administration theory, methods and techniques to a practical job situation. Those employed in a governmental or nonprofit agency at the professional level (in-service students) must complete PSC 5950. Those without government or nonprofit job experience at the professional level (pre-service students) must complete six credit hours of PSC 6940. At the end of the internship, the intern submits a final report and the agency supervisor submits an evaluation of the intern. Pre-service students should begin planning their internships with the program adviser before they expect to receive their degree.
- Comprehensive examination: Students must pass a written comprehensive examination. A student who fails the examination may retake it once.

Certificate Program in Management of Non-Profit Organizations

This program is intended both for professionals already working or volunteering in the nonprofit sector, and for students without professional experience who seek to prepare themselves for nonprofit careers.

The fundamental organizational and management principles provided by this program can be used by leaders in the nonprofit sector to strengthen both their systems and service delivery. The Certificate will prepare students to lead and administer nonprofit organizations as paid staff, directors, board members, philanthropists or volunteers in human-service, cultural, educational, religious and community organizations. In addition, students in the MPA and other graduate

programs can use their elective hours to earn this certificate.

The program consists of four required courses from the department of political science and public administration and marketing, and one elective selected from an approved list available from the Program Director.

Required courses: Mgmt of Nonprofit Org (PSC 5410), Budgeting & Financial Admin (PSC 5440), Public Personnel Admin (PSC 5430), Marketing for Nonprofit Org (MKTG 5170), or Marketing Systems (MKTG 5410).

Undergraduate Prerequisite: PSC 3420, Principles of Public Administration or equivalent, or permission of Program Director.

Certificate Program in Municipal Administration

The primary purpose of this certification is to strengthen the professional management skills of personnel in responsible local government administrative positions. These include supervisors, department heads, administrative assistants and others who need more management training to enhance their career prospects. Students in the M.P.A. program may also use their electives to receive this certificate. In addition, this certificate program is appropriate for graduate students in geography and planning and civil engineering who wish to improve their knowledge of administration.

Certificate Program in Health Care Policy and Administration

This program is intended for students who are interested in pursuing mid-level careers in the health-care field or for those already working in the field who want to expand their knowledge without pursuing a formal graduate degree program in health administration. The program is composed of five courses in the departments of political science and public administration, health education, finance, and related areas.

- Health Care Policy (PSC 5330) or Issues in Public Health (PUBH 664)
- Health Care Delivery Systems (PSC 5350) or PUBH 664
- Health Systems Management (PSC 6440)
- Two additional courses chosen from the Departments of Health and Rehabilitative Services, Economics, Sociology, Finance, or Management, in consultation with a faculty adviser from the MPA program.

Joint J.D./M.P.A. Degree

The J.D./M.P.A. dual degree program offers graduate students the opportunity to earn two graduate degrees evidencing the completion of the curriculum for the juris doctor (J.D.) from the College of Law and the curriculum for the master of public administration (M.P.A.) from the College of Arts and Sciences department of political science and public administration. The program is administered jointly by the College of Law and the department of political science and public administration. The program is designed for students who wish to be effective in administrative and regulatory positions in public and in private, nonprofit organizations.

Admission Standards and Requirements

To be admitted to the J.D./M.P.A. program, a student must first be admitted to both the College of Law and the M.P.A. program in the department of political science and public administration. The student must qualify for admission to each degree program, make separate application for admission to each program, and be admitted to each program in order to be eligible for the J.D./M.P.A. program.

After admission to the College of Law and the M.P.A. program in the department of political science and public administration, the student must be admitted to the J.D./M.P.A. program by the coordinating committee.

Requirements for Degrees and Continued Participation in the Program

Juris Doctor: In order to qualify for the juris doctor from the College of Law, a student must comply with all the academic and nonacademic rules of the college, with respect to the admission process and during the period after initial enrollment in the college until the granting of the degree. The College of Law will grant credit toward the J.D. for

certain courses taken in the department of political science and public administration under the J.D./M.P.A. program, as detailed below.

Master of Public Administration Degree: In order to be eligible for the M.P.A. degree from the department of political science and public administration in the College of Arts and Sciences, a student must complete at least 12 graduate-level courses (36 credit hours), including at least five courses open only to graduate students, of which three must be at the 6000 level, with an overall minimum GPA of 3.0. A student must complete any prerequisite courses and all required courses, and the M.P.A. experiential learning requirement. The department of political science and public administration will grant credit toward the M.P.A. degree for certain courses taken in the College of Law, as detailed below.

Course Requirements

College of Law Credit for Certain Political Science Courses in the J.D./M.P.A. Program: Under the J.D./M.P.A. program, up to 12 semester credit hours of approved graduate M.P.A. courses may be applied toward the completion of the total credit hours required for the J.D. The student must earn a grade of B (3.0) or better in an M.P.A. course for the course to be credited toward the J.D.

The 12 hours of approved M.P.A. courses are as follows:

PSC 5430	Public Personnel Administration	3
PSC 5470	Public Organization Theory	3
PSC 6420	Quantitative Methods in Decision Making	3
PSC 6430	Public Policy Analysis	3

On written application by the student, and for good cause shown, the associate dean of the College of Law may substitute another graduate PSC course for one on the approved list.

Political Science Credit for Certain College of Law Courses in the J.D./M.P.A. Program: Under the J.D./M.P.A. program, up to 12 semester credit hours of approved upper-level courses in the College of Law may be applied toward the completion of the 36 credit hours required for the M.P.A. degree. In College of Law graded courses, the student must earn a grade of C (2.0) or better; and in College of Law ungraded courses, the student must earn a Pass or better for the course to be granted credit toward the M.P.A. degree.

Scheduling: A full-time student entering the College of Law must enroll full time exclusively in the College of Law beginning in the fall, for the first academic year. A part-time student entering the College of Law must enroll exclusively in the College of Law beginning in the fall of the first year, for two academic years.

After the initial first year or two years (as the case may be) in the College of Law, a student in the J.D./M.P.A. program is required to maintain his or her status as a student in the College of Law by taking at least one course for credit in the college during each academic year until the course requirements for the J.D. are completed.

Department of Psychology

Mark Denham, chair

Rickye S. Heffner, associate chair

Joni L. Mihura, director of clinical training

Requirements for the Master's Program

Students enrolled in the doctoral program earn the M.A. degree in partial fulfillment of requirements for the Ph.D. degree. For these students, requirements for the M.A. degree are an integral part of the doctoral program.

A minimum of 35 semester hours beyond the bachelor's degree is required. Each student must complete specific course-related requirements, including research practicum experience, and must complete a master's thesis. Although the

program is designed to provide broad training in general psychology, it is expected that the thesis will be conducted within one of the following domains: cognitive psychology, developmental psychology, psychobiology and learning, or social psychology.

Master of Arts and Education

For the degree of master of arts and education, students must meet requirements for the degree as stated in the College of Education graduate section of this catalog.

Requirements for the Doctoral Program

Applicants must satisfy admission requirements of the Graduate School, the College of Arts and Sciences, and the department. Each applicant must submit an application, transcripts of previous academic work, three letters of recommendation, and GRE scores (including the advanced psychology test).

A minimum of 92 semester hours of course work is required in the Ph.D. program in psychology, 47 hours of core requirements, and a minimum of 45 hours in one of two areas of concentration -- behavioral science or clinical psychology. Training in clinical psychology, which is fully accredited by the American Psychological Association, provides students with a broad educational foundation in the science and the practice of clinical psychology. Training in behavioral science allows students to focus on various aspects of cognitive psychology and language, developmental psychology, psychobiology and learning, and social psychology.

The purpose of the doctoral program is to prepare students for careers in academia (teaching, research, clinical work), in mental health programs, in clinical intervention settings, as well as in other settings. Doctoral training emphasizes the inculcation of scientific attitudes with regard to the gathering and evaluation of information; the solving of basic and applied research problems; and clinical assessment and psychotherapy. Each student must complete specific course-related requirements, a master's thesis, doctoral examinations, and a doctoral dissertation. The department's foreign language requirement also must be completed successfully. An individual plan of study is developed by the student in consultation with the academic adviser and advisory committee.

Applicants must satisfy admission requirements of the Graduate School and the department. Each applicant must submit an application, transcripts of previous academic work, three letters of recommendation, and GRE scores (including the advanced psychology test). A brief biographical sketch also is required from each applicant in clinical psychology.

Spatially Integrated Social Science (SISS)

Peter S. Lindquist, Director

The Spatially Integrated Social Science (SISS) Ph.D. Program is a multidisciplinary degree program offered jointly by a consortium of academic departments in the College of Arts and Sciences that include Geography and Planning, Economics, Political Science and Public Administration, and Sociology and Anthropology. This program is designed around the application of geographic information science, spatial statistics, spatial econometrics and spatial analysis to study the spatial dimension of human and social dynamics, including interaction of individuals and society, government, and market participants.

Students entering this program must have completed a master's degree, preferably in a Social Science discipline. In addition, all students admitted into the program must have completed two courses covering geographic information systems and one course in multivariate statistics. New graduate students who are deficient in these requirements must complete prerequisites prior to entering the program. All students seeking admission are required to provide transcripts, GRE scores, three academic letters of recommendation, and a statement of purpose. All students applying from universities outside of the U.S. are also required to submit TOEFL scores. Completion of the Ph.D. takes up to four

years of study beyond the master's degree. The doctoral degree requires 60 semester hours beyond the Master's Degree with 36 course credits and 24 dissertation credits.

Requirements for the Ph.D.

Course Work. The doctoral degree requires 60 semester hours beyond the Master's Degree with 36 course credits and 24 dissertation credits. 18 credits (six courses) are mandatory core courses (SISS 7010, 7020, 8010, 8020, 8030, 8040). Two advanced seminar courses (6 credits) selected from SISS 7030, 8150, 8160, 8170, 8180, 8190, 8200, 8210.) Two elective courses (6 credits) selected within one of the allied social science departments participating in the program: Geography and Planning, Economics, Political Science and Public Administration, or Sociology and Anthropology. Two additional courses (6 credits) from advanced seminar courses or electives. All courses must be approved by the program director or dissertation advisor. Enrollment for dissertation credit is reserved for the third and fourth years of the program after course work has been completed and the qualifying exam has been passed. Students are eligible to take a minimum of six credits of dissertation in a semester.

Comprehensive Examination. A comprehensive examination will be scheduled for the summer following the end of the first year of the graduate program and will cover material presented in the first five core courses of the program. To qualify, a student must have a "B" or better in all five core courses. Upon successful completion of the examination, the student can begin taking the advanced seminars and electives in the second year of residence.

Dissertation. Each student must complete 24 credit hours of dissertation. In the Spring Semester of the second year of residence, students can begin to establish a Dissertation Advisory Committee. Students will also enroll in the final core course (SISS 8040: Research Design). It is during this time that the student should begin to focus on establishing a dissertation topic. A Qualifying Exam will be administered at the beginning of the Fall Semester of the student's third year. The Qualifying Exam will test each student on the basis of their knowledge and skills in the area(s) of their dissertation topic. Upon completion of the qualifying exam, students will prepare a dissertation proposal and defend it by end of semester. Upon successful completion of the defense, each student will work on their dissertation for the remainder of Year 3 and up to Year 4.

Department of Sociology and Anthropology

Barbara K. Chesney, chair

Elias T. Nigem, graduate director, adviser

Requirements for the Master's Program

Regular admission to the master of arts and master of arts and education degree programs in sociology requires meeting the admission requirements of the Graduate School, including presentation of scores on the aptitude sections of the GRE.

The master of arts in sociology requires a minimum of 37 credit hours of study. These hours are made up of required courses in theory, methods, and statistics (see B below); elective course work (see C below); and completion of a thesis, an internship or additional course work (see D below).

The program requirements are:

A. Required background courses (0-9 hours)

(For students who have not completed these or equivalent undergraduate courses):

SOC 5040 Classical Theory	3
SOC 5270 Social Research Methods	3
SOC 5290 Social Research Statistics.....	3

B. Core courses required of all students (10 hours)

SOC 6000 Introduction to Graduate Studies in Sociology	1
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SOC 6040 Advanced Sociological Theory or	
SOC 6050 Advanced Social Theory & Political Economy	3
SOC 6270 Advanced Social Research Methods	3
SOC 6290 Advanced Social Research Statistics.....	3

- C. **Program electives (21 hours):** These may be completed by choosing from 5000- and 6000-level courses offered in sociology. Students must take a minimum of two of these courses at the 6000 level.

Students in the M.A. degree program may choose to use their elective hours to focus on a substantive area of the discipline. The faculty offers four areas of concentration – health and medicine; class, race and gender; law and society; and social change/ globalization.

- D. **Thesis/Internship/Course Work:** Students may choose to complete a thesis (six hours), an internship (six hours) or six additional hours of course work with adviser approval. Organized and presented in a fashion consistent with Graduate School guidelines, the master’s thesis is an original piece of research developed in collaboration with a full-time member of the departmental faculty who serves as thesis committee chair. Two additional full-time faculty members (at least one of whom is a member of the departmental faculty) may also serve as advisers to the student and are members of the thesis committee. Students should enroll in SOC 6960 for thesis credit; these hours will be graded on a S/NC basis.

Students selecting the internship must develop this option in concert with two members of the full-time faculty, one of whom will serve as chair. A third member of the committee will come from the field in which the internship is located. Examples of internship settings include community organizations, health facilities, criminal justice facilities and government offices. Internships must place students in a position to make sociological observations about the setting. These observations will be the basis for an internship report to be filed with the graduate adviser, after approval by the internship committee. Students should enroll in SOC 6940 to receive credit for the internship; these hours will be graded on a S/NC basis.

- E. **Independent Research:** Generally, students may take no more than three hours of independent study or research (5990, 6900, 6990) to complete their degree requirements. Exceptions may be approved by the graduate adviser to a maximum of six hours.

Typically, students may apply no more than three hours taken outside the department toward completion of the degree requirements. Exceptions may be approved by the graduate adviser.

Students should consult with the graduate adviser for additional information about program requirements and options.