

# THE GRADUATE SCHOOL

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The University of Toledo offers a wide array of master's and doctoral programs. This catalog provides you with the necessary information to make your academic choices regarding graduate courses and programs. It contains course descriptions and academic regulations. For more detailed information about specific policies or academic programs please consult the graduate adviser in your chosen discipline or the Graduate School.

## Degrees Offered

### College of Arts and Sciences

Master of Arts or  
 Master of Arts and Education in  
   Economics  
   English  
   Foreign Language  
     French  
     German  
     Spanish  
   History  
   Mathematics  
   Sociology  
 Master of Arts in  
   Geography  
   Philosophy  
   Political Science  
   Psychology  
 Master of Art Education (see College of Education for details)  
 Master of Music Education (see College of Education for details)  
 Master of Music Performance  
 Master of Science or  
 Master of Science and Education in  
   Biology  
   Chemistry  
   Geology  
   Mathematics  
   Physics  
 Master of Science and Education in  
   Public Health (see College of Health and Human Services for details)  
 Master of Arts and Education in  
   Anthropology (see College of Education for details)  
 Master of Liberal Studies  
 Master of Public Administration  
 Master of Public Administration/Juris Doctor  
 Doctor of Philosophy in  
   Biology  
   Chemistry  
   History  
   Mathematics  
   Physics  
   Psychology  
 Doctor of Philosophy in Physics/Master of Science in Engineering  
 Post Baccalaureate Certificate  
   Health Care Policy and Administration  
   Municipal Administration

### College of Business Administration

Master of Business Administration  
 Executive Master of Business Administration  
 Master of Business Administration/Juris Doctor (J.D.)  
 Master of Science in Accounting  
 Doctor of Philosophy in Manufacturing Management and Engineering

### College of Education

Master of Education  
   Art Education  
   Career and Technical Education  
   Curriculum and Instruction  
   Educational Administration and Supervision  
   Educational Psychology  
   Educational Research and Measurement  
   Educational Technology  
   Educational Theory and Social Foundations  
   Elementary and Early Childhood Education  
   Health Education  
   Higher Education  
   Music Education (Master of Music Education)  
   Physical Education  
   Secondary Education  
   Special Education  
 Master of Arts and Education  
   Education and Anthropology  
   Education and English  
   Education and English as a Second Language  
   Education and French  
   Education and German  
   Education and History  
   Education and Mathematics  
   Education and Sociology  
   Education and Spanish  
 Master of Science and Education  
   Education and Biology  
   Education and Geology  
   Education and Mathematics  
   Education and Physics  
 Education Specialist  
   Educational Administration and Supervision  
   Curriculum and Instruction  
 Doctor of Education or Doctor of Philosophy in  
   Curriculum and Instruction  
   Foundations of Education  
 Doctor of Education in Educational Administration and Supervision  
 Doctor of Philosophy in Higher Education

## College of Engineering

Master of Science  
Bioengineering  
Chemical Engineering  
Civil Engineering  
Electrical Engineering  
Engineering  
Industrial Engineering  
Mechanical Engineering  
Doctor of Philosophy  
Engineering  
Manufacturing Management and Engineering

## College of Health and Human Services

Master of Arts in Counselor Education  
Community Counseling  
School Counseling  
Master of Arts in School Psychology  
Education Specialist  
School Psychology  
Doctor of Philosophy in Counselor Education  
Master of Science in Exercise Science  
Applied Biomechanics  
Clinical Kinesiology  
Clinical Exercise Physiology  
Exercise Physiology  
Doctor of Philosophy in Physical Education: Exercise Science  
Master of Public Health  
Master of Arts in Recreation and Leisure Studies  
Recreation Administration  
Recreation Therapy  
Recreational Therapy and Therapeutic Arts  
Master of Arts in Speech-Language Pathology  
Doctor of Philosophy in Health Education

## College of Law

Juris Doctor (J.D.)  
Juris Doctor (J.D.)/Master of Business Administration (M.B.A.)

## College of Pharmacy

Master of Science in Pharmaceutical Sciences  
Master of Science in Medicinal Chemistry  
Doctor of Philosophy in Medicinal Chemistry  
Doctor of Pharmacy

## Admissions

### Financial Assistance

Assistantships are available for students studying for advanced degrees. Students holding assistantships receive a stipend for service as assistants and a tuition fee award. Tuition-only scholarships also are available. Contact department chairs or designated directors of graduate programs for application procedures.

A limited number of University and Endowed Fellowships are available in master's and doctoral areas for outstanding students. Nominations should be made by University of Toledo advisers and department chairs.

Fellowship students receive a stipend and a scholarship for tuition and fees.

Scholarships from foundations and societies are available to students who have maintained a high undergraduate and graduate scholastic record. Such scholarships usually permit full-time or part-time study. Applications can be obtained from the Graduate School office; however, prospective students are advised to inquire directly to agencies that may provide scholarships or other financial support.

### Admission Application Forms

Application may be made on the form provided by the Graduate School or submitted electronically via the Internet at <http://www.utoledo.edu/grad-school/>. Application forms and transcripts must be filed at least four weeks prior to registration in order to be considered. An application fee of \$40 (check or money order payable to The University of Toledo) must accompany each application for admission. This fee is nonrefundable. However, all supporting materials and fees must be submitted by mail. It should be noted that some departments or programs have an on-line preapplication process intended to prescreen students for possible admission. In all of these cases when prospective students are advised that admission is likely, they are also advised to go through the formal Graduate School application process described above.

### Admission Requirements

An applicant is considered for admission to the Graduate School on the basis of the performance of the applicant in his or her undergraduate program, a well-formulated objective for graduate study and recommendations from college faculty members acquainted with the student's ability. In some instances, additional recommendations are required. The specific requirements are:

1. A bachelor's or professional degree earned from a department of approved standing and granted by an accredited college or university.
2. A 2.70 or equivalent GPA ratio for all previous academic work, or
  - a. If the GPA is less than a 2.70 or equivalent, applicants are required to forward results of the Graduate Record Examination (GRE) and/or other appropriate qualifying examinations as specified by the department concerned.
  - b. Various departments may require the GRE or other qualifying examinations for all applicants.
3. Prerequisite academic work that indicates the applicant should be able to pursue effectively the graduate work in the department in which specialization is desired.
4. Acceptance by the college and/or department concerned.
5. In addition to the requirements for regular admission, all students from countries where English is not the primary language must achieve satisfactory scores on the Test of English as a Foreign Language (TOEFL) and the general test of the GRE. All international students also must demonstrate that they have adequate financial resources for their graduate education before they can be admitted. All international students are required to have health and accident insurance at time of registration.

Students not meeting requirements for admission to the Graduate School may apply to the appropriate baccalaureate college for admission as an undergraduate with degree (UWD) to make up deficiencies and to establish a basis for reconsideration of admission to the Graduate School. UWDs are not permitted to register for graduate credit courses.

Admission to a master's program does not automatically admit a student to the doctoral program.

## Classification of Students

Students may be admitted in six categories to take graduate studies.

1. **Regular.** An applicant is admitted as a regular graduate student if, after considering all of the required documents, the applicant is considered to meet all admission requirements.
2. **Provisional.** An applicant is admitted as a provisional student if, at the time of application, all of the requirements for admission have not been completed. All admission requirements must be completed during the first semester of attendance.
3. **Non-Degree Student.** Individuals who want specific courses or groups of courses to meet special personal needs may be considered for admission to the individual department and college as non-degree students. These students are expected to have at least a bachelor's degree and must have permission of the graduate adviser of the department to enroll in each specific course. Persons applying are not candidates for degrees, but subsequent admission to a degree program is possible on recommendation of the college. In such cases, up to 12 graduate credit hours earned as a non-degree student, may, upon approval, be accepted as determined by the college and department concerned.
4. **Special Student Status.** Applicants interested in taking graduate courses for personal enrichment, professional development, certification, or who wish to explore graduate study prior to deciding on a degree program, may enroll under Special Student Status. This status is not an admission to a Graduate School degree program. However, upon application to the Graduate School and if subsequently accepted to a degree program, a maximum of 10 semester hours earned while on this status may, upon approval, be counted toward a degree. Applicants must present proof of a bachelor's degree at the time of application or within the first semester of enrollment; without such proof, registration will be canceled. Since this status is not available in all academic areas, applicants should inquire with the Graduate School, the appropriate department or college before submitting an application.
5. **Conditional Admission Status.** Applicants who meet all qualifications for admission to a graduate program, except for the TOEFL requirement, will be considered for conditional admission. To be considered in this category, the applicant must (1) have submitted a TOEFL score greater than 450, (2) be self-supporting, and (3) satisfy all other academic requirements. A student with conditional admission status may not register for any graduate level course work until a TOEFL score of 550 or higher is obtained. Students in this category will be required to enroll for English language training at the American Language Institute until the required minimum 550 TOEFL score is achieved.
6. **Transient Admission.** A student enrolled in a graduate program at an accredited institution other than The University of Toledo may be admitted as a graduate transient student. A transcript of work completed at The University of Toledo will be sent to the student's home institution for the semester enrolled. This status is granted on a semester basis and is contingent upon approval of the institution in which the student is pursuing a degree.

## Cooperative Enrollment Program

The University of Toledo, Bowling Green State University and the Medical College of Ohio jointly sponsor this program, which allows

graduate students at one institution to enroll and receive credit for classes offered at the other institution. The cooperative program provides graduate students the unique opportunity to enhance their academic experience by taking advantage of resources provided by the three institutions. Credit and grades earned count as resident credit at the home institution.

Students at any of these institutions must be admitted under the cooperative student status, and the approval of the graduate dean of the student's home institution is required before a student receives credit and a grade for the class in which he/she has enrolled. In addition, The University of Toledo graduate students who enroll at Bowling Green State University or the Medical College of Ohio are required to complete a minimum of 51 percent of their courses in their degree programs on the main campus of The University of Toledo. Part-time graduate students pay the instructional, general, and if applicable, the nonresident fees at the host institution on a per-hour basis. Instructional and nonresident fees will be waived by the host institution for those students who have paid full-time instructional, general and nonresident fees at their home institution, or who are graduate assistants or teaching fellows at their home university.

## Letter of Admission

A letter of admission will be issued to the student upon the satisfactory completion of all requirements. A copy of this admission will be kept in the student's file in the Graduate School office and copies will be forwarded to the program adviser and the Student Records office.

## Transcripts

Three transcripts (one of which must be official\*) of all undergraduate credits and all degrees earned must be provided by the student. If previous graduate work has been undertaken, three transcripts of these records also must be filed with the Graduate School. The official copy will be filed with the Office of Registrar and the other copies will be retained in the Graduate School office and the college dean's file.

**\*Note:** An official transcript is defined as one that is **received directly from the issuing institution**. Transcripts marked "issued to student" are not considered official transcripts.

## Academic Regulations

### Responsibility of Graduate Students

The graduate student is advised and expected to become familiar with academic regulations of the University and the particular requirements of the specific educational program. The student is solely responsible for complying with all regulations of the University, the Graduate School and the department of instruction, and for meeting all requirements for the degree. The student should consult with the adviser in the event that there is any question concerning the requirements for the degree. The student should determine that proper prerequisites for each course to be taken have been met. Regulations of the graduate faculty require that graduate students maintain (a) a GPA of 3.0 on a 4-point system for all courses completed and (b) an average of 3.0 on a 4-point system for courses completed in the department of specialization. Students whose GPA falls below 3.0 on the 4-point scale are subject to dismissal from Graduate School. Grades of A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and F are used in determining GPAs. A grade of below a C (2.0) in a graduate course is unsatisfactory and will not satisfy the academic requirements

## 242 Graduate School

in a graduate program of study. Therefore, any graduate course in which a grade of below a C was achieved will not be permitted on the Plan of Study. Grades below a C will continue to be counted in determining the cumulative GPA.

For individual study, master and doctoral thesis, and/or dissertations and other projects at the graduate level, the letters PR may be used for work in progress. The PR and IN letter grades will not be considered in the GPA. A limited number of special graduate courses are grades S (satisfactory) or U (unsatisfactory) upon completion. A grade of S will allow for graduate credit to be earned, while a grade of U will be processed as an F.

### Courses for Graduate Study

Credit toward a graduate degree is given for completion of courses designed for graduate students (5000 level and over). If a student does not qualify for admission to the Graduate School the student may take work in the undergraduate program as an Undergraduate With Degree (UWD) but will not be classified as a graduate student.

### Advising

The Graduate School of The University of Toledo places a high priority on a program of faculty advising for students. After a student has been accepted for graduate study by the Graduate School, an adviser is appointed. The student should take up questions concerning the program with the adviser and seek advice each semester prior to the time of registration. Early in their programs, master's students should consult with their advisers and prepare a Plan of Study. This plan must be approved by the adviser and submitted to the Graduate School for approval before the student can receive a degree. In addition, early in the program and before embarking on research for the master's thesis, project doctoral dissertation, the student must file with the Graduate School Notice of Thesis or Project or the Doctoral Program Proposal and all accompanying compliance forms.

### Assurance of Compliance

All graduate students engaging in project, thesis and dissertation research are required to submit a completed Assurances of Compliance with Applicable Federal and State Regulations Governing Research form to the Graduate School. The form is available in the Graduate School and should be completed at the time the nature of the research project is determined. The student must demonstrate compliance before engaging in related research. Failure to obtain the proper approvals could prevent or significantly delay the awarding of the degree.

Students who work on projects sponsored by external entities are required to comply with all contractual terms, including the confidentiality of data or other information received from the sponsor or developed within the scope of the project by the University researchers.

### Minimum Enrollment

Graduate students who have completed their coursework and are working on their project, thesis or dissertation, and/or using University facilities and services (i.e., the library, health services, computer services, laboratories, consult with faculty, apply for graduation, etc.) must register for a minimum of one graduate credit hour each semester, excluding summer terms. However, students who apply for graduation during the summer term also must be registered for a minimum of one graduate

credit hour. Access to certain other facilities and services, such as the Student Recreation Center and parking, will require additional user fees.

### Transfer of Credits

Graduate work completed in residence at other academically accredited institutions may be offered in partial fulfillment of the requirements, other than residence, for graduate degrees at The University of Toledo when the work is of acceptable quality and appropriate to the student's program. Application for transfer of credit must be made to the student's adviser. The department/college will communicate its recommendation to the associate dean for graduate studies. The student may obtain advance approval from the adviser to take work elsewhere while enrolled at The University of Toledo. All graduate credits requested for transfer must carry a grade of A, A-, B+ or B. Credit for an S grade may be transferred for grade only if the grading institution verifies that the S translates into a grade of B or higher. Application for transfer of credit must be completed as soon as the credits have been earned. As a rule, a total of 10 semester hours may be accepted for transfer by master's candidates.

A student who has obtained one master's degree at The University of Toledo and elects to take a second master's degree at The University of Toledo may use up to 12 semester hours from the first master's if the course work is appropriate for the student's program.

### Probation and Dismissal from Graduate Programs

A graduate student must maintain a minimum overall GPA of 3.0 for all graduate courses taken in order to be in good standing and to make adequate progress toward the degree. Whenever the GPA falls below 3.0, the student is placed on academic probation and must within the next semester of enrollment correct the GPA deficiency. Failing to do so may result in dismissal. Please consult with graduate advisers in the individual programs of study concerning other academic requirements necessary for graduation.

### Foreign Language Requirement

The student is required to meet the foreign language requirement of the specific department or college. Applications for the examination are available in the Graduate School.

### Master's Thesis

Certain departments specify the submission of a thesis as a requirement for the master's degree. If a thesis is required, the title must be reported to the department concerned, the college dean and the Graduate School. The title of the master's thesis must be filed not later than one semester prior to the expected date of graduation. The title of each thesis must be approved by the student's adviser. The original of the thesis and one copy, both signed by the adviser, must be in the Graduate School office 30 days prior to graduation. To assist students in the preparation of the thesis or project, a handbook is available in the Graduate School.

## Admission to Candidacy for the Ph.D. Degree

At the time a student applies for admission to candidacy, the following requirements must be fulfilled: (a) a GPA of 3.0 on a 12-point system for all courses completed and for courses completed in the department of specialization, and (b) satisfactory completion of the examination requirements of the specific college of department. Application forms are available at the Graduate School office. It is the student's responsibility to initiate the application to candidacy. Admission to candidacy shall be recorded on the student's permanent record. A student who fails to qualify for candidacy at the required time will not be permitted to continue.

## Doctoral Dissertation

All departments require a dissertation in partial fulfillment of the doctoral degree. It should constitute an original work of a scholarly nature. It is the responsibility of the student to meet the requirements for the dissertation as stipulated by the department and college conferring the degree. The original of the dissertation and two copies, all signed by the adviser(s) and/or appropriate committee members, must be in the Graduate School office 30 days prior to graduation. All dissertations are microfilmed at the expense of the student. Copyrighting is available but not required. To assist students in the preparation of the dissertation, a handbook is available in the Graduate School.

## Outside Readers on the Dissertation Committee

One member of the dissertation committee must be from outside the student's department or college. The chair of the dissertation committee recommends the outside reader to the Graduate School for final approval.

## Participation in Commencement Exercises and Awarding Diplomas

Students must apply for graduation on a Formal Application for Degree form filed with the Graduate School by the time of the published deadline. This deadline is usually in the beginning of the semester in which the student plans to graduate. The official diploma will be issued approximately two weeks after the commencement following the semester in which the student completes the degree requirements. The University graduation exercises are conducted to honor those who have earned their degrees. The graduate is encouraged to attend the commencement exercises. Academic dress with appropriate hoods shall be worn by the candidates. Arrangements for academic dress must be made through the Bookstore well in advance of commencement. The student should contact the Bookstore early in the semester of graduation.

## Review of Graduation Requirements

The following is only a partial list of graduation requirements. Please check with your adviser or the Graduate School for additional information. **You must be registered for a minimum of 1 credit hour during the semester in which you apply for graduation.**

1. Submit an Application for Degree (must be completed in the beginning of the semester you intend to graduate; if the planned graduation is not accomplished, you must file a new application and pay the \$20 application fee again).
2. Submit a Plan of Study early in the program.

3. Submit Application to Candidacy for the Ph.D. degree.
4. Submit a Notice of Thesis, Project or Dissertation Proposal to the Graduate School.
5. Submit the Assurance of Compliance form before beginning research.
6. Submit the original and one copy of the thesis or project to the Graduate School; the original and two copies of the dissertation.
7. Have all PRs removed from your transcript.
8. You must be admitted as a regular student in the department and college.
9. You must have attained a cumulative 3.0 GPA.
10. You must be registered for at least 1 credit hour during the semester in which you apply for graduation.
11. All outstanding fees and fines must be paid.
12. Contact Educational and Information Technology if you have a computer account.

## Minimum Earned Hours Required for Graduation

The University requires a student to earn a minimum of 30 semester hours for the master's degree and 90 semester hours for the doctoral degree. Students should contact the department for the actual number of required credit hours for a specific degree program.

## Courses Reserved for Graduate Credit

A senior who does not require a full schedule for the completion of bachelor's degree requirements at The University of Toledo may enroll in courses for graduate credit. In such cases the total schedule is not to exceed 12 semester hours of work. An application for admission must be filed with the Graduate School before the beginning of the semester. This procedure is possible only where the academic record reveals unusual scholastic ability.

## Residence Requirements for the Ph.D. and Ed.D. Degrees

Two consecutive semesters of full-time work must be completed at the University in order to fulfill requirements for the Ph.D. degree. For the Ed.D. degree, residence requirements are the same as those for the Ph.D. degree, or they may be fulfilled by the completion, at the University, of two consecutive full-time summer semesters.

## Time Limitations for Degrees

The credit applied toward the master's degree must have been earned within the period of six years immediately preceding the time the degree is awarded. In the doctoral programs, a maximum study period of seven years is allowed prior to the time the degree is awarded. In the event the above requirements constitute a hardship on an individual student, a written petition may be presented to the Graduate School for consideration.

## Academic Grievance Procedure for Graduate Students

In the event that a graduate student has an academic grievance he or she should attempt to resolve the problem by adhering to the following procedure:

1. Discuss the problem with the instructor involved.
2. If no resolution can be achieved, the student should present his or her grievance to the chair of the department.
3. If the problem is still not resolved, the student should see the dean of the college.
4. If a resolution has been unsuccessful at the college dean's level, the student may present the grievance to the Graduate School.
5. The final appeal can be made to the Committee on Academic Standing of the Graduate Council and its decision shall be binding on all parties involved in the grievance.

In steps 1 through 4 above, a resolution of the grievance is sought by achieving a consensus on the part of all involved in the grievance. If the process reaches step 5, the Academic Standing Committee of the Graduate Council renders a final decision based upon all of the evidence presented. The Committee's decision shall be binding on all parties involved in the grievance.

**Note:** Graduate students must file the initial grievance with the instructor and a copy to the department no later than one semester after the occurrence of the incident. If students desire to proceed to the next level of appeal, they must file within one month of the last rendered decision until final resolution of the grievance.

## Other Policies and Information

Other policies and information pertaining to graduate education may be found in the *General Section* of the University catalog and the college and departmental catalog sections. Graduate students are encouraged to obtain a copy of the *Graduate Student Handbook* prepared by the Graduate School and/or the individual college departments.

# College of Arts and Sciences

## Graduate Programs

### Department of Biological Sciences

*Patricia R. Komuniecki, 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 30 semester hours of graduate course work approved by an advisory committee, including BIOL 6000, 6010, 6090, 6930 (two hours) and CHEM 6500, and additional course and research credits for 13-17 hours. The student also must pass a comprehensive oral examination. In some cases a written comprehensive examination also may be required. The student must complete 6 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, a student must complete 30 semester hours of graduate course work approved by an advisory committee, including BIOL 6000, 6010, 6090, 6930 (two hours), three additional BIOL lecture and/or laboratory courses or their equivalents from other departments that are approved by the student's advisory committee 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 also must pass a comprehensive oral examination and write an original research 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.

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 thesis in biology rather than 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 four years of study beyond the bachelor's degree. 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. 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, 8930 (three hours), 8010, 8090 and CHEM 8500, and additional course and research credits for 72-76 hours. Ph.D. candidates must pass a written qualifying examination in their area of specialization during the first two years of study, an oral comprehensive examination involving a defense of their research proposal after gaining admission to candidacy and then 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 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 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 are also expected to acquire teaching experience as part of their graduate programs.

## Department of Chemistry

*A. Alan Pinkerton, chair*

*Mark R. Mason, 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.

### Requirements for the Master's Program

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

- The courses presented must total at least 30 hours of graduate credit, including at least 4 hours of credit in Graduate Research.
- Registration for Research Seminar is typically required each term the student is enrolled in Graduate Research.
- Each candidate must present a thesis.
- Registration for Chemistry Colloquium is typically required each term, but no more than 4 hours credit may count within the required 30 hours.
- Each candidate must demonstrate satisfactory performance on a comprehensive oral examination in addition to the public defense of the thesis at a colloquium presentation.
- 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 six or more 6000 level courses as part of the plan of study.

## 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 department 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:

- 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.
- Registration for Chemistry Colloquium is required each term.
- Registration for Research Seminar is required each term the student is enrolled in Graduate Research.
- Each student must satisfactorily complete two semesters in supervised half-time teaching.
- 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.
- Dissertation research must be carried out primarily in laboratories of The University of Toledo.

## Department of Earth, Ecological and Environmental Sciences

*Michael W. Phillips, chair*

*Johan F. Gottgens, graduate adviser (ecology)*

*James A. Harrell, graduate adviser (geology)*

The department of earth, ecological and environmental sciences (EEES) offers graduate degrees in geology at the master's level and in biology (ecology-track) at the master's and doctoral levels. 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 6 hours of thesis research and 24 hours of formal lecture courses approved by the student's advisory committee. Up to 8 of the required 24 hours of course work may be taken outside EEES provided they are relevant to the student's research program. Students who do not have a baccalaureate in geology must either take the following remedial courses or have had equivalent courses at another institution: EEES 1010, 1020, 1030, 1040, 2210, 2220, 3320 and 4650/5650. None of these remedial courses 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 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 18 hours of this requirement must be earned in the major subject area. In addition, each plan of study must include EEES 5610, 6600 and 6930 (two hours). The student must pass a comprehensive oral qualifying examination prior to completion of the first year in the program and 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 6600, 6930 (two hours) and four additional EEES courses (5000 level or higher) or their equivalents from other departments that are approved by the student's advisory committee. Furthermore, the plan of study may only include a maximum of three semester hours in EEES 6960 or 6990. The student also must pass a comprehensive oral qualifying examination and 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

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 EEES 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 that 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 7610 and an advanced multivariate statistics course such as EEES 6500), EEES 8600, 8930 (three hours) 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 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.

## 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 and education in economics 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):

ECON 5150 Advanced Macroeconomic Theory  
 ECON 5200 Advanced Microeconomic Theory  
 ECON 5300 Introduction to Mathematical Economics  
 (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 7 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 two faculty members and satisfy Graduate School thesis requirements. Such a candidate may receive a maximum of 7 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.

### 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 would complete the regular M.A. core requirements, an additional econometric course (ECON 5820) and field/related course work. Further, they are 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 would enroll in a sequence of two applied econometrics seminars (ECON 6810 and ECON 6820) and engage in thesis work.

### Internships

The department also offers for non-assistants a public service internship, requiring 7 credit hours of ECON 6940. In addition to ECON 6940, the intern is allowed to include up to 3 credit hours of either ECON 6900 or ECON 6990 towards 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

*Samir Abu-Absi, chair*

*Sara Lundquist, 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 3 credit course, for a total of 36 hours.

All students working toward the master of arts (literature concentration) degree must satisfy these requirements:

- (a) The course work shall include (1) ENGL 5100: History of the English Language; (2) ENGL 5790: Approaches to Research in English; (3) **either** ENGL 5750: History of Literary Criticism **or** ENGL 5780: Contemporary Literary Theories and Criticism; and (4 & 5) 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 at a level of competence sufficient for the understanding of scholarly and critical materials. 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).
- (d) Candidates must pass a written qualifying examination based on 32 texts chosen from the English department's approved reading list (four selections from each of the eight sections of the list). It consists of four parts and is administered according to departmental regulations governing the M.A. qualifying examination.
- (e) Candidates must submit a graduate level course paper applying scholarly techniques to a literary topic of their choice.

#### 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 (concentration in E.S.L.) must satisfy these specific requirements:

- (a) The course work shall include ENGL 5100, 5150, 6150 and 6160, 6170, 6060 and one course to be prescribed by the adviser.

- (b) The remaining 12 hours required for the degree must include CI 5430, ENGL 5190 and an additional 6 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 reading proficiency in one foreign language by passing an examination administered by the department of foreign languages.
- (d) Candidates must also complete a thesis (ENGL 6960, 1-3 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) A minimum of 18 hours shall include ENGL 5100; either ENGL 5750 or ENGL 5780; and two seminars (**excluding instructional seminars**); (b) Candidates must pass a written examination based on a list of 17 British and American literary works and submit either a paper applying scholarly and critical techniques to a literary work of their choice or a project in education. As an alternative to the examination and paper, they may choose to take 6 additional hours of literature courses including at least one seminar (**excluding instructional seminars**). 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) 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); (b) A minimum of 10 hours in E.S.L. which must include ENGL 6170, 6060 and CI 5430; (c) A thesis or project (1-3 hours); (d) 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 readings lists.

## Department of Foreign Languages

*Antonio Varela, chair*

*Ruth Hottell, French graduate adviser*

*Joseph A. Feustle Jr., Spanish graduate adviser*

*Debra Stoudt, German graduate adviser*

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

A minimum of 30 semester credit hours is required for the master of arts and a minimum of 30 semester credit hours is necessary 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: (a) present an undergraduate major in the language of interest from an accredited college or university; (b) satisfactorily complete at least 18 hours of graduate credit in the major language (including courses 5010 and 5020 in French and German, 5010 in Spanish); (c) satisfactorily complete an additional 12 hours in the major language or in approved, cognate courses; (d) pass a comprehensive examination; and (e) 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 or by passing an examination administered by the department of foreign languages. A thesis may be presented for an additional 6 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

*Samuel A. Attoh, chair*

*Peter S. Lindquist, graduate adviser*

*Neil Reid, internship director*

### Requirements for the Master's Program

For the degree of master of arts, students must meet the following departmental requirements, including 30 semesters of graduate work: (a) 15 of the 30 minimum hours to be taken in the department are at the 6000 level. Nine additional elective hours may be taken at the 5000 or 6000 level within the major. The 6100 and 6150 courses are mandatory. This 15-hour requirement may not include the following courses: 6700, 6910, 6940, 6960; (b) A minimum of one graduate level (at least 3 hour) course or seminar, approved by the adviser, be taken in a related area outside the department. This may not include an independent study or research course; (c) The selection of geography and planning courses and related courses should comprise a unified program chosen in consultation with the graduate adviser; (d) 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 9 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; (e) The student then seeks approval of a thesis topic, forms a thesis

committee and submits the proposal for approval; (f) Research and writing of 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; (g) Upon completion of the thesis, an oral examination on the student's research as it relates to general professional competence will be required; (h) Minimum enrollment to qualify for the master's degree is 2 hours of thesis credits, but as many as 6 hours within the 30 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 (a) community and urban planning, (b) economic geography, (c) geographic information science, (d) environmental geography and planning or (e) cultural and behavioral geography.

## Department of History

*William Henry Longton, chair*

*Michael Jakobson, 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 lengthy description of the history program is available from the departmental office or online at: <http://www.history.utoledo.edu/gradstudies>.

### Requirements for the Master of Arts Degree

The student may earn the M.A. degree either by completing: (a) 30 graduate credits, including a thesis, of which 6 credits may, with the approval of the student's committee, be taken outside the department; or (b) 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 (a) and (b) 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 the following: 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

*Neil Reid, director*

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, students create their own programs of study. For further information, please contact the director of the program.

### Master of Liberal Studies Program Requirements

For the master of liberal studies degree, students must complete the following requirements:

1. The four interdisciplinary core seminars (12 hours): MLS Seminar in the Humanities (6010), MLS Seminar in the Social Sciences (6020), MLS Seminar in the Natural Sciences (6030), and MLS Seminar in the Visual and Performing Arts;
2. Electives (selected in consultation with the director) (15-18 hours);
3. Thesis (3-6 hours).

Total: 33 hours

## Department of Mathematics

*En-Bing Lin, chair*

*Marie Hoover, associate chair*

*Donald B. White, 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 (<http://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 (note: Colloquium and Proseminar do not count toward the 30 hours) and meet the following requirements:

1. Complete two-semester sequences in abstract algebra, real analysis, and topology and a semester course in complex analysis.
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 either 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 either 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 credit (note: Colloquium and Proseminar do not count toward the 30 hours).

In the **standard** track, students must meet the following requirements:

1. Complete two-semester sequences in numerical analysis, real analysis and differential equations, and a semester course in complex analysis.
2. Remaining courses may be chosen from: 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.

In the **industrial mathematics** track, the requirements are:

1. Completion of courses in applied linear algebra, probability, numerical analysis, optimization and ordinary differential equations and three courses chosen from among discrete structures and analysis of algorithms, theory of computation, linear statistical models, sample surveys, applied probability, mathematical statistics,

numerical analysis, calculus of variations, and linear and non-linear programming.

2. Six hours of approved courses in the departments of physics & astronomy, chemistry, biological sciences, earth, ecological & environmental sciences, economics, engineering, INFS, business and geography & planning.
3. Submission of a project report (to serve as a master's thesis) containing the solution to a practical problem, drawn from an industrial, university or government context and approved by the adviser.

**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 credit (note: Colloquium and Proseminar do not count toward the 35 hours) 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, 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 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 9 hours in education, with an additional 6 hours to be assigned in conference with the adviser. As part of the additional 6 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 6 hours of abstract algebra and/or linear algebra, 6 hours in geometry, statistics, probability and/or computer programming, 3-6 hours of analysis (beyond calculus), 3 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 among 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 dissertation research is begun.
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 dissertation research is begun.
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. The completed dissertation must be approved by an outside examiner and the student must defend it before a faculty committee appointed for that purpose.

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 -<br>World Music .....       | 3 |
| MUS 5490 | Music History & Literature -<br>Twentieth Century ..... | 3 |
| MUS 5590 | Piano Pedagogy .....                                    | 3 |

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

3. Applied Music (10)  
MUS 6800 Applied Music: 2-5 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)  
Ensembles chosen in consultation with the graduate adviser.
5. Graduate Electives (3)  
Music or non-music courses chosen in consultation with the graduate adviser.
6. MUS 6990: Recital/Document [Independent Study] (2)  
A paper of 15-20 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.

## Department of Music and Dance

*Dr. Raymond Marchionni, 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 coursework. 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 (3 hours), ensembles (2 hours), a document (2 hours) and electives (3 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 2.70 undergraduate GPA 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  
MUS 5900 Graduate Studies in Music ..... 3
2. Music Electives (10)  
Graduate courses in music theory, music history and literature and pedagogy. The choice of courses will be determined in consultation

### 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

*Eric Snider, chair*

*Benjamin Pryor, graduate adviser*

*Susan Purviance, graduate adviser*

### Requirements for the Master's Program

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

**Thesis option:** (1) completion of at least 27 semester hours of graduate credit in courses offered by the department of philosophy, excluding readings and research courses; (2) a written thesis for 6 semester hours of credit; and (3) an oral examination covering the field of the thesis and general competency in the major areas of philosophy.

**Non-thesis option:** (1) completion of 33 semester hours of graduate credit in courses offered by the department of philosophy, excluding readings and research courses; (2) completion of an examination on contemporary philosophy and on an area, topic or figure chosen by the student in consultation with the faculty.

**For both options:** (1) completion of PHIL 3000 or 6000 (or its equivalent or satisfied as an undergraduate); (2) completion of PHIL 3210 and 3230 (or their equivalents or satisfied as an undergraduate); (3) completion of

an examination on the history of philosophy; and (4) completion of at least 42 semester hours of graduate and undergraduate credit in philosophy.

### Department of Physics and Astronomy

*Philip B. James, chair*

*Jacques G. Amar, 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.

#### 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.

#### 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.

#### 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 6200 approved by the student's committee; and 30-48 hours allowed for the dissertation research, depending on the nature of the research and the needs of the student. Credit in PHYS 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 coursework. This

committee administers the oral comprehensive examination, after which only the dissertation research requirement remains. The graduate program ends with the presentation of the dissertation and its satisfactory defense in an oral examination.

#### 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) and 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 College of Ohio (MCO). 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 that may be appropriate to 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 (MCO).

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

Recently, The University of Toledo 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 CSE or EE is not required. In order to complete this program, students must satisfy all the requirements for both the Ph.D. in the department of physics and astronomy and the M.S. degree in the department of electrical engineering and computer science (EECS). 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 EECS graduate program. The student's Ph.D. dissertation adviser will be in physics, and an adviser in EECS will serve as the outside member on the student's advisory committee. Students will normally take one course per semester in EECS along with courses in physics.

## Department of Political Science and Public Administration

*Lynn W. Bachelor, chair*

*Sunday E. Ubokudom, director, M.P.A. program*

*Richard F. Weisfelder, 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. We offer study in five areas of the discipline: American government (including state and local politics), comparative government, international relations, political theory and methodology.

### Admission Requirements

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 are required for admission. Official results should be sent to the department. While the Graduate School allows a minimum undergraduate grade point average 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 in 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:

- Two required courses: PSC 6110 (3 credits) and 5110 (3 credits)
- Three seminars or lecture courses open only to graduate students: several 5000 level courses (3 credits) and any 6000 level course (3 credits each).
- A required master's thesis: PSC 6960 (6 credits)
- Two courses (6 credits) may be taken outside of the department

### Academic Standards

M.A. students must maintain a cumulative grade point average of at least 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:

- An undergraduate degree with a GPA of 3.0 on a 4.0 basis.

- Scores from the GRE. A combined score of 1000 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 Admissions Test (GMAT).
- 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.
- A thoughtfully drafted statement of purpose.

### Degree Requirements

All students must satisfy the following university and program requirements:

- Program prerequisites: PSC 3420 (or equivalent), and 3110 or equivalent). Students who are not proficient in basic spreadsheet and database microcomputer applications must complete PSC 4180. Prerequisite courses are not counted as part of the 36 hours (12 graduate courses) required for the degree.
- 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 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 6410 | Proseminar in Public Administration .....       | 3 |
| PSC 5430 | Public Personnel Administration .....           | 3 |
| PSC 5140 | Intermediate Social Science Statistics .....    | 3 |
| PSC 5470 | Public Organization Theory .....                | 3 |
| PSC 6430 | Seminar in Public Policy Theory & Analysis .... | 3 |
| PSC 5440 | Budgeting and Financial Administration .....    | 3 |
| PSC 6420 | Quantitative Methods in Decision Making .....   | 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 currently 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 6 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 well before they expect to receive their degree.)
- Comprehensive examination: Students must pass a written comprehensive examination in order to graduate. A student who fails the examination may retake it once.

## Certificate Program in Municipal Administration

The primary purpose of this certification is to strengthen the professional management skills of current 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 use their electives to also receive this certificate. In addition, it will also be 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 seek to expand their knowledge without pursuing a formal graduate degree program in health administration.

## 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 non-academic 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.

In general, in order to be eligible to receive a J.D, a student must have successfully completed 89 credit hours of study, including all required courses, under the auspices of the college, and must have successfully completed all writing requirements. 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 grade point average of at least 3.0. A student must complete any prerequisite courses and all required courses, and the M.P.A.'s 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 89 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

*Robert A. Haaf, chair*

*Ricky S. Heffner, associate chair*

*Jeanne B. Funk, 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.

Students not enrolled in the doctoral program may apply for admission to the master's program in general psychology. 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 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, social psychology.

## Requirements for the Doctoral Program

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 (a) the gathering and evaluation of information, (b) the solving of basic and applied research problems and (c) 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 must also 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 biological sketch is also required from each applicant in clinical psychology.

## Department of Sociology and Anthropology

*Barbara K. Chesney, chair*

*Elias T. Nigem, graduate 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 (1) required courses in theory, methods, and statistics (see B below); (2) elective coursework (see C below); and (3) completion of a thesis, an internship, or additional coursework (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 (10 hours) required of all students:

|          |   |   |
|----------|---|---|
| SOC 6000 | Introduction to Graduate Studies in Sociology ..... | 1 |
| SOC 6040 | Advanced Sociological Theory <b>or</b>              |   |
| SOC 6050 | Advanced Social Theory and Political Economy .....  | 3 |
| SOC 6270 | Advanced Social Research Methods .....              | 3 |
| SOC 6290 | Advanced Social Research Statistics .....           | 3 |

#### C. Program electives (21 hours) may be completed by choosing from among 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. Currently, the faculty offers four areas of concentration: health and aging; class, race, and gender; law and society; and social change.

#### D. Thesis/Internship/Coursework. Students may choose to complete a thesis (6 hours), an internship (6 hours) or 6 additional hours of coursework 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 P/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 P/NC basis.

#### E. Independent Research. Generally, students may take no more than 3 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 6 hours.

Typically, students may apply no more than 3 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.

## 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.

## Anthropology Courses

The department does not offer a graduate degree in anthropology. However, an array of graduate courses in anthropology is offered for students participating in master of arts programs in social science and the master of arts and education degree program (refer to the College of Education graduate section).

# College Of Business Administration

## Administration

**John Reynolds, director, M.B.A./E.M.B.A. programs**

Room 1033, Stranahan Hall  
Phone: 419.530.5231

**Darlene Miller, manager, E.M.B.A program**

Room 1029, Stranahan Hall  
Phone: 419.530.7982

**William Doll, Ph.D., director, Ph.D. in manufacturing management program**

Room 2008, Stranahan Hall  
Phone: 419.530.2850

**Diana Franz, Ph.D., director, M.S. in accounting program**

Room 3045, Stranahan Hall  
Phone: 419.530.4264

**Elissa Teal, academic adviser – M.B.A. program**

Room 1031 Stranahan Hall  
Phone: 419.530.5230

## Degrees Offered

### Degrees

The College of Business Administration is accredited by the AACSB - The International Association for Management Education for undergraduate and graduate work. The graduate division of the college affords students an excellent opportunity to earn a degree on a full-time or part-time basis. The College of Business Administration offers the following degrees at the graduate level:

Master of Business Administration (M.B.A.)  
Executive Master of Business Administration (E.M.B.A.)  
A dual Juris Doctor/Master of Business Administration (J.D./M.B.A.)  
A dual Bachelor of Science in Engineering/Master of Business Administration (B.S./M.B.A.)

Master of Science in Accounting (M.S.A.)

Doctor of Philosophy in Manufacturing Management (Ph.D.)

## Specializations within the Master of Business Administration Program

Accounting  
Administration  
Finance  
Human Resource Management  
Information Systems  
International Business  
Management  
Marketing  
Operations Management

## Admissions Policies

### General Requirements

Refer to the Graduate School admissions section of this catalog for University of Toledo graduate school admissions requirements and classification of graduate students.

### Admission to Master of Business Administration (M.B.A.) Program

All decisions regarding admission to the M.B.A. program in business are made through the College of Business Administration Graduate Studies Office. Admission is available to those students who can demonstrate high promise of success in a graduate business degree program. The college has adopted qualitative admissions standards in which applicants are considered on the basis of their merits with weight given to the quality of prior academic achievement, the Graduate Management Admissions Test (GMAT) scores, professional experience indicating increased levels of responsibility, and other relevant information that the candidate may share with the admissions committee. Although GMAT scores and GPA are important indicators of success, they will not be the sole basis for admissions decisions. Each candidate's qualifications must also meet the admission standards set by AACSB - The International Association for Management Education.

Student applications will be reviewed on the following criteria:

1. Academic record and overall GPA, as well as the trend and comparison of grades over a period of time.
2. Verbal, quantitative, written and total scores on the GMAT or other appropriate tests. An official GMAT score must be sent directly from the Graduate Management Admissions Council (GMAC) to the College of Business Graduate Studies Office, and can be no more than five years old.
3. Managerial, professional and leadership potential as exhibited by work experience, extracurricular activities or community service.
4. The statement of purpose as required on the graduate application form.
5. In the case of students whose native language is not English, a score of at least 550/213 on the Test of English as a Foreign Language (TOEFL) is mandatory, unless the student has a degree from an American university.
6. Three letters of reference.

7. A voluntary personal interview through the College of Business Administration Graduate Studies Office.

Annual deadlines for submission of completed applications are as follows\*:

|                 |             |
|-----------------|-------------|
| fall semester   | August 1    |
| spring semester | November 15 |
| summer semester | April 15    |

\* International students should submit completed applications as follows:

|                 |           |
|-----------------|-----------|
| fall semester   | May 1     |
| spring semester | October 1 |
| summer semester | March 1   |

All materials do not have to be submitted as a package, but a final decision on admission will be withheld until the package is complete. No materials submitted to the University will be returned to the applicant.

## Admission to Executive Master of Business Administration (E.M.B.A.) Program

The E.M.B.A. program is designed for executives and professionals with a minimum of three to five years of management or professional experience. Applicants must be nominated, and may be sponsored, by their employers. Self-employed professionals may nominate themselves. An admissions committee of the college will select the participants. The admissions committee seeks candidates with proven leadership potential. Consideration will be given to the following areas:

- Completion of a bachelor's degree
- Completion of the GMAT
- An assessment of the individual's work experience
- Evidence of the motivation, commitment and support necessary to complete a demanding program
- Voluntary personal interview

## Admission to Joint J.D./M.B.A. Program

Students applying for the J.D./M.B.A. program must already have a bachelor's degree. A student must apply and be admitted to both the law and business schools separately to be admitted to the J.D./M.B.A.. The LSAT will be accepted by the College of Business Administration in lieu of GMAT scores. Refer to the College of Law and M.B.A. sections of this catalog for specific admission standards for each program

## Admission to Joint B.S./M.B.A Degree Program

The College of Business Administration in conjunction with the College of Engineering offers a program whereby qualified students can earn simultaneously both a B.S. in engineering and an M.B.A. This program provides a unique opportunity to combine business and engineering skills to prepare graduates for global competitiveness. It supports the mission of the College of Business Administration to prepare corporate leaders for the future. The program should be particularly attractive to students interested in starting their own company or who want to develop an appreciation for how engineering and business compliment each other.

This program will allow engineering students in their final two semesters of study to begin taking M.B.A. courses while completing their B.S. This arrangement should reduce the time it takes a student to receive

both degrees by a year. The business undergraduate prerequisites can be satisfied as part of the undergraduate curriculum.

Students who wish to pursue the program should make this known to the associate dean for undergraduate studies in the College of Engineering by the end of their sophomore year. Interested students will take the GMAT at the end of their junior year and should apply for admission to the program to the Graduate School before the fall of their senior year. To be admitted to the program, students must have senior standing, score a minimum of 450 on the GMAT and have at least a 3.0 cumulative GPA. Undergraduate requirements for the business minor must also be completed. Upon admission to the program by the Graduate School, the College of Business Administration and the College of Engineering, students will be classified as special provisional graduate students so that they may take graduate courses while simultaneously completing the requirements for the B.S. in engineering.

Students' special status must be tracked by the M.B.A. office to assure AACSB compliance, and to assure that the B.S. in engineering degree is granted prior to graduating with the M.B.A.

## Admission to Master of Science in Accounting (M.S.A.) Program

All decisions regarding admissions to the M.S.A. program are made through the office of the director of graduate programs in accounting. Applicants must apply by the established deadline for the semester they plan to attend.

Admission to the M.S.A. program is available for those students who demonstrate high promise of success in a graduate program. All applicants are considered on the basis of their own merits with weight given to the quality of prior academic achievement, GMAT or GRE test scores, professional experience indicating increased levels of responsibility and other relevant information. The admission procedures for the M.S.A. program are similar to those described for the M.B.A. program.

## Admission to the Doctor of Philosophy in Manufacturing Management (Ph.D.) Program

Applicants should have a bachelor's degree, preferably in engineering or business. Letters of reference from college faculty acquainted with the student's character and ability, and official transcripts of all prior college work must be supplied. Applicants are expected to demonstrate preparation for, and a high promise of, success in the doctoral program. The following will be considered in evaluating an application to the Ph.D. program on an individual basis: (a) The student's undergraduate and graduate record with general academic performance as well as the trend and comparison of grades over a period of time; (b) Student's verbal, quantitative and total scores on the GMAT. In certain cases, depending on the academic background of the student, GRE scores may be substituted for GMAT scores. It is to be stressed that, although GMAT and GPA are important, they alone will not be the basis of admissions decisions; (c) Evidence of the ability to do research (publications, presentations, etc.); (d) Statement of purpose explaining why the student wants to pursue a Ph.D. in manufacturing management; (e) Letters of reference; (f) Appropriate experience in a manufacturing organization; (g) In the case of students whose native language is not English,

## 258 Graduate School

acceptable performance on the TOEFL is mandatory unless the student has a degree from a U.S. institution.

While students may come from many academic disciplines, those students with bachelor's degrees in fields other than business or engineering may require more than 91 semester hours. Any student wishing to enter the program from a discipline other than engineering or business may do so with the approval of the program director and upon completion of the prerequisite courses. *Students admitted to the Ph.D. program will not receive graduate credit for any undergraduate courses they take.*

A student should take the Ph.D. comprehensive examination as soon as he/she and his/her adviser believe the student has mastered all the required subject areas and completed all coursework. The format and other details of the examination are given in the handbook for Ph.D. students and is available from the program director. Following successful completion of the comprehensive examination, the student is admitted to candidacy for the Ph.D. and undertakes dissertation research. It is the student's responsibility to initiate the application to candidacy on a form available from the Graduate School.

Each student will be assigned a faculty adviser by the Ph.D. program director at the time of admission. When a student enters the program, he will consult with the faculty adviser to determine which courses should be taken during the first year of study. Depending upon the level and type of preparation of the entering student, these courses will include foundation courses in business, engineering and manufacturing technology. During this first year of study, the student will choose an adviser who will assist the student in preparing a plan of study, choosing a dissertation topic, forming a dissertation committee and in other matters concerning the program.

## Academic Policies

### General Requirements

Refer to the general Graduate School section of this catalog for general academic policies that apply to all graduate students in areas such as advising, minimum enrollment, dishonesty, grievance and probation and dismissal.

### Academic Advising

Advising for the M.B.A. and E.M.B.A. programs is available in the Graduate Studies office on the first floor of Stranahan Hall. Advising all M.S. and Ph.D. programs is done by the respective program director. Students are encouraged to meet with an adviser regularly. Each student is ultimately responsible for correct and timely completion of degree requirements.

### Financial Assistance

A limited number of graduate assistantships, which provide a stipend and/or cover instructional fees, are awarded to students each year. Awards are based upon scholastic achievement, work experience, research/computer experience and extra-curricular activities. They are not based upon financial need.

Applications are due by April 30 for the entire following academic year. Due to the competitive nature of these awards, however, students are encouraged to apply by the end of January.

## Transfer Students

Students who have taken graduate course work at another AACSB accredited university or from another college at The University of Toledo, may, upon recommendation of the Graduate Studies in Business Office, be permitted to transfer up to 9 semester hours of business-related course work toward the M.B.A.

## Degree Requirements

### GPA Requirements

Students must complete all requirements for their program of study with at least a 3.0 (4.0 scale) cumulative GPA. If a student is in the M.B.A. program, they must also maintain a cumulative 3.0 GPA in courses taken in the area of specialization selected, if any.

### Master of Business Administration (M.B.A.)

The M.B.A. curriculum may be built upon any bachelor's degree. The M.B.A. degree is granted to students who satisfactorily complete a minimum of 30 semester hours of 6000 level or higher graduate courses.

The length of the program will vary depending upon the nature of the undergraduate degree. The program consists of preliminary background (9 hours), common body of knowledge (21 hours), core (18 hours) and specialization and/or elective (12 hours) courses. **Any or all preliminary background and common body of knowledge courses may be waived for equivalent coverage at the undergraduate or graduate level.**

### Master of Science in Accounting (M.S.A.)

The master of science in accounting is a 30 semester hour program. The MSA program is designed to prepare students for a professional career in accounting and to fulfill the requirements to sit for the Uniform CPA Exam in the state of Ohio. Candidates without a background in accounting can be admitted to the program but will be required to take additional courses.

### Doctor of Philosophy in Manufacturing Management (Ph.D.)

The program requires at least 91 semester hours of study beyond the baccalaureate. For a full-time student with only a bachelor's degree, the course requirements before entering the dissertation stage can be completed in three years. Full-time students with an M.B.A. or a relevant M.S. degree should be able to complete the course work in two years. During the first year, the students without prior appropriate undergraduate or graduate work in business or engineering will acquire the foundation knowledge in business, engineering and manufacturing technology. Course waivers are possible at the foundation stage by passing competency examinations in appropriate areas.

## Programs of Study

### Master of Business Administration (M.B.A.)

#### Preliminary Background (9 hours maximum)

The M.B.A. program requires an introductory knowledge of computer and basic math skills. A grade of at least a C (2.0) in the appropriate course will be sufficient evidence of or appropriate skill level. Computer skills can be demonstrated by proficiency test, Microsoft certification, or an appropriate (as determined by the program adviser) equivalent course. Students without math skills will be required to take one or more of the following undergraduate courses:

MATH 1260 Modern Business Math I ..... 3  
MATH 1270 Modern Business Math II ..... 3

#### Basic Core (21 hours maximum)

These courses represent the minimum background required of students prior to taking 6000 level courses in the M.B.A. program. Students admitted to the M.B.A. program can meet the requirements by taking the 5000 level courses or by proficiency examination. If a student can demonstrate that he/she has completed an equivalent course(s) at the undergraduate level prior to admission to the M.B.A. program and has earned a grade of C (2.0) or better in the course(s), the corresponding 5000 level course may be waived.

ACCT 5000 Financial & Managerial Accounting ..... 3  
MGMT 5110 Management of Organizations ..... 3  
BANS 5210 Economics for Business Decisions ..... 3  
FINA 5310 Managerial Finance ..... 3  
MKTG 5410 Marketing Systems ..... 3  
OPMT 5510 Business Statistics with Computer Applications ..... 3  
OPMT 5520 Analysis of Manufacturing and Service Systems ..... 3

#### Advanced Core (18 hours)

These courses are required of all students. They are reflective of business techniques, methodology and processes, and are designed to be cross-functional and integrative.

BUAD 6010 Assessing Emerging Business Opportunities ..... 3  
BUAD 6020 Accounting and Organizational Performance  
Measurement ..... 3  
BUAD 6030 Designing Products and Operations ..... 3  
BUAD 6040 Marketing, Production and Distribution ..... 3  
BUAD 6050 Managing in a Dynamic Environment ..... 3  
BUAD 6060 Financial Decision-Making and Risk Management ...3

#### Specialization Courses (9 hours)

Each student may select an area of specialization. An alternative is to select the administrative specialization described below, which is designed for students who prefer to take a variety of electives in different areas. The substitution of any courses for an area of specialization requires the written approval of the department chair. No more than one independent study/research paper (3 hours) may be taken in lieu of a course to fulfill a specialization requirement.

#### Elective Course (3 hours)

Each student should select three hours of business electives. The selected courses must be at the 6000 level. The student may choose to take another

course in the chosen area of specialization or any other elective for which prerequisites have been fulfilled.

### Areas of Specialization

#### Accounting

The specialization in accounting is designed to enable students to advance more rapidly to positions of responsibility and leadership in their chosen fields. Beginning in 2000, all candidates taking the Ohio CPA exam must have completed 150 semester hours of college course work.

Undergraduate accounting majors wishing to complete a 150 semester hour program may find it advantageous to select an accounting specialization in the M.B.A. program. Admission to the M.B.A. specializing in accounting is available to those students who demonstrate high promise of success in a graduate program. All applicants are considered on the basis of their own merits with weight given to the quality of prior academic achievement, GMAT scores and other relevant information. Consult the M.B.A. program requirements presented earlier in the catalog.

M.B.A. students without an undergraduate accounting major must successfully complete the following courses:

#### Prerequisite Accounting Courses

BUAD 2040 Financial Accounting Information ..... 3  
BUAD 2050 Accounting for Business Decision Making ..... 3  
ACCT 3110 External Financial Reporting I ..... 3  
ACCT 3120 External Financial Reporting II ..... 3  
ACCT 4210 Taxes and Business Decisions ..... 3  
ACCT 4310 Internal Reporting ..... 3

**Note:** Students wishing to register in ACCT 3110 must meet the following prerequisites: a GPA of 2.50 or better in all introductory level college accounting courses including a grade of C (2.0) or better in both BUAD 2040 and BUAD 2050 or equivalent courses, and a higher education GPA of 2.50 or better in all prior college level courses.

#### M.B.A. Program - Accounting Specialization

Students specializing in accounting must take ACCT 6210, Research in Accounting and Taxation, and must select three courses from the following list:

ACCT 6130 External Financial Reporting III ..... 3  
ACCT 6150 International Accounting and Taxation ..... 3  
ACCT 6190 Contemporary Accounting Problems ..... 3  
ACCT 6210 Research in Accounting and Taxation ..... 3  
ACCT 6220 Corporate Tax ..... 3  
ACCT 6230 Fiduciary, Estate and Gift Taxation ..... 3  
ACCT 6240 Partnership and S Corporation Taxation ..... 3  
ACCT 6310 Advanced Managerial Accounting ..... 3  
ACCT 6320 Cost Analysis and Control ..... 3  
ACCT 6420 Auditing ..... 3

#### Administration

The administration specialization is designed for students who want a general degree. Please select any three electives within the college for which prerequisites have been fulfilled.

## Finance

The graduate finance curriculum provides students with a background in all major areas of finance including corporate finance, investments and portfolio management and financial institutions and markets. The prerequisite for all 6000 level finance courses is FINA 5310 or the equivalent undergraduate material. A student wishing to specialize in finance will take FINA 6130, Managerial Finance, plus two from the following list:

|           |   |   |
|-----------|---|---|
| FINA 6150 | Financial Institutions and Markets .....          | 3 |
| FINA 6330 | Seminar in Financial Management .....             | 3 |
| FINA 6340 | Seminar in Portfolio Management .....             | 3 |
| FINA 6350 | Seminar in Financial Institution Management ..... | 3 |
| FINA 6370 | International Financial Management .....          | 3 |
| FINA 6840 | Small Business Financial Management .....         | 3 |

## Human Resource Management

A specialization in human resource management is designed both for students who intend to seek or continue managerial careers in human resources, as well as for those who are seeking more general leadership positions, but need to understand approaches to attracting, retaining, compensating, motivating and managing employees in contemporary organizations. This specialization requires the student to successfully complete a set of four human resource management courses approved by the departmental adviser.

## Information Systems

Specialization in information systems provides the student with a managerial overview of computers and information systems. Emphasis is placed upon the role and function of the computer as a managerial tool to store, process, analyze and present information. The prerequisite for this option is previous training in a programming language. The prerequisite can be satisfied by the completion of INFS 5400 or by passing a proficiency test covering the material in this course. A specialization in this area includes INFS 6560, 6610 and one of the following: INFS 6570, 6810, 6750 or 6930.

## International Business

The international business program provides training for entry in careers in corporations with a global orientation, particularly multinational corporations, export-import firms, banks, transportation and logistics, and government and international agencies involved in international trade, finance, and economic development. Students specializing in international business must choose three of the following courses: FINA 6370, IBUS 6360, IBUS 6390, IBUS 6490, MKTG 6080, MKTG 6400, and, subject to approval of the department chair, IBUS 6500, study abroad.

## Operations Management

Specialization in operations management provides the student with the decision-making and problem-solving skills required for managing people and resources more effectively, whether in manufacturing firms, service industries, nonprofit organizations or government operations. A specialization in this area includes OPMT 6680, 6690 and one of the following: OPMT 6510, 6720 or 6750.

## Management

A specialization in management involves a detailed understanding of the functions of general management. The specialization offers the M.B.A. student an opportunity to gain expertise and insight into general management. This program builds upon the required dimensions of the

M.B.A. program in a manner that is relevant for general management functioning in large or small firms, divisional or corporate-level positions, and profit or nonprofit organizations. This specialization requires the student to successfully complete a set of three management courses approved by the M.B.A. adviser.

## Marketing

Students specializing in marketing should take any three of the following courses: MKTG 6120, 6210, 6230, 6290, 6400, 6980 or BANS 6310.

## Executive M.B.A. Program

The College of Business Administration offers an innovative executive M.B.A. (E.M.B.A.) program for executives of mid-sized and growing firms. The program curriculum is designed to enhance the ability of managers to manage the change and growth common in today's competitive environment. To accomplish this, participants in the program take courses built around three major integrative themes: entrepreneurship/intrapreneurship and integration of business functions, the e-business competitive challenge, and competition in a global marketplace.

The E.M.B.A. program is designed with experienced managers in mind and is tailored to fit their schedules. Through the use of a structured approach, executives are able to pursue an M.B.A. with their peers at a level and pace appropriate to their business experience. The program is completed in 15 months. Courses are taught in a convenient two-weekend-on-and-one-weekend-off format. Classes are held on Friday evenings and all day Saturday.

## Required Courses:

|           |  |   |
|-----------|--|---|
| EMBA 5500 | Analytical Foundations for Executives .....                                | 3 |
| EMBA 6100 | Global Competitive Challenge .....   | 3 |
| EMBA 6120 | Cultural, Legal & Operational Issues in Doing<br>Business Abroad .....     | 3 |
| EMBA 6200 | Entrepreneurship and Personal Strategic Planning .....                     | 3 |
| EMBA 6140 | Accounting & Financial Foundations for Executives ..                       | 3 |
| EMBA 6210 | Problem Solving & Interpersonal Skills .....                               | 3 |
| EMBA 6220 | Accounting Systems for Operational Control &<br>Strategic Management ..... | 3 |
| EMBA 6230 | Market Driven Analysis .....   | 3 |
| EMBA 6240 | Entrepreneurial Financial Management .....                                 | 3 |
| EMBA 6250 | Leadership & Performance Management .....                                  | 3 |
| EMBA 6290 | Strategic Management in a Global Environment .....                         | 3 |
| EMBA 6300 | E-Business Competitive Challenge .....                                     | 3 |
| EMBA 6310 | Managing global Supply Chains .....  | 3 |
| EMBA 6320 | Product Development .....  | 3 |
| EMBA 6330 | Customer Relationship Management .....                                     | 3 |
| EMBA 6470 | Global/E-Business field Trip .....   | 2 |

## J.D./M.B.A. Dual Degree

This integrated program and curriculum leads to the awarding of two degrees. The juris doctor degree is awarded by the College of Law and the M.B.A. degree is awarded by the College of Business Administration.

## Juris Doctor (J.D.)

The College of Law requires the successful completion of 89 semester hours. The dual degree program would permit up to 12 semester hours of core course from the College of Business Administration to be applied toward the satisfaction of the 89 hour requirement. The 12 hours of core courses from the College of Business Administration are:

|           |   |   |
|-----------|---|---|
| BUAD 6010 | Assessing Emerging Business Opportunities             | 3 |
| BUAD 6020 | Accounting and Organizational Performance Measurement | 3 |
| BUAD 6030 | Managing in a Dynamic Environment                     | 3 |
| BUAD 6060 | Financial Decision-Making and Risk Analysis           | 3 |

## M.B.A. Degree

To fulfill requirements for the M.B.A. degree, students must complete 30 semester hours at the 6000 level or above, including all six M.B.A. core courses (18 hours). Students in the joint program may apply up to 12 hours of non-first year course work at the College of Law towards satisfaction of the M.B.A. electives. These 12 hours may come from the following courses or others approved by the program adviser:

|                       |     |
|-----------------------|-----|
| Corporations          | 3/4 |
| Agency/Partnership    | 2/3 |
| Corporate Finance     | 2/3 |
| Securities Regulation | 2/3 |
| Business Planning     | 2/3 |
| Labor Law             | 2/3 |
| Employment Law        | 2/3 |
| Corporate Taxation    | 2/3 |
| Partnership Taxation  | 2/3 |
| Patent                | 2/3 |
| Copyright Law         | 2/3 |
| Labor Arbitration     | 2/3 |
| Negotiations          | 2/3 |

## Master of Science in Accounting (M.S.A.)

### M.S.A. Curriculum

#### Basic Core

Based on the candidate's prior course work, any or all of the basic core may be waived (each course is 3 semester hours):

|           |  |
|-----------|--|
| MATH 1260 | Modern Business Math I                         |
| MATH 1270 | Modern Business Math II                        |
| BUAD 1020 | Microcomputer Applications in Business         |
| BUAD 2040 | Financial Accounting Information               |
| BUAD 2050 | Accounting for Business Decision Making        |
| ACCT 3110 | External Financial Reporting I                 |
| ACCT 3120 | External Financial Reporting II                |
| ACCT 4210 | Taxes and Business Decisions                   |
| ACCT 4310 | Internal Reporting                             |
| BANS 5210 | Economics for Business Decisions               |
| FINA 5310 | Managerial Finance                             |
| OPMT 5510 | Business Statistics with Computer Applications |

Students should take 10 courses/30 semester hours allocated as follows: 3 core courses, 4 courses from the electives listing and 3 courses from the diversification electives menu.

#### Core Courses (required of all students):

|           |                                     |   |
|-----------|-------------------------------------|---|
| ACCT 6130 | External Financial Reporting III    | 3 |
| ACCT 6190 | Contem. Accounting Problems         | 3 |
| ACCT 6210 | Research in Accounting and Taxation | 3 |
| ACCT 6310 | Advanced Managerial Acctg.          | 3 |
| ACCT 6420 | Auditing                            | 3 |

#### Electives (Select 4 courses):

|           |  |   |
|-----------|--|---|
| ACCT 6150 | International Accounting and Taxation  | 3 |
| ACCT 6220 | Corporate Tax                          | 3 |
| ACCT 6230 | Fiduciary, Estate and Gift Taxation    | 3 |
| ACCT 6240 | Partnership and S Corporation Taxation | 3 |
| ACCT 6320 | Cost Analysis and Control              | 3 |

#### Diversification Electives (Select 3 courses):

|           |   |   |
|-----------|---|---|
| BUAD 6010 | Assessing Emerging Business Opportunities | 3 |
| BUAD 6030 | Designing Products and Operations         | 3 |
| BUAD 6040 | Marketing, Production and Distribution    | 3 |
| BUAD 6050 | Managing in a Dynamic Environment         | 3 |
| INFS 6460 | Management Information Systems            | 3 |
| INFS 6470 | Information Technology                    | 3 |
| INFS 6560 | Systems Analysis and Design               | 3 |
| INFS 6610 | Info. Storage and Retrieval               | 3 |
| INFS 6810 | Network Communications                    | 3 |
| INFS 6930 | Contemporary Topics Seminar               | 3 |

## Doctor of Philosophy in Manufacturing Management (Ph.D.)

The purpose of the Ph.D. program is to train scholars to meet traditional standards of excellence in, and contribute to, the manufacturing management field through research, teaching and publication in academic and professional journals. The program is designed for individuals who seek to contribute to the advancement and dissemination of knowledge in manufacturing management through an integrative approach with sound foundations in business, engineering and research methodology. Graduates are expected to pursue careers in academia, consulting, research or manufacturing organizations.

The basic philosophy underlying the doctoral program is that researchers in manufacturing management require a careful and creative mix of functional management specialties, economics, engineering, manufacturing and information technologies, and analytical tools such as statistics, optimization and research methodology. Therefore, the program is designed to provide the students with abilities and skills to integrate and synthesize manufacturing, engineering and business functions (e.g., finance, organizational behavior, strategy, marketing, managerial accounting and information systems).

#### Prerequisites

- 1 year (2 semesters) of calculus
- Statistics (through regression & analysis of variance)
- Background in physics or chemistry
- One semester/quarter of computer systems with applications

**Note:** Prerequisites must be complete before starting the Ph.D. program.

#### Foundation Courses

|              |  |
|--------------|--|
| Business:    | ACCT 5000, ORGD 7110, FINA 7310, BANS 7210, MKTG 7410, OPMT 7520 |
| Engineering: | MIME 5060, MIME 5160, MIME 5750, MIME 5980                       |

## Ph.D. Program

#### Research Tools and Methods:

|           |                                      |   |
|-----------|--------------------------------------|---|
| MFGM 8630 | Management Science                   | 4 |
| MFGM 8860 | Advanced Statistics                  | 4 |
| MFGM 8880 | Research Methods and Theory Building | 4 |

## Manufacturing Core Competencies:

|           |   |   |
|-----------|---|---|
| OPMT 8270 | Simulation and Facility Planning .....  | 3 |
| OPMT 8680 | Total Quality Management & SPC .....    | 3 |
| OPMT 8690 | Manufacturing Resource Management ..... | 3 |

## Integrative Seminars:

|           |  |   |
|-----------|--|---|
| INFS 8480 | Information Systems Issues in Manufacturing .....  | 4 |
| MFGM 8830 | Organizational Theory & Behavior for Implementing<br>Advanced Manufacturing Technologies ..... | 4 |
| MFGM 8840 | Manufacturing Strategy .....   | 4 |
| MFGM 8890 | Advanced Manufacturing System Design .....   | 4 |

## Field Research: (8 hours)

### Dissertation:

MFGM 8990 (16 hours)

## Proficiency Examinations

Within the first year, students may take standardized examinations to demonstrate proficiency in foundation courses for which they have gained knowledge through experience or by studying on their own, and thereby obviate the necessity for taking these courses.

## Dissertation Research

The dissertation must be based on work initiated and undertaken specifically for that purpose. It must reflect a high level of scholarship, must constitute a substantial piece of work, and must indicate and document its claim to be a significant contribution to knowledge in its subject area.

Details regarding the dissertation research, starting with dissertation proposal and ending with the final defense, are available in the handbook for Ph.D. students available from the program director.

# College of Education

## Graduate Programs

The College of Education offers programs leading to the degrees of master of education, doctor of education and doctor of philosophy. The College of Education collaborates with the College of Arts and Sciences to offer the master of arts and education and the master of science and education degrees. Sixth-year education specialist degree programs are available in educational administration and supervision as well as curriculum and instruction.

## Admission to Graduate Programs

Admission requirements for Graduate School are described in a prior section of the Graduate School section of this catalog. Admission to graduate study in the College of Education is open to graduates of accredited colleges and universities who meet the minimum admission requirements of the Graduate School as well as the specific admission requirements of the college, department and program. Please refer to the degree program descriptions for specific information.

**Note:** Previously admitted students wishing to transfer to a different program must apply for admission to the new program. Admission to one program does not guarantee admission to another.

## Administration of Programs

All graduate programs in the College of Education are administered jointly by the college and the Graduate School. Students may contact the specific department, the college or the Graduate School for further information on programs or admission requirements. The college's associate dean coordinates the graduate policies within the college.

## Master's Degree Programs

The college offers the master of education degree. The degrees of master of arts and education and master of science and education are offered in collaboration with the College of Arts and Sciences. Specific areas of study for these degree programs are indicated below:

### Master of Education

Art Education  
 Career and Technical Education  
 Curriculum and Instruction  
 Educational Administration and Supervision  
 Educational Psychology  
 Educational Research and Measurement  
 Educational Technology  
 Educational Theory and Social Foundations  
 Elementary and Early Childhood Education  
 Health Education  
 Higher Education  
 Music Education (Master of Music Education)  
 Physical Education  
 Secondary Education  
 Special Education

### Master of Arts and Education

Education & Anthropology  
 Education & English  
 Education & English as a Second Language  
 Education & French  
 Education & German  
 Education & History  
 Education & Mathematics  
 Education & Sociology  
 Education & Spanish

### Master of Science and Education

Education & Biology  
 Education & Geology  
 Education & Mathematics  
 Education & Physics

## Admission to Master's Degree Programs

In addition to the Graduate School's requirements, the College of Education requires the following:

1. A bachelor's degree from an accredited institution.
2. An overall grade point average (GPA) of at least 2.7 on a 4.0 scale in all undergraduate work. Students who fail to meet this requirement may be considered for **provisional admission**, provided that they demonstrate excellent promise for graduate study.
3. Three recommendations concerning the prospective graduate student, which, depending upon the student's status at the time, may come from such sources as the undergraduate major adviser,

current employer, school principal or others who are knowledgeable about the applicant's ability for graduate work in the student's desired program.

4. Any additional published criteria established by a program.
5. Some programs have selective admissions and may admit a limited number of students each year. Thus, meeting all formal criteria does not guarantee admission.

## Admission Classifications

1. **Regular**—Meets all of the admission requirements.
2. **Provisional**—Fails to meet all admission requirements, but has demonstrated to the program excellent promise for graduate study. The candidate is required to immediately complete the GRE (quantitative and verbal portions) and earn a minimum combined score of 800. If the student fails to achieve these GRE results, a 3.5 GPA in the College Core courses is required for **regular admission**. The student must achieve regular admission status based on the above criteria by the completion of 15 hours of coursework to continue in the program.

## General Requirements for Master's Programs

1. Each master's program requires a minimum of 36 semester hours of approved graduate coursework with a minimum GPA of 3.0 on a 4.0 scale for all graduate coursework. Programs also leading to licensure or endorsement may require additional semester hours to fulfill credential as well as degree requirements.
2. All coursework for master's programs must be taken within a **six-year period** immediately preceding the date the degree is awarded.
3. All master's programs require the completion of a thesis, project, seminar or field experience (practicum). Refer to specific program descriptions for additional information.
4. No more than six semester hours of credit from workshops (5950), problems or special topics courses (5980 or 6980) and independent studies (5990 or 6990) may be included in the degree program. A maximum of ten semester hours of transfer course work may be applied to a master's program.
5. College core requirements (12 hours). All students completing master's degrees must fulfill the college's core requirements by completing one course from each of the following four areas within the first 21 semester hours of coursework:

### a. Psychological foundations core courses are as follows:

|          |  |   |
|----------|--|---|
| EDP 5110 | Basic Educational Psychology .....                       | 3 |
| EDP 5120 | Alternative Approaches to Discipline .....               | 3 |
| EDP 5210 | Child Behavior and Development .....                     | 3 |
| EDP 5220 | Adolescent Behavior and Development .....                | 3 |
| EDP 5230 | Adult Development .....                                  | 3 |
| EDP 5310 | Issues and Innovations in Learning and Instruction ..... | 3 |
| EDP 5320 | Instructional Psychology .....                           | 3 |
| EDP 5330 | Behavior Management .....                                | 3 |

### b. Research foundations core courses are as follows:

|           |                                       |   |
|-----------|---------------------------------------|---|
| RESM 5110 | Quantitative Methods I .....          | 3 |
| RESM 5210 | Educational Testing and Grading ..... | 3 |
| RESM 5310 | Educational Research .....            | 3 |
| RESM 5330 | Qualitative Research I .....          | 3 |

### c. Social foundations core courses are as follows:

|           |  |   |
|-----------|--|---|
| TSOC 5100 | Group Processes in Education .....           | 3 |
| TSOC 5110 | Modern Educational Controversies .....       | 3 |
| TSOC 5200 | Sociological Foundations of Education .....  | 3 |
| TSOC 5210 | Multicultural Non-Sexist Education .....     | 3 |
| TSOC 5230 | Intergroup and Intercultural Education ..... | 3 |
| TSOC 5300 | Philosophy and Education .....               | 3 |
| TSOC 5400 | History of Schooling & Teaching in the U.S.  | 3 |

### d. Curriculum core course requirement .....

A specific set of courses that satisfy the curriculum requirement is approved for each degree program. Students should check with their faculty adviser for additional information.

## Faculty Adviser

An adviser from the program will be assigned by the department upon admission to the program. It is the student's responsibility to work with the adviser on the development of the master's plan of study, evaluation of the program and other aspects pertinent to graduate study.

## Plan of Study

For each program, a student must develop a plan of study that will specify the curriculum that must be completed to fulfill degree requirements. The master's degree requires a minimum of 36 semester hours. The plan of study must be approved first by the faculty adviser and then filed through the college associate dean by the completion of 15 hours of graduate coursework. Upon final approval by the college and the Graduate School, a copy of the plan of study will be returned to the student.

## Teacher Licensure

Master's degree programs also meeting requirements for initial teacher licensure must follow the same policies and guidelines for field/clinical experience, student teaching/internship and licensure examinations as do undergraduate programs. Students should consult policies and guidelines published in the undergraduate College of Education section of the catalog for more information.

## Thesis or Master's Project Deadline

Students completing a thesis or project must meet the published deadline for submission to the Graduate School. In addition, the thesis or project must be submitted to the college associate dean at least two weeks prior to the published Graduate School deadline.

## Program Requirements

### Master of Education in Educational Administration and Supervision

|    |   |    |
|----|---|----|
| A. | College core .....                                      | 12 |
| B. | Specialization .....                                    | 21 |
|    | <i>Courses must be approved by the faculty adviser.</i> |    |
| C. | Culminating experience (choose one) .....               | 3  |
|    | EDAS 6920 or EDAS 6960                                  |    |

Programs leading to the M.Ed. degree in educational administration and supervision may also meet some of the requirements for the principal and/or administrative specialist license in Ohio. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Art Education

|    |  |    |
|----|--|----|
| A. | College core .....                           | 12 |
|    | Curriculum core must be AED 5500 or AED 5320 |    |

## 264 Graduate School

- B. Specialization ..... 21  
AED 5000, 5320 or 5500, Electives. *Courses must be approved by the faculty adviser.*
- C. Culminating experience (choose one) ..... 3  
AED 5000 or AED 6920 or AED 6960 or AED 6940

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Career and Technical Education

- A. College core ..... 12
- B. Specialization ..... 21  
*Courses must be approved by the faculty adviser.*
- C. Project, thesis or practicum (choose one) ..... 3  
CTE 6920 or CTE 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Curriculum and Instruction

- A. College core ..... 12
- B. Specialization ..... 21  
*Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
CI 6920 or CI 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Educational Psychology

- A. College core ..... 12
- B. Specialization ..... 21  
Areas of focus may include learning/cognition or human development  
*Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
EDP 6980 or EDP 6960

### Master of Education in Educational Research and Measurement

- A. College core ..... 12
- B. Specialization ..... 21  
Areas of focus may include statistics, measurement or evaluation  
*Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
RESM 6980 or RESM 6960

### Master of Education in Educational Technology

- A. College core ..... 12
- B. Specialization ..... 21-22  
Areas of focus may include instructional technology, educational computing or instructional design. *Courses must be approved by the faculty adviser.*
- C. Culminating experience (choose one) ..... 2-3  
CI 6900 or CI 6920 or CI 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Educational Theory and Social Foundations

- A. College core ..... 12
- B. Specialization ..... 21  
Areas of focus may include historical foundations, philosophical foundations, multicultural or urban education. *Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
TSOC 6980 or TSOC 6960

### Master of Education in Elementary and Early Childhood Education

- A. College core ..... 12
- B. Specialization ..... 18-19  
*Courses must be approved by the faculty adviser. Areas of focus may include curriculum, literacy, play or assessment.*
- C. Theory and research requirement (choose one) ..... 3  
CI 6490 or CI 6590 or CI 6690 or CI 6790
- D. Seminar, project or thesis (choose one) ..... 2-3  
CI 6900 or CI 6920 or CI 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Health Education

- A. College core ..... 12
- B. Specialization ..... 21  
HEAL 6500, 6600 and electives. *Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
HEAL 6920 or HEAL 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

### Master of Education in Higher Education

- A. College core ..... 12
- B. Specialization ..... 18  
Areas of focus may include college student personnel, community college administration or general administration. *Courses must be approved by the faculty adviser.*
- C. Practicum ..... 3  
HED 6940
- D. Project or thesis (choose one) ..... 3  
HED 6920 or HED 6960

### Master of Education in Physical Education

- A. College core ..... 12
- B. Specialization ..... 21  
Areas of focus may include adapted physical education or teacher development. *Courses must be approved by the faculty adviser.*
- C. Project or thesis (choose one) ..... 3  
PED 6920 or PED 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

## Master of Education in Secondary Education

- A. College core ..... 12
- B. Specialization ..... 21-22  
*Courses must be approved by the faculty adviser.*
- C. Culminating experience (choose one) ..... 2-3  
CI 6920 **or** CI 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

## Master of Education in Special Education

- A. College core ..... 12  
Research foundations core must be RESM 5310
- B. Specialization ..... 18  
Areas of focus may include, but are not limited to, adult services, autism, developmental disabilities, early childhood education for the handicapped, inclusion, multihandicapped, severe behavior handicapped, specific learning disabilities, transition and vision impaired. Students interested in the severe behavioral spectrum (S.B.S.) should contact the College of Health and Human Services.  
*Courses must be approved by the faculty adviser.*
- C. Culminating experience (choose one) ..... 6  
SPED 6930:001 and one of the following: SPED 6930:002 **or** SPED 6920 **or** SPED 6960

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

## Master of Music Education

- A. College core ..... 12  
Curriculum core must be MED 5360
- B. Specialization ..... 24  
MUS 5900, 5350, Music Ensembles (2 hours), Music Electives  
*Courses must be approved by the faculty adviser.*
- C. Project **or** thesis ..... 3

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

Requirements for initial teacher licensure may be met as part of the M.Ed. degree. Please see the appropriate description in the Endorsement and Licensure section.

## Master of Arts and Education

This degree program is offered by the College of Education in collaboration with the College of Arts and Sciences. As a general rule, students will have an adviser in Education and in Arts & Sciences who will jointly plan and direct the program.

- A. College of Education core ..... 12
- B. Specialization ..... 21  
Select a minimum of 15 semester hours in anthropology, English, French, German, history, mathematics, sociology, Spanish or English as a second language. *Courses must be approved by the faculty adviser.*
- C. Project, thesis **or** seminar ..... 3

See M.Ed. above for initial teaching licensure. Master of arts and education ordinarily requires licensure as a prerequisite.

## Master of Science and Education

This degree program is offered by the College of Education in collaboration with the College of Arts and Sciences. As a general rule,

students will have an adviser in Education and in Arts and Sciences who will jointly plan and direct the program.

- A. College of Education core ..... 12
- B. Specialization ..... 21  
Select a minimum of 15 semester hours in biology, geology, mathematics or physics. *Courses must be approved by the faculty adviser.*
- C. Project **or** thesis ..... 3

See M.Ed. above for initial teaching licensure. master of science and education ordinarily requires licensure as a prerequisite.

## Alternative Master's Program (LAMP)

The alternative master's is a program for individuals who are looking for a career change and are interested in teaching. The program provides a sequence of courses that lead to teacher licensure from the State of Ohio and a master's degree. The program leads to licensure to teach in middle childhood (grades 4-9) or adolescent and young adult (grades 7-12). Licensure may be obtained in the following areas: language arts, mathematics, science and/or social studies, foreign language, music education and visual arts education. The program is designed to provide the student with many opportunities to spend time in schools and non-school settings and to put these experiences into perspective through on-campus reflective seminars. Interested individuals should contact the college director of advising.

## Education Specialist Degree Programs

The education specialist (Ed.S.) degree program is an advanced graduate program that provides students an area of educational specialization with emphasis on practice. Ed.S. programs are offered in educational administration and supervision as well as curriculum and instruction.

### Education Specialist Program Areas

**Administration and Supervision:** The Ed.S. in educational administration and supervision provides patterns of study that enable advanced graduate students to fulfill individual career goals, be they licensure for advanced administrative positions in public and private schools (district administrator, vocational director, administrative specialist and/or building administrator) or in the area of organizational leadership.

**Curriculum and Instruction:** The Ed.S. in curriculum and instruction is designed to meet the needs of individuals involved with the curriculum, teaching and supervision aspects of discipline-centered areas of study. The degree provides patterns of study for teachers and supervisors who want an education beyond the master's degree as a specialist but who are not interested in a doctoral degree. Specific areas represented are educational technology, elementary and early childhood education, secondary education, special education and career and technical education. For the program and requirements of a specific area, contact a faculty adviser.

## Admission to Ed.S. Programs

General admission requirements for the Ed.S. programs include:

1. A bachelor's degree from an accredited institution.
2. Completion of a master's degree from an accredited institution with a minimum GPA of 3.0 (4.0 scale).

## General Requirements for the Ed.S. Program

1. The completion of a minimum of 32 semester hours of approved graduate coursework beyond the master's level with a minimum GPA of 3.0 on a 4.0 scale.
2. All coursework for the Ed.S. must be taken within a **six-year period** preceding the date the degree is awarded.
3. Most programs require the completion of a culminating experience, which may include field experiences, internships, projects, etc.
4. No more than six semester hours of credit from workshops (5950/7950), problems or special topics courses (5980/7980 or 6980/8980) and independent studies (5990/7990 or 6990/8990) may be applied to a specialist's program.
5. Each student is required to develop a plan of study with his/her adviser that specifies the coursework that must be completed to fulfill degree requirements. This plan must be filed prior to the completion of 15 semester hours and must be approved by the adviser, the college associate dean and the Graduate School. Forms are available from the college office.

## Doctoral Degree Programs

Doctoral students majoring in education may earn either a doctor of philosophy (Ph.D.) degree or a doctor of education (Ed.D.) degree, depending on the program. Requirements for the two degrees are similar; differences are noted in this section. The Ph.D. is conceived as a research-oriented degree, whereas the Ed.D. is more oriented to the practitioner. Doctoral programs are long and complex. Students are encouraged to discuss a prospective program with appropriate faculty prior to submitting an application. Students should refer to the *Doctoral Program Handbook*, which provides additional information.

## Doctoral Majors

Doctoral degree programs (Ph.D. and/or Ed.D.) are offered in the following areas of specialization:

Educational Administration and Supervision (Ed.D.)

Curriculum and Instruction (Ph.D. or Ed.D.)

Concentrations:

- Educational Technology
- Elementary and Early Childhood Education
- Curriculum and Instruction
- Secondary Education
- Special Education

Foundations of Education (Ph.D. or Ed.D.)

Concentrations:

- Educational Psychology
  - Areas of focus may include learning/cognition or human development
- Educational Sociology
- Foundations of Education
- History of Education
- Philosophy of Education
- Research and Measurement
  - Areas of focus may include statistics, measurement or evaluation

Health and Physical Education (Ph.D. or Ed.D.)

Concentration:

- Physical Education

Higher Education (Ph.D.)

## Doctoral Minors

The major fields listed for doctoral specialization are also available as minor areas of study for other doctoral programs. Additional areas of study for the minor are available within the college as well as areas from the colleges of Arts and Sciences, Business Administration and Health and Human Services. Students should discuss these alternatives with their advisers.

## Admission to the Doctoral Program

Individuals applying for admission to doctoral study in the College of Education must meet the admission requirements of the Graduate School, the College of Education and the program in which the individual wishes to pursue a major field of study. These requirements are as follows:

1. Completion of a bachelor's degree from an accredited institution with a minimum GPA of 2.7 on a 4.0 scale.
2. Completion of a master's degree from an accredited institution with a minimum GPA of 3.0 on a 4.0 scale. (In special cases an applicant who does not have a master's degree may be considered.)
3. Applicants are required to submit current GRE scores taken within the past 6 years. Generally, a GRE score at the 50th percentile or higher will enhance an applicant's chance for admission (e.g., a minimum of 480 Verbal plus a minimum of 560 Quantitative for a total of 1040).
4. Evidence in prerequisite academic work that the applicant will be able to effectively pursue a doctoral degree in the program in which the applicant wishes to specialize.
5. An autobiographical statement, including statements on previous study, educational experience, professional accomplishments, immediate and future professional goals, a proposed time schedule and other pertinent information that the applicant believes will aid the program in making the recommendation for admission.
6. Evidence of a minimum of two years of successful teaching experience for an applicant who expects to continue working in teacher education. An applicant without teaching experience may be admitted to doctoral study in the absence of such experience upon the approval of the program in which applicant wishes to concentrate.
7. Evidence of research and writing ability, if required by the program. Such evidence can include a master's thesis, a written research report, reprints of one or more publications, a paper presented to a professional society or similar evidence of the applicant's competence in this respect.
8. Some programs may require a formal interview by an admissions committee and/or administration of an examination.

## General Requirements for the Doctoral Program

1. Doctoral programs require the completion of a minimum of 76 semester hours beyond the master's degree or, in special cases, a minimum of 112 semester hours beyond the bachelor's degree.
2. Students must demonstrate competence in educational foundations (6-12 semester hours). Various options exist for the Ph.D. and Ed.D. programs. Refer to the *Doctoral Program Handbook* for specific information.
3. Students must demonstrate competence in research methodology (6-9 semester hours). Differences exist between the Ph.D. and Ed.D.

programs. Refer to the *Doctoral Program Handbook* for additional information.

4. A doctoral program must have either:
  - a. One major (minimum of 36 hours) and one minor (minimum of 15 hours)
  - b. One major (minimum of 24 hours) and two minors (minimum of 15 hours each)
5. All requirements for the degree program must be completed within a **seven-year period immediately** preceding the date the degree is awarded.
6. Dissertation hours (minimum of 10 and maximum of 32).

## Advising/Committees

Upon admission to a program the student is assigned a temporary adviser. This adviser guides the student through the formation of a doctoral program committee.

The doctoral program committee shall be formed before the student completes 18 hours of credit. The doctoral program committee has a minimum of three members who are selected from the membership of the graduate faculty of the University. Specific composition of the committee is outlined in the *Doctoral Program Handbook*.

The doctoral program committee is responsible for assisting the student in the development of a plan of study and assuring competence by overseeing the qualifying examination (if required), doctoral major exam, doctoral minor exam(s) and doctoral orals. After passing doctoral orals, the student must form a *Dissertation Committee* to guide the development of the dissertation. Guidelines for this committee are outlined in the *Doctoral Program Handbook*.

## Plan of Study

The doctoral program specification sheet, a form listing all courses to be included in the student's program, is available in the College of Education office or the Graduate School office. Requirements for foundations, research methodology, major, minor(s) and dissertation credit are included on the form. The plan must be approved by the doctoral program committee, the associate dean of the college and the dean of the Graduate School. The plan must be filed before 18 semester hours of the doctoral program are completed.

## Residence Requirements

A student who is seeking the Ph.D. degree **must complete two consecutive full-time semesters in residence**. A student who is seeking the Ed.D. may meet the above requirement or may complete two consecutive full-time summer semesters.

The residence requirement implies a period of full-time concentration in academic study. A program of nine semester hours is recognized as the minimum for full-time residence in any semester or in a complete 12-week summer semester (Terms I and II). The student must meet the residence requirement under a plan that is submitted in writing to the doctoral program committee for prior approval.

## Examinations

Five or six examinations, depending on the program, must be passed successfully by students who complete a doctoral program. Consult the *Doctoral Program Handbook* for additional information. The examination sequence for doctoral candidates is as follows:

1. Departmental qualifying examination. (Preliminary examination in doctoral area that is dependent on the specific doctoral program. Students should consult their adviser.) For those programs that require a qualifying examination, students must take the examination between the point that a student has earned a minimum of 15 semester hours of approved credit and a maximum of 27 semester hours of approved credit. Failure to pass the examination will result in dismissal from the program.
2. Written major examination
3. Written minor examination(s).  
The sequence of the major and minor examinations may be reversed
4. Combined major/minor(s) oral examination
5. Oral presentation of dissertation proposal
6. Oral presentation and defense of dissertation

Following is the sequence for completion of the doctoral program:

1. Admission to program
2. Work with temporary adviser
3. Form doctoral program committee
4. File doctoral program specification sheet
5. Pass qualifying examination
6. Complete required coursework
7. Pass written major/minor exams
8. Pass doctoral oral examination
9. Form dissertation committee
10. Have dissertation proposal approved by dissertation committee  
If the dissertation will use human subjects, obtain approval from the Human Subjects Research and Review Committee
11. Pass final oral defense of dissertation (supervised by dissertation committee)
12. Submit final, approved copies of dissertation to dissertation committee, college and Graduate School

## Dissertation Deadline

Students completing the dissertation must meet the published deadline for submission to the Graduate School. In addition, the dissertation must be submitted to the associate dean in the college at least two weeks prior to the published Graduate School deadline.

## Doctoral Monitoring Committee (DMC)

The DMC is responsible for reviewing all requests not consistent with College of Education and Graduate School policies and making recommendations to the college's associate dean and the dean of the Graduate School. Consult the *Doctoral Program Handbook* for additional information.

## Endorsement and Licensure Programs

The College of Education offers graduate programs to meet Ohio Teacher Education Licensure Standards. The following requirements may be met as part of an M.Ed. or, in some cases, an Ed.S. program.

## Licensure Programs

### Administrative Specialist—Curriculum, Instruction and Professional Development

NOTE: See faculty adviser for M.Ed. core selections

#### Pre-Licensure

|                   |        |  |   |
|-------------------|--------|--|---|
| EDAS              | 6/8000 | The Individual in Organizations .....            | 3 |
| EDAS              | 6/8010 | Supervision for Improved Instruction .....       | 3 |
| EDAS              | 6/8020 | Instructional Leadership .....                   | 3 |
| EDAS              | 6/8030 | Developing Effective Learning Environments ..... | 3 |
| CIEC              | 6/8310 | Pre-K/Primary Curriculum .....                   | 3 |
| Select one: ..... |        |  | 3 |
| CI                | 5/7860 | Middle/Junior High Curriculum                    |   |
| CI                | 5/7870 | Secondary School Curriculum                      |   |
| EDAS              | 6/8220 | Administration of Special Programs .....         | 3 |
| EDAS              | 6/8230 | Community and Schools .....                      | 3 |

#### Licensure

|  |        |  |
|--|--------|--|
| Additional courses in Curriculum and Instruction ..... |        | 9  |
| EDAS   | 6/8200 | Continuous Improvement of Schools                    |
| EDAS   | 6/8240 | Development of Learning Organizations                |
| EDAS   | 8300   | Integrated Experiences in Educational Administration |

### Administrative Specialist—Educational Staff Personnel Administration

NOTE: See faculty adviser for M.Ed. core selections

#### Pre-Licensure

|                  |        |  |   |
|------------------|--------|--|---|
| EDAS             | 6/8000 | The Individual in Organizations .....            | 3 |
| EDAS             | 6/8010 | Superv for Improved Instruction .....            | 3 |
| EDAS             | 6/8020 | Instructional Leadership .....                   | 3 |
| Select one ..... |        |  | 3 |
| EDAS             | 6/8110 | Legal Aspects of School Admin                    |   |
| EDAS             | 6/8330 | Collective Bargaining & Dispute Resolution       |   |
| EDAS             | 6/8230 | Community and Schools .....                      | 3 |
| EDAS             | 6/8360 | Personnel Management & Contract Administration . | 3 |
| Select one ..... |        |  | 3 |
| CI               | 6/8810 | Curriculum Development K-12                      |   |
| CI               | 6/8800 | Foundation of Curriculum Constr                  |   |

#### Licensure

|  |        |   |
|--|--------|---|
| Additional Courses from Public Admin. Business ..... |        | 6   |
| EDAS   | 6/8030 | Developing Effective Learning Environments                                  |
| EDAS   | 8300   | Integrated Experiences in Educational Administration:<br>Policies in Action |

### Administrative Specialist—School-Community Relations

NOTE: See faculty adviser for M.Ed. core selections

#### Pre-Licensure

|                  |        |  |   |
|------------------|--------|--|---|
| EDAS             | 6/8000 | The Individual in Organizations .....            | 3 |
| EDAS             | 6/8220 | Administration of Special Programs .....         | 3 |
| EDAS             | 6/8110 | Legal Aspects of School Administration .....     | 3 |
| EDAS             | 6/8360 | Personnel Management & Contract Administration . | 3 |
| EDAS             | 6/8230 | Community and Schools .....                      | 3 |
| EDAS             | 6/8420 | Micropolitics of School Communities .....        | 3 |
| Select one ..... |        |  | 3 |
| CI               | 6/8800 | Foundation of Curriculum & Instruction           |   |
| CI               | 6/8830 | Curriculum Trends and Issues                     |   |

## Electives

|   |  |   |
|---|--|---|
| Additional courses from Communications, Marketing, Public Administration or Political Science ..... |  | 3 |
|---|--|---|

## Licensure

|   |        |  |
|---|--------|--|
| Communications, Marketing, Public Administration or Political Science 6 |        |  |
| EDAS  | 6/8190 | Integrated Experiences in Educational Administration:<br>Practices in Action |
| EDAS  | 8300   | Integrated Experiences in Educational Administration:<br>Politics in Action  |

### Administrative Specialist—Vocational Education Administration

NOTE: See faculty adviser for M.Ed. core selections

#### Pre-Licensure

|                  |        |  |   |
|------------------|--------|--|---|
| Select one ..... |        |  | 3 |
| CTE              | 5060   | Foundations of Vocational Education                                      |   |
| EDAS             | 6/8000 | The Individual in Organizations .....                                    | 3 |
| CTE              | 5080   | Principals: School-to-Work Transition .....                              | 3 |
| CTE              | 5100   | Organization, Administration & Regulations of Vocational Education ..... | 3 |
| Select one ..... |        |  | 3 |
| CTE              | 5120   | Supervision of Vocational Education                                      |   |
| EDAS             | 6/8010 | Supervision for Improved Instruction                                     |   |
| Select one ..... |        |  | 3 |
| CTE              | 5180   | Promotion, Recruitment & Retention                                       |   |
| EDAS             | 6/8230 | Community and Schools  |   |
| CTE              | 5/7810 | Staff Evaluation and Development .....                                   | 3 |
| CTE              | 5/7830 | Curriculum Principles and Models .....                                   | 3 |
| EDAS             | 6/8110 | Legal Aspects of School Administration .....                             | 3 |

#### Licensure

|      |        |   |   |
|------|--------|---|---|
| CTE  | 5/7940 | Practicum-Intern in Vocational Education .....                                    | 3 |
| EDAS | 6/8020 | Instructional Leadership .....  | 3 |
| EDAS | 6/8330 | Collective Bargaining & Disputer Resolution .....                                 | 3 |
| EDAS | 8190   | Integrated Experience in Educational Administration:<br>Practices in Action ..... | 3 |
| EDAS | 8300   | Integrated Experiences in Educational Administration:<br>Policies in Action ..... | 3 |

### Licensure Alternative Masters' Program (LAMP)

This program is for individuals who already have a bachelor's degree in a non-education field and are interested in teaching. Please consult the description for the alternative master's program.

### Principal —PK-9 (ages 3-12 & 8-14)

NOTE: See faculty adviser for M.Ed. core selections

#### Pre-Licensure

|                  |        |  |   |
|------------------|--------|--|---|
| EDAS             | 6/8000 | The Individual in Organizations .....        | 3 |
| EDAS             | 6/8010 | Supervision for Improved Instruction .....   | 3 |
| EDAS             | 6/8020 | Instructional Leadership .....               | 3 |
| EDAS             | 6/8150 | The Administrative Experience .....          | 3 |
| EDAS             | 6/8110 | Legal Aspects of School Administration ..... | 3 |
| EDAS             | 6/8220 | Administration of Special Programs .....     | 3 |
| EDAS             | 6/8230 | Community and Schools .....                  | 3 |
| Select one ..... |        |  | 3 |
| CIEC             | 6/8310 | Pre-K/Primary Curriculum                     |   |
| CI               | 5/7860 | Middle-Junior High Curriculum                |   |

## Licensure

|                   |  |   |
|-------------------|--|---|
| <b>Select one</b> | .....  | 3 |
| EDAS 6/8330       | Collective Bargaining and Dispute Resolution                               |   |
| EDAS 6/8360       | Personal Management and Contract Administration                            |   |
| <b>Select one</b> | .....  | 3 |
| CI 6/8800         | Foundations of Curriculum and Instruction                                  |   |
| CI 6/8810         | Curriculum Development K-12  |   |
| EDAS 8190         | Integrated Experiences in Education Administration:<br>Practices in Action | 3 |
| EDAS 8300         | Integrated Experiences in Education Administration:<br>Policies in Action  | 3 |

## Principal —4-12 (ages 8-14 & 10-21)

NOTE: See faculty adviser for M.Ed. core selections

### Pre-Licensure

|             |  |   |
|-------------|--|---|
| EDAS 6/8000 | The Individual in Organizations        | 3 |
| EDAS 6/8010 | Supervision for Improved Instruction   | 3 |
| EDAS 6/8020 | Instructional Leadership               | 3 |
| EDAS 6/8110 | Legal Aspects of School Administration | 3 |
| EDAS 6/8220 | Administration of Special Programs     | 3 |
| EDAS 6/8230 | Community and Schools                  | 3 |
| EDAS 6/8150 | The Administrative Curriculum          | 3 |
| CI 5/7870   | Secondary School Curriculum            | 3 |

## Licensure

|                   |  |   |
|-------------------|--|---|
| <b>Select one</b> | .....  | 3 |
| EDAS 6/8330       | Collective Bargaining & Dispute Resolution                                   |   |
| EDAS 6/8360       | Personnel Management & Contract Administration                               |   |
| CI 6/8810         | Curriculum Development K-12  | 3 |
| EDAS 8190         | Integrated Experiences in Educational Administration:<br>Practices in Action | 3 |
| EDAS 8300         | Integrated Experiences in Educational Administration:<br>Policies in Action  | 3 |

## School Counselor and School Psychologist

Students completing master's degrees in the College of Education or the College of Health and Human Services may also complete requirements for licensure. For further information, students should contact the department of counseling and mental health services or the associate dean for graduate studies in the College of Health and Human Services.

## School Nurse

The school nurse licensure program is aligned with the master of education in health education degree program. Students completing the following courses will qualify for school nurse licensure in the State of Ohio, as well as a master of education in health education.

### Required Education Courses (21 hours)

#### Cultural Foundations (3 hours)

|           |  |
|-----------|--|
| TSOC 5200 | Sociological Foundations of Education or |
| TSOC 5230 | Intergroup & Intercultural Education     |

#### Research Foundations (3 hours)

|           |                        |
|-----------|------------------------|
| RESM 5100 | Quantitative Methods I |
|-----------|------------------------|

#### Curriculum (6 hours)

|           |                             |
|-----------|-----------------------------|
| SPED 5000 | Issues in Special Education |
| HEAL 6850 | Patient Education           |

#### Psychological Foundations (3 hours)

|          |                                     |
|----------|-------------------------------------|
| EDP 5210 | Child Behavior and Development or   |
| EDP 5220 | Adolescent Behavior and Development |

#### Counselor and Human Service Education (6 hours)

|           |                                   |
|-----------|-----------------------------------|
| CMHS 5010 | Introduction to School Counseling |
| CMHS 5150 | Counseling Across the Life Span   |

### Required Health Courses (18 hours)

|           |  |     |
|-----------|--|-----|
| HEAL 5400 | Professional Issues in School Nursing            | 3   |
| HEAL 5950 | School Nurse Workshop                            | 1-4 |
| HEAL 5940 | School Health Internship                         | 3   |
| HEAL 6500 | Issues in School Health                          | 3   |
| HEAL 6530 | Drug Use and Misuse                              | 3   |
| HEAL 6920 | Master's Research Project in Health Education or |     |
| HEAL 6960 | Master's Research Thesis in Health Education     | 1-4 |

## Speech-Language Pathology

To obtain both teacher and clinical licensure in speech-language pathology, students should consult the program director, the department or the associate dean for graduate studies of Health and Human Services to insure an approved baccalaureate program, master's degree and suitable practicum experience.

## Superintendent

Students may complete requirements for the superintendent's license through advanced graduate study that may also be part of the education specialist or doctoral degrees. Prerequisites for study include satisfactory completion of a principal or administrative specialist licensure program, five years successful teaching under a standard license and five years successful administrative experience with demonstrated skills in leadership, curriculum and change. Additional graduate coursework required includes:

|             |   |   |
|-------------|---|---|
| EDAS 6/8240 | Development of Learning Organizations                       | 3 |
| EDAS 6/8310 | School District Leadership                                  | 3 |
| EDAS 6/8320 | School Business Management                                  | 3 |
| EDAS 6/8420 | Micropolitics of School Communities                         | 3 |
| EDAS 6/8440 | Equity Issues in Ed Finance & Econ                          | 3 |
| EDAS 8620   | Politics & Policy Analysis & Develop                        | 3 |
| EDAS 8640   | Leading System Change                                       | 3 |
| EDAS 7960   | School District Leader: Portfolio Development<br>& Analysis | 3 |

Portfolio that demonstrates the ability:

- to articulate a system vision
- to develop school cultures for student and staff success
- to design management systems for effective and efficient learning environments
- to develop democratic school communities and
- to model personal and professional values for a caring school community.

The portfolio must also clearly demonstrate knowledge of education law, equity, conflict management, community analysis, interpersonal skills and diversity. Hours depend on student/faculty analysis of knowledge, dispositions and performance standards.

## Endorsements

### Career and Technical Education Endorsements

An endorsement for a student holding a valid teacher certificate/license may be recommended for the following on completion of the specified course work:

## 270 Graduate School

### Adult Education

|     |      |   |   |
|-----|------|---|---|
| CTE | 5570 | Instruction Adult Learners .....  | 3 |
| CTE | 5100 | Organization, Administration & Regulation of Vocational Education ..... | 3 |
| CTE | 5830 | Curriculum Principles & Models .....                                    | 3 |
| CTE | 5020 | Occupational Safety & Liability .....                                   | 3 |

### Career-Based Intervention

|      |      |   |   |
|------|------|---|---|
| CTE  | 5140 | Cooperative Education .....   | 2 |
| CTE  | 5160 | Curriculum Development & Teaching Cooperative Education .....           | 3 |
| CTE  | 5100 | Organization, Administration & Regulation of Vocational Education ..... | 3 |
| CTE  | 5020 | Occupational Safety & Liability .....                                   | 3 |
| SPED | 5000 | Issues in Special Education .....                                       | 3 |

### Transition to Work

|      |      |   |   |
|------|------|---|---|
| SPED | 5170 | Sup Youth & and Adults With Disabilities. Living in the Community .....                   | 3 |
| SPED | 5250 | Career & Vocational Education for Students With Disabilities .....                        | 3 |
| SPED | 6250 | Issues & Research in Trans & Post Secondary Outcomes for Students With Disabilities ..... | 3 |
| CTE  | 5080 | Prin. School to Work .....  | 3 |
| SPED | 6940 | Externship in Trans .....   | 5 |

### Vocational Work-Site Teacher/Coordinator

|     |      |  |   |
|-----|------|--|---|
| CTE | 5140 | Cooperative Education .....  | 2 |
| CTE | 5160 | Curriculum Development & Teaching Cooperative Education .....            | 3 |
| CTE | 5100 | Organization, Administration & Regulations of Vocational Education ..... | 3 |
| CTE | 5020 | Occupational Safety & Liability .....                                    | 3 |
| CTE | 5080 | Principles of S-T-W Transition .....                                     | 3 |

### Computer/Technology

A student holding a valid teacher certificate/license may add this endorsement on completion of the following coursework.

|      |      |  |   |
|------|------|--|---|
| CIET | 5010 | Selection & Use of Instructional Media .....                 | 3 |
| CIET | 5100 | Educational Comp. Productivity Tools .....                   | 3 |
| CIET | 5120 | Telecommunication In Education .....                         | 3 |
| CIET | 5150 | Developing Multimedia Instructional Materials .....          | 3 |
| CIET | 5200 | Implementation & Evaluation of Educational Technology .....  | 3 |
| CIET | 5250 | Integration of Educational Technology In Content Areas ..... | 3 |

A minimum of 3 hours with at least 1 credit hour in each from the following:

|      |         |  |     |
|------|---------|--|-----|
| CIET | 5500    | Practicum in Educational Technology .....                                | 1-3 |
| CI   | 5990:02 | Independent Study: Portfolio Development in Educational Technology ..... | 1-3 |

### EEH Validation in Early Childhood for Professionals Holding Special Education Certification

|      |      |  |   |
|------|------|--|---|
| EDP  | 5210 | Child Behavior and Development .....       | 3 |
| CIEC | 6310 | Curriculum for Early Childhood .....       | 3 |
| CIEC | 5520 | Multi-Sensory Experiences .....            | 3 |
| CIEC | 6750 | Development and Classroom Assessment ..... | 3 |
| CIEC | 6330 | Language & Concept .....                   | 3 |
| CIEC | 6320 | Play Behavior .....                        | 3 |

|      |      |  |   |
|------|------|--|---|
| SPED | 6070 | Curriculum Models & Intervention Strategies in Early Childhood Special Education ..... | 3 |
| SPED | 5260 | Home-School Relations .....  | 3 |

*For EEH Validation for Early Childhood Certificates, see Special Education programs.*

### EEH Validation in Special Education for Professionals Holding Early Childhood Certification or PK

|      |      |  |   |
|------|------|--|---|
| CIEC | 6330 | Language and Concept Development .....   | 3 |
| CIEC | 6320 | Meaning & Development of Play Behavior .....   | 3 |
| SPED | 6070 | Curriculum Models & Intervention Strategies in Early Childhood Special Education ..... | 3 |
| SPED | 5000 | Issues in Special Education .....  | 3 |
| SPED | 5180 | Teaching Students with Severe/Multiple Disabilities ..                                 | 3 |
| EDP  | 5210 | Child Behavior and Development .....   | 3 |
| SPED | 5260 | Family-Professional Relations in Special Education ...                                 | 3 |

### PK Validation for Professionals Holding K-3/1-8

|      |      |   |     |
|------|------|---|-----|
| CIEC | 6340 | Curriculum Design: Infants and Toddlers ..... | 3   |
| EDP  | 5210 | Child Behavior and Development .....          | 3   |
| CIEC | 6320 | Meaning and Development of Play .....         | 3   |
| CIEC | 5380 | Practicum: Preschool .....                    | 1-2 |
| CIEC | 5390 | Preschool Seminar .....                       | 2   |
| CIEC | 5580 | Practicum: Infant/Toddler .....               | 1   |
| CIEC | 5590 | Infant/Toddler Seminar .....                  | 2   |

### Reading (PK-12)

(Requires student to hold 1-8 or 7-12 certification or new teacher licensure)

|    |      |  |   |
|----|------|--|---|
| CI | 6400 | Trends in Literacy Acquisition .....                   | 3 |
| CI | 6430 | Diagnosis of Reading Disability .....                  | 3 |
| CI | 6440 | Remediation Practicum .....                            | 3 |
| CI | 6420 | Content Area Literacy for Secondary Teachers <b>or</b> |   |
| CI | 6410 | Content Area Literacy for Elementary Teachers .....    | 3 |

Electives: Two additional courses in Reading/Language Arts

## College of Engineering

### Graduate Programs

The College of Engineering offers graduate programs of study in bio-, chemical, civil, electrical, industrial and mechanical engineering. Requirements for the engineering graduate programs are identified below. In addition, students should familiarize themselves with the general Graduate School requirements (found in a preceding section of this catalog).

### Entrance Requirements

The graduate program is open to all qualified individuals with a bachelor of science (B.S.)/master of science (M.S.) in engineering. Applicants should have a grade point average (GPA) of at least 3.0 in previous undergraduate work and 3.3 in previous graduate work. Students with a degree in another field may be eligible for admission provided they meet the minimum background requirement that includes two years of calculus

through differential equations and one year of engineering physics. In some cases other prerequisite courses may be required. Course credits for meeting undergraduate prerequisites are not applied toward the graduate degree.

An applicant for admission must do the following:

- A. Submit a completed application for admission to the Graduate School.
- B. Submit the application for graduate assistantship to the Graduate School.
- C. Submit a complete financial statement (for international students).
- D. Pay the relevant application fee.
- E. Submit three letters of recommendation.
- F. Submit a statement of purpose on the application and indicate those areas of engineering in which you are interested.
- G. Submit official transcripts of all previous college level work.
- H. Submit scores of the GRE, if required.
- I. All students from non-English speaking countries must submit scores for the TOEFL. The minimum acceptable score for the TOEFL is 550.

The above documentation should be sent directly to the Graduate School, The University of Toledo, Toledo, Ohio 43606-3390, USA. Admission to the graduate program is contingent upon the availability of openings for incoming students. To receive full consideration for financial support starting from the fall semester, the application should be received by March 1. Normally, however, all applications are considered as they are received. Because of the sequential nature of courses, full-time students are admitted for the fall semester of the academic year. Please be advised that only complete application files will be considered.

## Admission

Application for admission should be made to one of the engineering departments for study in specific focus areas. Application materials should be sent directly to the Graduate School.

To be admitted to a graduate program in the College of Engineering, the applicant must have a bachelor's degree in engineering or a closely related field. Admission is made on an individual basis taking into account the applicant's previous academic record, the intended area of study and professional experience. Individual departments may have additional requirements, which are listed in their department description. Generally, a GPA of at least 3.0 is required for admission. Applicants having a GPA less than 3.0 who demonstrate potential for graduate study may be admitted to the master's program on a provisional or other basis at the option of the department. All students from non-English speaking countries must submit scores for the TOEFL; some departments will require completion of the GRE, as well. Application procedures and general requirements for admission to doctoral programs are described elsewhere in this catalog. The completed Graduate School application form and all required accompanying materials should be sent directly to the Graduate School.

The graduate program director of the department that houses the student's proposed area of study will make the admission decision subject to department policies and review by the Graduate School. Therefore, the applicant should clearly indicate an area of intended concentration and/or the department of intended study. The criteria for admission include: the baccalaureate and previous graduate record (grades and curricular content), the student's potential for success as indicated by professional

references and relevant post-baccalaureate experience and, for international students, the scores on required standardized tests.

Most successful applicants for the Ph.D. program will have completed a master's degree in the intended area of study or a closely related field. For applicants with an outstanding undergraduate record and without a master's degree, direct admission to the doctoral program is available. Applicants seeking direct admission must satisfy all prerequisites for graduate study in the intended field of study and must have achieved an undergraduate GPA of at least 3.0.

## Early Admission to M.S. in Engineering

The College of Engineering encourages students who wish to continue their education and earn a graduate degree in engineering to enroll in the M.S. program in engineering by offering an early admission option. By entering the M.S. program prior to completing their B.S. degree requirements, talented students may begin working on their graduate research while completing B.S. degree requirements and may apply certain graduate courses towards selected B.S. course requirements (subject to departmental restrictions).

Students currently enrolled in a B.S. degree program in engineering at The University of Toledo who are within 18 hours of graduation, have a 3.3 cumulative undergraduate GPA or better and have completed their minimum co-op work requirements may be accepted for early admission into an M.S. engineering degree program. Applications will be accepted no earlier than one year (33 semester credit hours) prior to the expected completion of the B.S. program. An expedited application package contains 1) a completed regular application for graduate admission (special student application is not accepted); 2) three letters of recommendation; and 3) a biographical sketch (1 page). Application forms for this option are available in the College of Engineering office of research and graduate studies. Students accepted through this process will initially be granted provisional admission to allow them to enroll in graduate level courses, and will be automatically admitted into the M.S. program in the College of Engineering upon completion of the B.S. degree.

The student must file an M.S. plan of study immediately after being granted early admission into the M.S. program. The plan must specify up to 9 semester credit hours of graduate coursework that will be applied in lieu of specific B.S. degree requirements. The student must meet all the requirements of the M.S. program as specified by the Graduate School, the college and the department.

## Master of Science Programs

The master's degree programs are intended to provide advanced study in a relevant area of engineering. The programs provide sufficient flexibility to allow students to develop an area of specialization, broaden their educational experience into additional areas of engineering or synthesize an integrated program of interdepartmental studies through a thesis or project.

## Plan of Study

Master of science in engineering, master of science in bioengineering, master of science in chemical engineering, master of science in civil engineering, master of science in electrical engineering, master of science in industrial engineering and master of science in mechanical engineering are offered with the following options:

- 1. Master of science degree with thesis option:** A minimum of 30 credit hours of approved graduate study including 9 credit hours of master of science thesis under the supervision of a faculty is required. Students are required to submit a written thesis and successfully complete the oral defense of the thesis work. Additional guidelines and requirements may exist for individual departments.
- 2. Master of science degree with non-thesis option:** The master of science with non-thesis option is available with the approval of the department chair or the department graduate program director:
  - a. Master of science degree with project option:** Students are required to complete 30 credit hours of approved graduate study including 6 hours of master of science project as specified by individual department guidelines and requirements. Students are required to submit a written project report to the department.
  - b. Master of science degree with coursework-only option:** Students are required to complete 36 credit hours of approved graduate-level course work. Additional hours of coursework to replace thesis or project are selected from departmental electives approved by the department chair or the graduate program director.

A plan of study that specifies the entire master's program to include thesis or project and graduate course work, as well as any specified preparatory undergraduate course work, is to be developed by the student working with his/her adviser. This plan of study is to be submitted for review and approval to the department's graduate director, the department chair and the Graduate School before 10 graduate credits are completed. Graduate course work is selected from that available in engineering, math, science, business and related fields to include required core courses and/or to satisfy course category restrictions specified by the individual programs. Students should consult the departmental program descriptions for additional requirements.

## Doctoral Degree Program

The doctor of philosophy program in the College of Engineering is intended for academically outstanding students with an appropriate bachelor's degree. The program requires the completion and defense of a significant, original research dissertation. Potential fields of study are designated as areas of research focus by individual departments. Potential concentrations are: bioengineering, chemical engineering, civil engineering, computer science and engineering, electrical engineering, environmental engineering, industrial engineering, manufacturing engineering and mechanical engineering. A Ph.D. degree program in manufacturing management and engineering is also offered through the department of mechanical, industrial and manufacturing engineering.

## Advisory Committee

Doctoral students, in consultation with the graduate program director and department chair, should select an adviser during their first term of study. Since the adviser is expected to become the student's dissertation supervisor, selection should be based on mutual agreement and common interests with the expectation that the student and adviser can work effectively together. Notification of the adviser's appointment should be forwarded for approval to the department's graduate program director, the college's associate dean of research and graduate studies and the Graduate School.

When the student and adviser have agreed on a general area for the dissertation within the first year of study, an advisory committee should

be appointed, subject to the approval of the graduate program director and department chair. This committee, in general, is composed of a minimum of five graduate faculty members, at least one of whom must be outside the focus area and another outside the department of the adviser. The duties of the advisory committee include: developing a plan of study that will prepare the student in the chosen field and facilitate successful completion of the dissertation, reviewing and approving the dissertation proposal, advising and assisting in the completion of the dissertation research and preparation of the manuscript, and conducting the dissertation defense. Students are referred to additional details and requirements provided in the Graduate Student Handbook of individual departments.

## Plan of Study

The advisory committee's first responsibility is to develop and submit for approval a doctoral program study plan which meets all University, college and departmental requirements. This document specifies the course work and other requirements for the Ph.D.; it sets a tentative schedule for the examinations, and for presentation and defense of the dissertation proposal. Submission of this study plan for approval to the graduate director, the department chair and the Graduate School also accomplishes official appointment of the advisory committee.

The plan of study requires a minimum of 45 credit hours each of dissertation and course work. (Students admitted to the Ph.D. program with an M.S. degree are granted up to 30 coursework credits for their M.S. degree.) Course work must satisfy core course and other requirements specified for the student's focus area by the department.

## Residence Requirement

The minimum residence requirement for the Ph.D. degree is the completion of one academic year of full-time study and/or research conducted at The University of Toledo. This requirement will be met by the completion of 24 dissertation or course work credits in two consecutive semesters while in residence at the University.

## Examinations

At the discretion of the student's department, either a qualifying examination or a comprehensive examination or both will be required prior to admission to candidacy. Please refer to departmental and University requirements for details of the qualifying or comprehensive examinations.

## Admission to Candidacy

When notified that the required qualifying or comprehensive examination(s) have been passed, and all other departmental requirements for candidacy are fulfilled, the student should initiate formal admission to candidacy. This requires the signed approval of the graduate program director and department chair and notification of the Graduate School.

## Dissertation Proposal

The student, working with the adviser, develops a detailed written dissertation proposal for presentation to the advisory committee. The proposal should state the objectives, provide appropriate background and describe the general approach to accomplish the research clearly and completely. Specific procedures and details for the timing, preparation, distribution and defense of this proposal are noted in departmental requirements. An approved copy of the accepted proposal, signed by each member of the advisory committee, is to be kept in the student's file.

## Dissertation Defense

After the adviser and committee have approved the dissertation proposal, the student carries out the dissertation plan. When the adviser and student believe that the work is complete and ready for defense, a dissertation manuscript is prepared with the adviser providing suggestions for improvement until both the adviser and the student believe that the document is ready for publication.

The student distributes the final adviser-approved manuscript and schedules a defense before the advisory committee.

The defense is open to the public. Notice of the exam should be sent to the departmental graduate director, associate dean of research and graduate studies of the College of Engineering and the Graduate School, and should be posted on College of Engineering bulletin boards.

Following the examination, the advisory committee will vote on whether to approve the dissertation and its defense. The committee will advise the student on what additions or corrections are necessary before another defense will be scheduled. When the examination is passed, there are generally revisions for improvement to be implemented before final approval of the document. When the final corrected, signed dissertation is submitted to the Graduate School through the graduate director and the department chair, the student is certified academically for graduation.

## Graduate Departments

### Department of Bioengineering

*Vijay Goel, chair*

*Patricia Relue, graduate program director*

Bioengineering, a relatively new discipline with rapidly growing job opportunities, applies engineering and life science principles in order to study, understand, modify and control biological systems. The goal of bioengineering is to develop new concepts and techniques that can be applied to a variety of problems in medicine and in the manufacture of bio-related products.

Achievement of these goals requires engineering graduates that are trained in both engineering and the life sciences. The department of bioengineering is multidisciplinary in nature. It draws on faculty resources, collaborative research programs and course offerings throughout the College of Engineering, the College of Arts and Sciences, the College of Pharmacy, various departments at the Medical College of Ohio and other area medical institutions.

### Master of Science Program

A minimum of 30 semester hours of approved graduate work are required for a master's degree. All credits used to make up the 30 hours must have the approval of the student's adviser (or the graduate director if the permanent adviser has not been selected). The student is expected to meet the following general requirements:

- At least 2 hours of bioengineering seminar (attendance and participation at the weekly seminars are **mandatory** every semester during the entire course of study of the students).
- 14 hours of bioengineering core courses (including 5 hours of Biomedical Process and Systems Research I & II).

- 6 hours of elective courses as approved by the adviser to support the research areas.
- 9 hours of bioengineering M.S. thesis.
- Meet the grade requirement of the courses.

### Doctor of Philosophy Program

The doctor of philosophy degree in engineering is conferred on the basis of extended study and high scholarly attainment in the field of bioengineering. This is to be proven by publication of the research results in professional peer-reviewed journals. The entrance requirement for the Ph.D. program is the M.S. in bioengineering or an appropriate engineering field. The M.D., D.D.S. and D.V.M. are acceptable, provided that the student presents evidence of an appropriate engineering background at the undergraduate level (minimum two years of calculus through differential equations and one year of physics). Highly qualified B.S. graduates can also be admitted as a direct entry into our Ph.D. program. In this case, the students will not get an M.S. degree prior to getting their Ph.D. degree.

The general requirements for the Ph.D. degree include:

- At least 60 semester hours beyond the M.S. degree or 90 semester hours beyond the B.S. degree.
- A year of advanced Ph.D. coursework, including:
  - 14 hours of bioengineering core courses (including 5 hours of Biomedical Process and Systems Research I & II).
  - 6 hours of elective courses as approved by the advisers to support the research areas.
  - At least 2 hours of bioengineering seminar.
- The bioengineering qualifying exam, to be completed during the second academic year.
- At least 45 semester hours of dissertation research. A student can register for dissertation research only after passing the qualifying exam and defending the dissertation research proposal.
- Additional coursework, including independent study, electives and/or dissertation research, approved by the adviser.

In addition, the student must:

- Prepare and defend the dissertation research proposal within one calendar year (or upon the student's request and adviser's approval, within two calendar years) after passing the qualifying exam.
- Write a dissertation and successfully defend it.
- Meet the grade requirement of the courses.

All students are highly encouraged to publish the results of their research in recognized peer-reviewed journals and conferences.

### Admission to Candidacy

All doctoral students must meet the following requirements before being admitted to doctoral candidacy:

- Satisfactory performance on the bioengineering qualifying exam
- Selection of a faculty adviser and formation of a dissertation committee
- Successful defense of the dissertation proposal
- A GPA of at least 3.0 for all graduate level coursework

## Qualifying Exam

The qualifying exam will occur during the second academic year for all first year doctoral students, but may occur before the end of the spring semester for current master's students in their second year applying for admission to the Ph.D. program.

The format of the qualifying exam is at the discretion of the student's faculty adviser; however, the usual format consists of an oral and/or written exam and a student assessment. The assessment is a detailed analysis of the student by the committee to determine the student's potential for succeeding at the doctoral level in the field of bioengineering. Furthermore, it is based on the student's entire record prior to joining the department, performance while at UT, oral communication skills (especially the ability to respond to questions extemporaneously) and the ability to analyze problems qualitatively as well as quantitatively. In the case of oral exam, the exam will be approximately two hours in length and will include subjects of importance to the student's program, and will probe areas of strength and weakness. The questions of the oral exam may be open-ended and student responses will be discussed in-depth. Students either pass or fail the exam, to be decided at the sole discretion of the examination committee. Students that fail the exam will have only one chance to retake the exam during a one-year period after the first testing.

## Department of Chemical and Environmental Engineering

*Steven E. LeBlanc, chair*

*Arunan Nadarajah, graduate program director*

The chemical and environmental engineering department offers graduate courses and conducts research in the areas of polymer science and engineering, environmental engineering, protein engineering and materials science. Students may select from a variety of courses and research topics in each area. The department offers two graduate degrees: master of science in chemical engineering (M.S.Ch.E.) and doctor of philosophy in engineering (Ph.D.).

In polymer science and engineering, the emphasis is on transport in polymer systems, polymer processing and polymer physical chemistry. Research activities emphasize better utilization of polyester materials for material packaging. In environmental engineering, the emphasis is in environmental catalysis, environmental chemodynamics, industrial waste treatment and hazardous material spills. Pollution control and prevention in manufacturing processes are the primary research objectives. The protein engineering area focuses on protein separation processes (such as chromatography and membrane separations), thermodynamics of protein systems, protein crystallization and molecular modeling. Research efforts address problems related to downstream processing in the biotechnology and pharmaceutical industries. The materials area encompasses microelectronic and photonic materials science, thermodynamics and materials characterization.

## Degree Requirements

The graduate curriculum consists of four core classes, technical electives and a seminar. Master's and doctoral students must complete all four core classes: Transport Phenomena I, Transport Phenomena II, Advanced Chemical Engineering Thermodynamics and Advanced Chemical Reaction Engineering. To complete the elective requirement, students may take any course at the 5000 level or higher in the College of

Engineering, the College of Pharmacy, or the EEES, biology, chemistry, mathematics and physics departments of the College of Arts and Sciences; students will choose specific courses jointly with their advisers and generally focus on classes in their specific research area. Additionally, all graduate students must enroll continuously for seminars in chemical and environmental engineering.

## Degree Requirements for the Master of Science in Chemical Engineering (M.S.Ch.E.)

Students may select one of two M.S.Ch.E. degree programs: the thesis option which requires 30 credit hours, or the course work option which requires 36 credit hours. The thesis option requires successful defense of a thesis and typically takes two years to complete. The course work option does not require a thesis and typically takes one year and half to complete. Minimum requirements are:

- A. 12 hours in four chemical engineering courses:
  - CHEE 6500 Advanced Chemical Reaction Engineering
  - CHEE 6510 Advanced Chemical Engineering Thermodynamics
  - CHEE 6550 Transport Phenomena I
  - CHEE 6560 Transport Phenomena II
- B. 9 hours of elective graduate course work (excluding the graduate seminar)
- C. Continuous registration for the graduate seminar
- D. 9 hours of thesis work (thesis option) completed to the satisfaction of the thesis committee or fifteen (15) additional hours of graduate course work (course work option)

A total of 30 credit hours (thesis option) or 36 credit hours (non-thesis option), plus seminar credit, is required. Only credit hours obtained with a letter grade of C or higher, or an S grade for the limited number of classes offered on a satisfactory or unsatisfactory basis, will fulfill degree requirements.

All graduate course work must satisfy the following restrictions:

- No more than 3 hours of independent study, special problems or special topics; 6 hours if the student opts for the course work option
- No more than 7 hours in dual level courses; courses with a minority enrollment of selected undergraduates are not restricted
- All courses must be taken at the 5000 level or higher in the College of Engineering, the College of Pharmacy, or the EEES, biology, chemistry, mathematics and physics departments of the College of Arts and Sciences

All students must register for one hour of CHEE 5930, Seminar in Chemical and Environmental Engineering, each semester during the academic year. This course is usually graded on a satisfactory/unsatisfactory basis. To receive a grade of S, students must attend all seminars or provide a written explanation for their absence.

## Degree Requirements for the Doctor of Philosophy in Engineering (Ph.D.)

The doctoral degree requires a total of 90 credit hours split equally between course work and dissertation research. However, to be formally admitted to candidacy for the degree, doctoral students must first pass the preliminary and qualifying examinations. After admission to

candidacy, the completion of 45 credit hours of course work and 45 credit hours of dissertation research, doctoral candidates must prepare a written dissertation documenting their research efforts. Final approval for graduation is contingent upon a successful oral defense of the dissertation before the dissertation committee in a public forum.

The minimum requirements for the doctor of philosophy (Ph.D.) in engineering are:

- 12 hours in four chemical engineering courses:
  - CHEE 8500 Advanced Chemical Reaction Engineering
  - CHEE 8510 Advanced Chemical Engineering Thermodynamics
  - CHEE 8550 Transport Phenomena I
  - CHEE 8560 Transport Phenomena II
- An additional 33 hours of graduate course work (excluding the graduate seminar)
- Ph.D. degree candidate must continuously register for the graduate seminar and pass the preliminary exam and the qualifying exam. All students must register for one hour of CHEE 5930, Seminar in Chemical and Environmental Engineering, each semester during the academic year. This course is usually graded on a satisfactory/unsatisfactory basis. To receive a grade of S, students must attend all seminars or provide a written explanation for their absence.
- Passage of the preliminary exam
- Passage of the qualifying exam
- 45 hours of dissertation research completed to the satisfaction of the dissertation committee for a total of 90 credit hours. Only credit hours obtained with a letter grade of C or higher, or an S grade for the limited number of classes offered on a satisfactory or unsatisfactory basis, will fulfill degree requirements.

The graduate course work must satisfy the following restrictions:

- No more than 15 hours of independent study, special problems or special topics.
- No more than 11 hours of dual level courses, except for courses with a minority enrollment of selected undergraduates.
- All courses must be taken at the 5000 level or higher in the College of Engineering, the College of Pharmacy or the EEES, biology, chemistry, mathematics and physics departments of the College of Arts and Sciences.

The faculty may award students admitted with a master's in chemical engineering up to 30 hours of credit toward the Ph.D. This may include credit for core classes if the faculty deems classes taken as a master's student are comparable to the core classes. The student must satisfy all other requirements as listed above. Additional course work must satisfy the following restrictions:

- No more than 3 hours of independent study, special problems or special topics.
- No more than 4 hours of dual level courses, except for courses with a minority enrollment of selected undergraduates.
- All courses must be taken at the 5000 level or higher in the College of Engineering, the College of Pharmacy or the EEES, biology, chemistry, mathematics and physics departments of the College of Arts and Sciences

## Preliminary/Qualification Examinations

The purpose of the preliminary exam is to determine whether a student possesses the necessary background to complete doctoral degree requirements. This is an oral exam given at the end of the spring semester, on the first Tuesday following the spring commencement. The exam will cover core chemical engineering areas: transport phenomena, thermodynamics and reaction engineering. Specific questions are tailored to match a student's background (e.g., a student with a polymer background may answer questions in the above areas with a polymer emphasis). The exam tests material covered at the undergraduate level as well as material from the fall and spring semester graduate classes. The faculty will also evaluate students' oral communication skills and their ability to analyze problems qualitatively.

The qualifying exam consists of an oral defense of the proposed dissertation research before a committee of five faculty members. Prior to the defense, students submit a written proposal to their committee. The defense consists of a brief presentation of the written proposal followed by a question and answer session. The committee will assess the appropriateness of the proposed research for a doctoral dissertation and the student's ability to successfully complete it. Students must take the qualifying exam within one calendar year of passage of the preliminary exam. Upon passing the qualifying exam, students are admitted to candidacy.

## Department of Civil Engineering

*Brian W. Randolph, chair*

*Jiwan D. Gupta, graduate program director*

The department of civil engineering offers graduate degree programs and conducts research in four focus areas: environmental, geotechnical, structural and transportation engineering. Environmental engineering includes advanced study in areas such as air pollution, industrial hygiene, groundwater contamination, hazardous waste management, water and wastewater treatment, and water resources analysis. Geotechnical engineering includes advanced study in areas such as shallow and deep foundations, groundwater and seepage, experimental and theoretical soil mechanics, and a specialization in environmental geotechnology. Structural engineering includes advanced study in areas such as earthquake engineering, structural optimization, experimental stress analysis and bridge analysis, design, rehabilitation and management. Transportation engineering includes advanced study in areas such as traffic and facility design, urban transportation planning, pavement materials' properties and design, pavement management, intelligent transportation systems and transportation system management and economics.

The department offers two graduate degrees: master of science in civil engineering and doctor of philosophy in engineering.

## Master of Science in Civil Engineering Degree Requirements

For the master of science in civil engineering (M.S.C.E.) degree, a minimum of 30 semester credits is required: 21 hours for graduate course work (a minimum of 9 credit hours should be at the 6000 level or above) and 9 hours for thesis research (CIVE 6960) performed under the supervision of a full-time faculty member of the department of civil engineering. The department also offers a M.S.C.E. degree with a project or course work option with the written approval of the department chair

or graduate program director. In a project option, a minimum of 30 semester hours is required: 24 hours for graduate course work (a minimum of 12 credit hours should be 6000 level or above) and six hours for the project report. In a course work option, a minimum of 36 semester hours in graduate course work is required of which a minimum of 18 credit hours should be at the 6000 level or above. Courses taken on an audit basis do not count toward the degree. Additional requirements include:

- A maximum of 6 hours of independent study are allowed toward the degree.
- Every full-time student must include in his or her registration the departmental seminar for one credit hour. The seminar credit may be counted toward the thesis or project credit hours.
- Students must prepare a plan of study in conjunction with the adviser (graduate program director for the first semester) with a concentration of required and elective courses in one of the department's research focus areas of graduate study and receive approval from the graduate program director. Required core courses in each area are determined by the faculty comprising that research area in conjunction with the graduate program director.
- No more than 9 credit hours towards the M.S.C.E. may be earned at another university, and in no case may the thesis or project be satisfied by work completed at another institution.

### Doctor of Philosophy Degree Requirements

The doctoral degree requires a minimum of 90 semester hours, of which 45 credits are for course work and 45 credits are for dissertation research. However, to be formally admitted to candidacy for the degree, doctoral students must first pass a qualifying examination. All Ph.D. students should note that admission to the doctoral program does not constitute admission to candidacy. The doctoral program is normally a full-time program throughout all of the course work and the dissertation. The department of civil engineering does not encourage part-time studies in the Ph.D. program.

For the Ph.D. degree, a minimum of 60 graduate semester credits beyond the M.S.C.E. degree (90 semester credits beyond the B.S. degree) are required, of which at least 12 credits are for graduate course work (largely departmental), an additional 3 credits for graduate level mathematics course work, and 45 credits for dissertation research under the supervision of a full-time faculty member of the department of civil engineering. A minimum of 45 credits beyond the M.S. must be completed at The University of Toledo.

To be awarded the Ph.D. degree, the student must have at least a B average (GPA of 3.0) for all credits in the program of study. In addition, the student must be admitted into doctoral candidacy and pursue an original research problem. The research must be completed and the dissertation written and successfully defended in public before the Ph.D. degree is conferred.

### Admission to Candidacy for the Ph.D. Degree

To be formally admitted to candidacy for the doctoral degree, students must first pass the qualifying examination. The purpose of the qualifying exam is to determine whether a student possesses the necessary potential to complete doctoral degree requirements. The exam consists of two parts: a written examination and an oral proposal defense. The written exam is given in the middle of the spring semester. It is intended to test the breadth and depth of the student's understanding of fundamentals

and the most important and basic elements of the broad area of graduate studies in which the student is specializing.

The oral defense of the proposed dissertation research is held before an advisory committee of no fewer than five faculty members. Prior to the defense, students submit a written proposal to the committee. The defense consists of a brief presentation of the written proposal followed by a question and answer session. During the exam, the committee will assess the appropriateness of the proposed research for a doctoral dissertation and the student's ability to successfully complete it. Students must defend their proposal in the fall semester following passage of the written exam. Upon passing both parts of the qualifying exam, students may apply for admission to candidacy.

After completion of a minimum of 45 credit hours of course work beyond the bachelor's degree and 45 credit hours of dissertation research, doctoral candidates must prepare a written dissertation documenting their research results. Final approval for graduation is contingent upon a successful oral defense of the dissertation before the advisory committee in a public forum.

Students applying for admission are expected to have completed a B.S. in civil engineering. Those with degrees in other areas of engineering or science will have to take certain undergraduate courses to prepare for graduate courses. These courses will be identified prior to admission and will appear on the student's plan of study.

## Department of Electrical Engineering and Computer Science

*Demetrios Kazakos, chair*

*Ezzatollah Salari, graduate program director*

The electrical engineering and computer science department (EECS) offers advanced study leading to M.S. and Ph.D. degrees. Graduate courses and research include topics in computer systems design and applications (hardware and software), communications, control and manufacturing systems, intelligent systems, machine vision and imaging, power systems, power electronics, microelectronics, VLSI design automation, fault tolerance and reliability, computer networks, robotics, signal processing, computer graphics and visualization, automotive systems, electromagnetics, remote sensing and transportation informatics.

Faculty of the EECS department participate in four academic and research focus areas. Research activities of faculty often overlap the focus area, and therefore several faculty participate in more than one focus area. Each focus area has a recommended list of courses for all graduate students pursuing that area of specialization. Courses to complete the degree requirements are to be selected by the student in consultation with an adviser. In order to provide some breadth in their programs of study, students also are encouraged to select courses from other focus areas in consultation with their advisers. The focus areas are as follows:

- **Advanced Computational Systems (ACS):** Computer operating systems, distributed and parallel computing, digital design, computer networking protocols, performance, reliability, modeling and simulation. **M. Alam** (coordinator), D.J. Ewing, M.M. Jamali, D. Kaur, L. Miller, H.M. Standley.
- **Applied Electrosiences and Control Systems (AECS):** Electromagnetics, solid state electronics, VLSI, low-temperature electronics, power electronics, power systems, robotics, feedback, nonlinear and adaptive controls, remote sensing/related applications.

E. Smith (coordinator), A.H. Eltimsahy, A.A. Ghandakly, S. Giles, V.J. Kapoor, R. King, R. Molyet, T.A. Stuart, A.D. Johnson.

- **Communications and Signal Processing (CSP):** Signal and systems analysis, random signals, information theory, image processing, image and video compression, vision and applications. **J. Kim** (coordinator), D. Kazakos, S.C. Kwatra, E. Salari.
- **Software and Intelligent Systems (SIS):** Database systems, systems software and security, software engineering, language design and implementation, algorithms, computer-human interfaces, computer graphics, neural networks, client/server software design. **G. Heuring** (coordinator), H.F. Ledgard, G. Serpen.

## Master of Science Program

Two M.S. degrees are offered by the department: one in electrical engineering and the other in engineering. Students studying under either the ACS or SIS focus groups receive the M.S.E. while those working under the other groups receive the M.S.E.E. degree.

The master of science degree is offered with the following options.

1. **Master of science degree with thesis option:** A minimum of 30 credit hours of approved graduate study including 9 credit hours of master of science thesis under the supervision of a faculty is required. Students are required to submit a written thesis and successfully complete the oral defense of the thesis work.
2. **Master of science degree with non-thesis option:** The degree requirements for master of science with non-thesis option are available with the approval of the department chair or the department graduate program director:
  - a. **Master of science degree with project option:** Students are required to complete 30 credit hours of approved graduate study including 6 hours of master of science project as specified by individual department guidelines and requirements. Students are required to submit a written project report to the department.
  - b. **Master of science degree with coursework-only option:** Students are required to complete 36 credit hours of approved graduate-level course work.

Students must complete the following additional requirements:

- an approved plan of study.
- a minimum of 18 hours of EECS courses (including thesis/project and independent study).
- at least 6 hours of EECS courses at the 6000 level excluding thesis and independent study.
- 1 credit hour (included in the required 30 hours for the program) of the EECS graduate seminar course EECS 5930 with a maximum of two excused absences in the semester.

Students are encouraged to include higher level math courses in their program, subject to approval of their advisers.

Courses taken on an audit basis do not count toward the degree. Courses outside of the College of Engineering require prior approval.

In order to be awarded the master of science degree, the student must have at least a B average (GPA of 3.0/4.0) for all graduate course credits in the program of study as well as for the entire graduate transcript.

## Doctor of Philosophy Program

Doctoral study in EECS leads to the degree of doctor of philosophy in engineering. Briefly, a student must complete a total of not less than 90 hours of graduate credit (including dissertation) beyond the bachelor's degree, less allowances for transfer credits or other credits such as an M.S. degree. Doctoral candidacy requires satisfactory performance on the doctoral qualifying examination, selection of an academic adviser and formation of a dissertation committee. Candidates are awarded the Ph.D. degree following: 1) satisfactory completion of a minimum of 60 semester credit hours beyond the M.S. degree or a minimum of 90 semester hours beyond the B.S. degree in a closely related field and 2) successful defense of a dissertation that constitutes a fundamental advancement to knowledge in the field. The Ph.D. usually takes a minimum of three full years of graduate study beyond the M.S. degree.

The general requirements for the Ph.D. degree are:

- A minimum of 60 semester credits beyond the M.S. degree and a minimum of 90 semester credits beyond the B.S. degree.
- At least 45 semester credits of graduate-level course work beyond the B.S. degree of which the credit allowance for the master's degree will not exceed 30 semester credit hours. Usually, 45 semester credits are required for dissertation research.
- No more than 3 semester credits of independent study for students with M.S. degree and no more than 15 semester credits of independent study for students with a B.S. degree may be counted toward the Ph.D. course requirement.
- The student must pursue, complete and publish a research study that is demonstrated to be an original contribution to the field of study.
- The dissertation must be written and successfully defended publicly before the Ph.D. degree is conferred.
- The student must submit a minimum of two journal papers based on the dissertation research. Copies of the official letters of acknowledgments for the submitted papers should be given to the graduate director. Also, every student is required to attend the seminar class in EECS and maintain at least an 80 percent attendance rate.

It is the responsibility of both the student and the faculty adviser to formulate a program of study to satisfy requirements for the Ph.D. degree. The student's program of study should contain both breadth of knowledge and depth of specialization in one of the focus areas outlined earlier. The program must be approved by the faculty adviser, the advisory committee, the graduate program director and the Graduate School.

## Department of Mechanical, Industrial and Manufacturing Engineering

*Abdollah A. Afjeh, interim chair*

*Mohamed Samir Hefzy, graduate program director*

Graduate students enrolled in the mechanical, industrial and manufacturing engineering department (M.I.M.E.) may pursue the following degree programs: master of science in industrial engineering, master of science in mechanical engineering and doctor of philosophy in engineering. The guidelines and procedures for the master's and doctoral programs in the M.I.M.E. department are listed in greater detail in the M.I.M.E. Graduate Student Handbook.

## M.I.M.E. Department Research Focus Areas

The current research focus of the department is in the following areas:

- **Computational and experimental thermal sciences:** The computational and experimental thermal science research focus group encompasses broad research activities. These include research in such areas as computational fluid dynamics and heat transfer, tribology, flow stability and transition, vortex dynamics, drag reduction, microgravity flows, thermal systems simulation, biofluid flow dynamics, turbulent boundary layer characterization, experimental methods using hot wire/film anemometry, laser Doppler velocimetry, particle image velocimetry, flow visualization techniques as well as thin film heat flux gauge research.
- **Mechanics, materials and design:** The objectives of the mechanics, materials and design focus group are to conduct research that will advance the engineering knowledge base and lead to new processes and products in the broad areas of mechanical systems, dynamic systems and control, mechanical behavior of materials and mechanical design. More specifically, the research thrust of this group includes but is not limited to the dynamic behavior and control of mechanisms, machines, mechanical systems, processes, structures and smart material systems including MEMS, biomechanics, design methodology, fatigue and fracture mechanics, machine dynamics, noise and vibration analysis and control, solid modeling and vehicle dynamics.
- **Manufacturing and systems:** The manufacturing and systems focus group emphasizes solving industrial and manufacturing problems. Example problems include planning and modeling manufacturing systems, forecasting industrial needs for materials, determining the best ways to transport goods to customers, development of processes for products, basic understanding of metal forming and cutting, design of assembly systems and improving the environmental impacts of industry. A key aspect of this group is the blend of practical plant expertise with the benefits of computational technologies including computer aided design and manufacturing. Processes are understood from a “hands-on” perspective and expanded through theoretical defining models. Engineering materials are studied throughout their life cycle from raw material acquisition, product creation and usage, remanufacturing, recycling and final material disposal. Key expertise within this group include internationally recognized faculty in computer aided design and manufacturing, rapid prototyping, system optimization, artificial intelligence, process engineering, grinding and abrasives engineering, facilities planning and modeling, and environmentally conscious design and manufacturing.

## Master of Science Programs

Applicants must hold a bachelor of science in mechanical or industrial engineering, or a closely related field, from an accredited engineering program. If the baccalaureate is in a non-engineering or science area, students may be required to complete prerequisite courses without graduate degree credit. The master of science degree program may be pursued with thesis and non-thesis options.

**Master of science degree with thesis option:** The plan of study must include 30 hours of graduate work selected from those approved for graduate study (5000 level or above). A minimum of 12 hours of course work must be in the student’s focus area of study. This option requires a minimum of 9 hours of thesis credit.

**Master of science degree with project option:** Students are required to complete 30 semester credit hours at the graduate level including 6 hours of master of science project under the supervision of a M.I.M.E. faculty member. The project option has to be approved by the M.I.M.E. department chair or the graduate program director. Students are required to submit a professional, written project report to the department after due approval by the faculty adviser, which will be logged and archived in the department as a technical report.

**Master of science degree with coursework-only option:** Students are required to complete a minimum of 36 semester credit hours of graduate level course work as specified by the department. This option has to be approved by the M.I.M.E. department chair or graduate program director.

The majority of student’s course work for all of the options will normally be from M.I.M.E. courses. Six or more hours of the course work must be from approved courses in advanced mathematics. An individual student may be required to complete more than the required minimum hours to satisfy prerequisite deficiencies specified as provisional admission conditions and/or to fulfill educational requirements of the program as specified by the adviser or department.

In addition to the above requirements, all supported students are required to enroll and/or participate in a graduate seminar (MIME 6930 or equivalent) each semester. The department, for satisfactory completion as well as enhancement of degree objectives, may specify additional credit or non-credit requirements.

The plan of study for the master of science degree must be filed before 16 hours of academic coursework has been completed. For full-time students this normally will require that the plan of study be filed before registration for the second term.

For transfer credit, students should refer to the general policies of the Graduate School.

## Doctoral Degree Program

A satisfactory doctoral degree plan is developed jointly by the student and the dissertation adviser, subject to the approval of the department chair or graduate director.

A minimum of 15 credits of regular departmental courses taken for a letter grade beyond the M.S. degree is required for the doctoral degree program. Twelve credits must be departmental courses. Students entering the direct doctoral program with a bachelor’s degree must complete 27 credits of regular departmental courses beyond their bachelor’s degree, of which at least 15 credit hours must be at the 6/8000 level. Project credits may not be counted towards the 27 credits of regular, letter-grade course work. All required courses are at the advanced graduate level as determined by the department. Other courses taken may include courses not listed as departmental courses, independent study courses and courses taken S/U. In addition to the above course requirements, all students are required to enroll and participate in a graduate seminar (MIME 8930 or equivalent) each semester. The department, for satisfactory completion as well as enhancement of degree objectives, may specify additional credit or non-credit requirements.

For transfer credit, students should refer to the general policies of the Graduate School.

## Doctoral Degree Candidacy

Doctoral candidacy requires satisfactory performance in the doctoral qualifying examinations, filing an approved doctoral program plan, selection of an academic adviser, formation of a doctoral dissertation committee, and maintaining good academic performance as specified in the M.I.M.E. department Graduate Student Handbook.

When the above requirements have been met, the student may file his/her application for doctoral candidacy. The department requires that the application be filed within one year of the time the qualifying examination is passed. Doctoral students must have established candidacy for the doctoral degree before presenting and defending dissertation research.

## Doctoral Dissertation

After the student and the adviser have agreed on a dissertation topic, the student must write a dissertation proposal. The student will present the proposal to the doctoral dissertation committee and successfully defend his/her dissertation proposal.

The doctoral dissertation committee must consist of at least five members. The chair of the committee will be the candidate's principal adviser. The other members usually will be the co-adviser (if any), faculty members or experts in a related field with at least one committee member outside the department. The signatures on the candidate's dissertation indicating approval of the dissertation research represent the final certification of its adequacy.

## Doctor of Philosophy in Manufacturing Management & Engineering

In addition to the doctor of philosophy in engineering offered by the department, the Colleges of Engineering and Business Administration jointly offer the degree of doctor of philosophy in manufacturing management & engineering. The doctoral degree program offers engineering and management tracks of study.

The applicants, preferably, should have completed a master's degree in one of the following areas: industrial, manufacturing, mechanical, production engineering or engineering management. For those applicants with a master's degree, the doctoral program of study involves a minimum of 60 semester credit hours including business and engineering foundation courses, core courses, integrative seminars/technical electives and a dissertation research.

For additional information regarding this program, please consult specific program guidelines jointly published by the colleges of Engineering and Business Administration.

## Department of Engineering Technology

*Daniel J. Solarek, chair*

*Ella Fridman, graduate program director*

The engineering technology department administers the College of Engineering's part-time master of science in engineering program. This engineering master's degree program is intended for students who are full-time employees seeking the master's degree to facilitate career advancement or achievement of personal educational goals. To accommodate students who are full-time employees, coursework for this

degree program may be taken online via distance learning on the Internet or as traditional on-campus courses.

## Master of Science in Engineering Degree Requirements

The part-time master of science in engineering program requires 24 hours of approved graduate level course work and a six hour work-related project for a total of 30 credit hours. The student is expected to meet the following general requirements:

- 9 hours of engineering core courses to establish a common foundation in engineering. These courses include Management of Projects and Technical Innovation, Advanced Computational Methods, and Probability and Statistics in Engineering and Management Science. The engineering core courses are designed to update computer analysis skills, provide a background in applied statistics and to furnish tools for the management of projects and technological innovation.
- 9 hours of business core courses that cover introduction to financial and managerial accounting, analysis of manufacturing and service systems, and business, government and society. The business core is intended to acquaint engineers, scientists and technologists with financial, managerial and social issues that can help the engineer succeed in today's marketplace.
- 6 hours of engineering elective courses to support the student's focus area. Each elective course will be worth three credits, so two are required. Graduate offerings in the bioengineering, chemical and environmental engineering, civil engineering, electrical engineering and computer science, engineering technology, or mechanical, industrial and manufacturing engineering departments are eligible for selection as electives.
- 6 credit hours of a work-related project. The topic and other specifics of the project require prior approval of the department's graduate program director and should include approval and cooperation of the employer.
- 30 credit hours total.

The project may be completed in two semesters plus the summer. Students may complete their course requirements in four semesters by taking the recommended two courses per semester.

For transfer credit, students should refer to the general policies of the Graduate School. No more than 9 credits towards the master of science in engineering may be earned at another university, and in no case may the project be satisfied by work already completed at another institution or on the job.

In order to be awarded the master of science in engineering degree, the student must have at least a B average (GPA of 3.0/4.0) for all graduate course credits in the program of study as well as for the entire graduate transcript.

## Admission Requirements

To be admitted to the part-time master of science in engineering program, applicants must have a bachelor's degree in engineering, engineering technology or in a closely related field (e.g., one of the mathematical, physical or biological sciences). Applicants must be employed or have experience in private industry, government or non-profit organizations. Admissions are made on an individual basis and take into account the

applicant's previous record, the intended area of study and the needs and capacity of the College of Engineering.

Generally, a GPA of at least 2.7 is required for admission. Applicants having a GPA less than 2.7 who demonstrate potential for graduate study may be admitted to the master's program on a provisional or other basis at the option of the department. Students with an undergraduate GPA below 2.7 must register and take the GRE. Information on the GRE is available on the GRE Web site. Students who graduated with a bachelor's degree from The University of Toledo do not need to submit official transcripts. Students who did not graduate from The University of Toledo need to contact the Office of the Registrar at their undergraduate alma mater to arrange for transmission of the undergraduate transcripts.

For additional information regarding this program, please consult the College of Engineering's Web site for specific program guidelines developed in cooperation with the colleges of business administration.

# College of Health and Human Services

## Graduate Programs

The College of Health and Human Services offers flexible programs leading to diverse master's and doctoral degrees. In addition, the College of Health and Human Services and the College of Education offer several master of education and doctor of philosophy degrees collaboratively. The College of Health and Human Services, with the Medical College of Ohio and Bowling Green State University, offer a joint master of public health degree. All students are encouraged to discuss programs with graduate faculty in respective departments.

## Admission to Graduate Programs

Admission requirements for Graduate School are discussed in a prior section of the Graduate School section of this catalog. Admission to graduate study in the College of Health and Human Services is open to graduates of accredited colleges and universities meeting the minimum admission requirements of the Graduate School and the college, as well as specific admission requirements of the department and/or program. (Previously admitted students wishing to transfer to a different department must apply for admission to the new department. Admission to one program does not guarantee admission to another program.) Please refer to the general degree program descriptions for specific information.

## Administration of Programs

All graduate programs in the College of Health and Human Services are administered jointly by the college and the Graduate School of The University of Toledo. Students may contact specific departments, the college's Student Service Center or the Graduate School for further information on programs or admission requirements. The associate deans for research and graduate education will coordinate the graduate policies within the college.

## Advising

Students must meet with their program adviser for the purpose of developing a plan of study. It is the student's responsibility to meet all

requirements for the degree as specified by the graduate program, the department, the Graduate School and the University.

## Graduate Monitoring Committee

The Graduate Monitoring Committee (GMC) is responsible for reviewing all requests not consistent with College of Health and Human Services and Graduate School policies. The GMC is also responsible for making recommendations to the college's associate deans for research and graduate education and the dean of the Graduate School.

## Graduate Degrees Offered

### Master of Arts in Counselor Education

Community Counseling  
School Counseling

### Master of Arts in School Psychology

### Education Specialist in School Psychology

### Doctor of Philosophy in Counselor Education

### Master of Science in Exercise Science

Applied Biomechanics  
Clinical Kinesiology  
Clinical Exercise Physiology  
Applied Exercise Physiology

### Doctor of Philosophy in Physical Education

Applied Biomechanics  
Applied Exercise Physiology  
Clinical Exercise Physiology

### Master of Public Health

### Master of Arts in Recreation and Leisure Studies

Recreation Administration  
Recreational Therapy  
Recreational Therapy and Therapeutic Arts

### Master of Arts in Speech-Language Pathology

### Doctor of Philosophy in Health Education

## Department of Counseling & Mental Health Services

*Dr. Nick Piazza, chair*

## Accreditation

The Council for Accreditation of Counseling and Related Educational Programs (CACREP) has conferred accreditation to the master's degree programs in school counseling and community counseling and the Ph.D. program in counselor education.

## Master's and Education Specialist Programs

Department admission requirements, in addition to the Graduate School requirements, include the following: Undergraduate degree in an appropriate foundational field with a 3.0 (on a 4-point scale) undergraduate grade point average (GPA). Applicants whose undergraduate GPA is below a 3.0 on a 4-point scale must take the GRE and preference will be given to applicants with a score of at least 800 (combined verbal and quantitative scores). Applicants will submit a typed personal statement (suggested length 2-3 pages) detailing significant personal and professional experiences that relate to the applicant's decision to pursue a career in counseling or school psychology (e.g.,

rationale for seeking the degree, commitment to counseling or school psychology as a profession). The personal statement should also address such topics as the applicant's skills or knowledge, preparation through education and/or experience, strengths and weaknesses, rationale for academic deficiencies, etc. Submission of a professional resume is also required. Applicants who meet academic admission criteria will be invited to interview with the department admissions committee before a final admissions decision is rendered. Application deadlines for interviews for each semester, are September 15 and January 15.

## Master of Arts in Counselor Education: School Counseling Track

Prospective applicants are urged to contact the department and program coordinators for program brochures and further details. Applicants expecting to practice outside of Ohio should consult that state's department of education to determine the current certification requirements. The curriculum leading to eligibility to take the State Department of Education examination for school counselors consists of 48 semester hours of training.

### A. General Core Requirements (3 hours)

RESM 5110 Quantitative Methods I

### B. School Counseling Major Courses (45 hours)

#### Required courses:

CMHS 5010 Professional Orientation to School Counseling  
 CMHS 5110 Career Counseling & Development  
 CMHS 5120 Individual & Group Assessment  
 CMHS 5130 Group Counseling  
 CMHS 5140 Counseling Theories & Techniques  
 CMHS 5150 Counseling Across the Lifespan  
 CMHS 5160 Counseling the Culturally Diverse  
 CMHS 5170 Theory & Practice of Consultation  
 CMHS 5190 Counseling Practicum  
 CMHS 6/8940 Counseling Internship  
 SPED 5000 Issues in Special Education

or

SPED 5120 Students with Special Needs  
*(SPED not required for students with Special Education Teacher Licensure)*

#### Elective courses: \*

CMHS 6/7220 Child, Adolescent and Family Therapy  
 CMHS 6/7230 Crisis Intervention Counseling  
 CMHS 8460 Substance Abuse Counseling  
 EDP 5210 Child Behavior & Development  
 EDP 5220 Adolescent Behavior & Development

*\*other courses may be approved by adviser*

**Total:** 48 credit hours

## Master of Arts in Counselor Education: Community Counseling Track

Prospective applicants are urged to contact the department and program coordinators for program brochures and further details. The curriculum leading to the master's degree consists of 48 semester hours of training.

### A. General Core Requirements (3 hours)

RESM 5110 Quantitative Methods I

### B. Community Counseling Major Courses – (45 hours)

#### Required courses:

CMHS 5020 ..... Prof Orient to Community Counseling  
 CMHS 5110 ..... Career Counseling & Development  
 CMHS 5120 ..... Individual & Group Assessment  
 CMHS 5130 ..... Group Counseling

CMHS 5140 Counseling Theories & Techniques  
 CMHS 5150 Counseling Across the Lifespan  
 CMHS 5160 Counseling the Culturally Diverse  
 CMHS 5190 Counseling Practicum  
 CMHS 6/8940 Counseling Internship

#### Elective courses: \*

CMHS 6/7210 Psychopathology  
 CMHS 6/7240 Diagnosis & Mental Health  
 CMHS 7540 Advanced Personality Assessment  
 CMHS 8470 Drugs & Mental Health Couns  
 CMHS 6/7220 Child, Adolesc, Family Therapy  
 CMHS 6/7230 Crisis Intervention Counseling  
 CMHS 8460 Substance Abuse Counseling  
 CMHS 5/7170 Theory & Practice of Consultation  
 EDP 5210 Child Behavior & Development  
 EDP 5220 Adolescent Behavior & Development  
 EDP 5/7230 Adult Development

*\* other courses may be approved by adviser*

**Total:** 48 credit hours

## Master of Arts/Education Specialist Degree in School Psychology

The program in school psychology constitutes a minimum three-year sequence of coursework, which includes a master's degree of 36 semester hours and a minimum of 32 additional hours toward the education specialist degree, plus an academic year paid internship in the schools.

The program is designed to meet the criteria for the master's and education specialist degrees and the Ohio State Department of Education requirements for the school psychologist certificate.

Please contact the department for program brochures and further details. The curriculum leading to the master's degree in school psychology consists of 36 semester hours of training.

### A. General Core Requirements (3 hours)

RESM 5110 Quantitative Methods I

### B. School Psychology Major Courses (33 hours)

#### Required courses:

CMHS 5030 Role & Funct School Psych  
 CMHS 5120 Individual & Group Assessment  
 CMHS 5130 Group Counseling  
 CMHS 5140 Counseling Theories & Techniques  
 CMHS 5150 Counseling Across the Lifespan  
 CMHS 5160 Counseling the Culturally Diverse  
 CMHS 5170 Theory & Practice of Consultation  
 SPED 5000 Issues in Special Education  
 SPED 5120 Students with Special Needs

#### For Students without Teaching License Only:

CMHS 5060 School Observation  
 EDAS 6000 The Individual in the Organization

#### Elective courses: \*

EDP 5210 Child Behavior & Development  
 EDP 5220 Adolescent Behavior & Development  
 CMHS 6960 Master's Thesis  
 CMHS 6220 Child, Adolesc, Family Therapy  
 CMHS 6230 Crisis Intervention Counseling

*\* Other course(s) may be approved by adviser*

**Total:** 36 credit hours

Students pursuing this program are required to complete the education specialist degree in school psychology. Internship is completed as part

of the specialist program. The curriculum leading to the education specialist degree in school psychology consists of a minimum of 32 semester hours of training.

|             |                                       |     |
|-------------|---------------------------------------|-----|
| EDP 5210    | Child Behavior & Development          | or  |
| EDP 5220    | Adolescent Behavior & Development     |     |
| EDP 7320    | Instructional Psychology              | or  |
| EDP 6340    | Theories of Learning                  |     |
| EDP 7320    | Instructional Psychology              | or  |
| EDP 7310    | Issues & Innovations Learn & Instruct |     |
| PSY 6200    | Theories of Personality               |     |
| CMHS 6/7210 | Psychopathology                       |     |
| CMHS 8470   | Drugs & Mental Health Counseling      |     |
| CI 6/8430   | Diagnosis of Reading Disability       |     |
| CMHS 7310   | Child Assessment I                    | and |
| CMHS 7320   | Child Assessment II                   |     |
| CMHS 7330   | Clinical Practicum I                  | and |
| CMHS 7340   | Clinical Practicum II                 |     |
| CMHS 7940   | Internship in School Psychology       |     |

Minimum of 32 semester hours Beyond the master's degree

Note: Students may complete some of these courses as part of their master's degree in school psychology

## Doctor of Philosophy in Counselor Education

The department of counseling and mental health services has a doctoral program in counselor education leading to a Ph.D. Numerous opportunities exist within this program to create areas of specialization that are relevant to the academic, professional or research interests of the student. The doctoral program in counselor education and supervision is intended to prepare professional leaders in their respective fields. Applicants are expected to possess the entry-level knowledge and skills received at the master's and/or specialist level. The program objectives and curricular experiences of the doctoral program reflect an extension of those offered at the master's and specialist levels.

Persons applying for admission to doctoral study must meet the admission requirements of the Graduate School, the College of Health and Human Services and the department of counseling and mental health services. Admission requirements for the Graduate School and the College of Health and Human Services are described in detail in the Doctoral Programs Brochure. These requirements include an official transcript with two copies of any and all undergraduate/graduate credits and degrees earned, a professional resume, three letters of reference and a non-refundable application fee (check or money order payable to The University of Toledo) that must be submitted to the Graduate School to begin the admission process. In addition, departmental requirements for admission to the doctoral program are:

1. A minimum GPA of 3.0 on a 4-point scale for all undergraduate academic work and a minimum GPA of 3.0 on a 4-point scale for all graduate level academic work.
2. A master's or education specialist degree in counseling or school psychology from a program that is approved by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) or the National Association for School Psychologists (NASP). Applicants with degrees from non-accredited programs or from non-counseling or non-school psychology programs will have to demonstrate their equivalency to approved programs or make up any deficiencies that may be present in their training.
3. A GRE score of a minimum of 480 verbal plus a minimum of 560 quantitative (minimum of 1040, which is at the 50th percentile). Scores should not be older than 6 years.

4. A resume and autobiographical statement of three to five pages in length.
5. A personal interview with departmental faculty and an interview with current doctoral students to determine the personal and professional suitability and leadership potential of the applicant. Applicants will be notified if they are selected for an interview. Applicants are interviewed and admitted to doctoral study in the department during the fall, spring and summer semesters of each academic year. Completed application materials must be received by September 15, January 15 or May 15. Thus, application materials must be submitted to the Graduate School for processing at least six (6) weeks prior to the above departmental deadlines.
6. One writing sample. The writing sample consists of your responses to questions about your academic and professional background and goals. These questions can be obtained by contacting the departmental secretary. The writing sample is designed to determine your writing ability and your suitability to the profession and to the doctoral program.

The department retains the right to waive any requirement for admission in those cases where there is evidence to suggest that the applicant would successfully complete his or her degree program. The curriculum leading to the doctor of philosophy degree in counselor education and supervision consists of a minimum of 70 semester hours of training.

### A. Research Tools (12 hours)

|           |                         |
|-----------|-------------------------|
| RESM 8120 | Quantitative Methods II |
| RESM 8320 | Research Design         |
| RESM 7330 | Qualitative Research I  |

One course from the following:

|           |                            |
|-----------|----------------------------|
| RESM 8340 | Qualitative Research II    |
| RESM 8130 | Multivariate Statistics    |
| RESM 8160 | Nonparametric Statistics   |
| RESM 8350 | Methods of Survey Research |
| HEAL 8700 | Epidemiology               |

### B. Counseling Major courses (36 hours)

#### Required courses (28 hours)

|           |  |
|-----------|--|
| CMHS 7510 | Supervision in Couns & Sch Psyc          |
| CMHS 7520 | Educ & Leadership in MH Profession       |
| CMHS 7530 | Adv Theo Couns & Consultation            |
| CMHS 7930 | Doctoral Research Seminar                |
| CMHS 8410 | Adv Pract Indiv & Grp Couns OR           |
| CMHS 8420 | Adv Practicum in Family Therapy          |
| CMHS 8480 | Adv Train Prof, Legal and Ethical Issues |
| CMHS 8940 | Counseling Internship                    |

#### Elective courses (8 hours \*)

|           |                                |
|-----------|--------------------------------|
| CMHS 7210 | Psychopathology                |
| CMHS 7220 | Child, Adoles, Family Therapy  |
| CMHS 7230 | Crisis Intervention Counseling |
| CMHS 7240 | Diagnosis and Mental Health    |
| CMHS 7540 | Adv Personality Assessment     |
| CMHS 8440 | Adv Group Theory and Practice  |
| CMHS 8450 | Couples and Family Therapy     |
| CMHS 8460 | Substance Abuse Counseling     |
| CMHS 8470 | Drugs & Mental Health          |

\* other courses may be approved by program committee

### C. Cognate Area (12 hours)

### D. Doctoral Dissertation (10 hours)

**Total:** 70 credit hours

## Department of Kinesiology

*Dr. Charles W. Armstrong, chair*

The department of kinesiology offers graduate programs leading to the master of science in exercise science (M.S.E.S.) and the doctor of philosophy (Ph.D.) degrees. These programs involve a combination of courses, seminars, clinical experiences and research that is intended to prepare individuals for a wide range of careers that relate to exercise science. The programs are interdisciplinary by design and all students are exposed to multiple dimensions of the field. As part of this program, students typically take courses that support their work from a variety of other departments across the campus and at the Medical College of Ohio. Involvement in research is emphasized throughout the program. Admission into the master's and doctoral programs is selective and is based on the applicants' previous academic training, their academic record, scores on the GRE, letters of recommendation, intended area of study and space within the graduate program. Meeting the minimum standards for admission does not guarantee acceptance into any of the department's programs.

### Master of Science in Exercise Science

**The Master's Program:** The M.S.E.S. degree is designed to provide students with an opportunity to specialize in one of four areas: applied biomechanics, clinical kinesiology, clinical exercise physiology and exercise physiology. Each of these programs involves approximately 32 - 36 semester hours of instruction and all master's students are required to complete a thesis. Full-time students typically are able to complete the programs in two years.

| M.S. in Exercise Science:            | Hours     |
|--------------------------------------|-----------|
| A. Research Foundations .....        | 12        |
| B. Kinesiology Core .....            | 6         |
| C. Specialization Requirements ..... | 6         |
| D. Specialization Electives .....    | <u>12</u> |
| <b>Total</b>                         | <b>36</b> |

In addition to the Graduate School and college requirements, evaluation of applicants for admission to the master of science in exercise science program is based on the following criteria: (a) minimum undergraduate GPA of 3.0 in the last 60 hours of the undergraduate program; (b) completion of the GRE, with a minimum combined score of 900 for the quantitative and verbal portions of the exam; (c) a clearly defined statement of purpose that specifies the area of specialization within the degree program; (d) a minimum of three letters of reference from faculty members with specific expertise in kinesiology (or a closely related area) who have worked with the applicant in an academic setting; (e) demonstrated knowledge in human anatomy, human physiology and two additional areas of kinesiology (exercise physiology, motor learning, biomechanics, etc.); and (f) all other pertinent information requested in the application. Prospective students should contact the department for further information. Meeting the minimum admission requirements does not guarantee admission to the program. Admission to a specific program area is dependent on the availability of space within the specialization area (i.e., the number of students currently being advised by faculty in the specialization area). Under special circumstances, the department graduate admissions committee may choose to waive any of the above requirements.

### Doctor of Philosophy in Physical Education

The doctor of philosophy in physical education is designed to provide qualified applicants with an opportunity to pursue advanced study and research leading to the completion of the Ph.D. degree. Three areas of

concentration are available within this option: clinical exercise physiology, applied physiology and biomechanics. The program involves a variety of courses, seminars and independent research experiences, and typically requires four years of full-time study to complete (part-time study is possible, but usually requires five to six years). Students work closely with a faculty mentor to design a program that meets the unique needs of the individual. This includes courses in the major area that may be taken from a variety of departments as well as courses in a cognate area (a secondary area of specialization). Upon the completion of all coursework students must pass written and oral comprehensive examinations and complete a dissertation.

In addition to the Graduate School and college requirements, evaluation of applicants for the doctoral program is based on the following criteria: (a) completion of a master's degree in exercise science or closely related area, (b) completion of the GRE, with a minimum combined score of 1060 for the quantitative and verbal portions of the exam, (c) a clearly defined statement of purpose that specifies the area of specialization within the degree program, (d) a minimum of three letters of reference from faculty members with specific expertise in kinesiology (or a closely related area) who have worked with the applicant in an academic setting. Prospective students should contact the department for further information. **Note:** Meeting the minimum admission requirements does not guarantee entrance into the program. Admission to a specific program area is dependent on the availability of space within that specialization area (e.g., the number of students currently being advised by faculty in the specialization area). Under special circumstances, the department graduate admissions committee may choose to waive any of the above requirements.

## Department of Public Health and Rehabilitative Services

*Dr. Roy H. Olsson Jr., chair*

The department of public health and rehabilitative services offers a variety of degree options and graduate courses in health/wellness and rehabilitation. In health/wellness, master's level options include the master of public health and the master of arts in recreation and leisure studies. The doctor of philosophy degree is offered in health education. In rehabilitative services, the master of arts in speech-language pathology and the master of arts in recreation and leisure studies with specialization in recreational therapy and in recreational therapy and therapeutic arts are available.

### Master of Public Health

This degree program provides advanced study beyond the bachelor's degree for persons wishing to update professional skills and obtain new professional competencies in the area of public health through courses offered by UT, MCO and BGSU. The program prepares students to enhance public health in the community and to be advocates for needed change. Graduates will be prepared to assess factors affecting health, critique and apply research findings and, in turn, develop strategies and implement various measures for health promotion and disease prevention. Students choose one of three tracks: environmental and occupational health, health promotion and education, or public health administration.

#### A. Master of Public Health Core (21 hours)

|           |                                |
|-----------|--------------------------------|
| HEAL 6600 | Health Behavior (UT)           |
| HEAL 6640 | Issues in Public Health (UT)   |
| PUBH 600  | Public Health Statistics (MCO) |

|          |                                     |
|----------|-------------------------------------|
| PUBH 601 | Public Health Epidemiology (MCO)    |
| PUBH 601 | Public Health Administration (BGSU) |
| PUBH 680 | Environmental Health (BGSU)         |

**B. Specialization (12 hours)**

Select from: environmental and occupational health (MCO), public health administration (BGSU) or health promotion and education (UT)

**Health Promotion and Education Specialization**

|           |  |
|-----------|--|
| HEAL 6200 | Methods and Materials in Public Health |
| HEAL 6360 | Evaluation Models                      |
| HEAL 6460 | Health Promotion Programs              |
| HEAL 6300 | Community Health Organization          |

**C. Electives (9 hours)**

Select courses with permission of an adviser.

**D. Practicum or project (3 hours)**

|           |                         |
|-----------|-------------------------|
| HEAL 6940 | Internship              |
| or        |                         |
| HEAL 6960 | Masters Research Thesis |

## Master of Education in Health Education/ School Nurse Certification

The department of public health and rehabilitative services also provides major coursework for the master of education in health education and for the master of education in health education with school nurse certification. The complete description of those degrees is provided in the College of Education program descriptions.

## Master of Arts in Recreation and Leisure: Recreation Administration

The recreation and leisure studies program offers advanced study beyond the bachelor degree in recreation administration. This degree focuses on the study of the profession of recreation and leisure with an emphasis on administrative careers in community and natural environments.

**A. Research Core (3- 6 hours)**

Research Design  
RESM 5310 or AED 5000 or SOC 5270

Research Statistics (required for project/thesis option)  
SOC 5290 or RESM 5110 or HEAL 6750

**B. Recreation Core (6 hours)**

|           |  |
|-----------|--|
| RCRT 6000 | Issues and Trends in Recreation/Recreational Therapy       |
| RCRT 6020 | Financial Resources of Recreation and Recreational Therapy |

**C. Specialization Area (15 hours)**

Courses selected from the graduate recreation course offering with adviser.

**D. Project/Thesis/Internship (3-6 hours)**

|           |                          |
|-----------|--------------------------|
| RCRT 6920 | Master's Project         |
| RCRT 6940 | Internship               |
| RCRT 6960 | Master's Research Thesis |

**E. Elective (3-6)**

## Master of Arts in Recreation and Leisure: Recreational Therapy or Recreational Therapy and Therapeutic Arts

The recreation and leisure studies program offers advanced study beyond the bachelor's degree in recreational therapy. This degree focuses on the study of treatment programming and research within a variety of settings. The recreational therapy and therapeutic arts specialization focuses on the study of therapeutic arts as they are related to the practice of recreational therapy.

**A. Research Core (3- 6 hours)**

Research Design  
RESM 5310 or AED 5000 or SOC 5270  
Research Statistics (required for project/thesis option)  
SOC 5290 or RESM 5110 or HEAL 6750

**B. Recreation Core (6 hours)**

|           |  |
|-----------|--|
| RCRT 6000 | Issues and Trends in Recreation/Recreational Therapy       |
| RCRT 6020 | Financial Resources of Recreation and Recreational Therapy |

**C. Specialization Area (15 hours)**

Select courses from the recreational therapy sequence with adviser.

**D. Project/Thesis/Internship (3-6 hours)**

|           |                          |
|-----------|--------------------------|
| RCRT 6920 | Master's Project         |
| RCRT 6940 | Internship               |
| RCRT 6960 | Master's Research Thesis |

**E. Electives (3-6 hours)**

## Master of Arts in Speech-Language Pathology

This degree is designed to contribute toward attainment of certification and licensure in the area of speech-language pathology. The process includes completion of a master's degree, an approved undergraduate program of preparation in this area and suitable practicum experiences. Students seeking certification and/or licensure for speech-language pathology should meet with an adviser to assess prior experience and to design a program that is tailored to the student's individual situation.

For fall admission to the speech-language pathology program, all materials, including GRE scores, must be received by the program admissions committee before **February 1** to receive complete consideration. An interview and spontaneous language sample is required as part of the complete application procedures for all qualified applicants.

**A. Research Core (6 hours)**

|           |                                 |
|-----------|---------------------------------|
| KINE 6320 | Scientific Writing and Research |
| RESM 5110 | or RESM 5310 or HEAL 6750       |

**B. Speech-Language Pathology Courses (35 - 41 hours)**

|          |   |
|----------|---|
| SLP 6100 | Diagnosis of Speech and Language Disorders        |
| SLP 6210 | Preschool Language Disorders                      |
| SLP 6220 | Language Disorders in School-Age Children         |
| SLP 6300 | Phonological and Articulatory Disorders           |
| SLP 6400 | Neurological Disorders: Aphasia                   |
| SLP 6450 | Neurological Disorders: Brain Injury and Dementia |
| SLP 6500 | Motor Speech Disorders                            |
| SLP 6550 | Augmentative and Alternative Communication        |
| SLP 6600 | Voice Disorders                                   |
| SLP 6650 | Dysphagia and Oropharyngeal Disorders             |

|     |      |   |
|-----|------|---|
| SLP | 6700 | Assessment and Remediation of Fluency Disorders |
| SLP | 6800 | Aural Rehabilitation                            |

Clinical experiences from: 6000, 6010, 6020 and 6940

### C. Thesis or Comprehensive Examination (3-6 hours)

|     |      |   |
|-----|------|---|
| SLP | 6930 | Seminar in Speech-Language Pathology or |
| SLP | 6960 | Research Thesis                         |

## Doctor of Philosophy in Health Education

The doctoral degree program in health focuses on advanced study and research in community/public health. The program prepares advanced students to contribute to the field of health through research. Although research and health courses are required, the program is individualized through selection of minor cognate and elective courses to develop each student for leadership roles in universities, public service or the private health sector.

Admission to the program includes completion of a master's degree from an accredited institution. In addition to the Graduate School requirements, evaluation of applicants is based on the following criteria: (1) completion of the GRE, (b) a clearly defined statement of purpose that specifies the area of specialization within the degree program and (c) a minimum of three letters of reference from faculty members with specific expertise in health who have worked with the applicant in an academic setting. Evidence of research and/or writing ability through a master's thesis, project, paper, report, publication, or paper presented to a professional society will be considered. International applicants must submit a TOEFL score of 550 or higher for admission to the program. Prospective students should contact the department for further information.

### A. General Core Requirements (12 credit hours)

|      |      |   |
|------|------|---|
| KINE | 8230 | Scientific Writing and Research Methods |
| RESM | 8120 | Quantitative Methods II                 |
| RESM | 8320 | Research Design                         |

Select from: RESM 7330, 8130, 8160, 8350, or HEAL 8700

### B. Major Courses (36 credit hours)

#### Required courses:

|      |      |   |
|------|------|---|
| HEAL | 8000 | Professional Issues in Health Education |
| HEAL | 8100 | College Teaching of Health Education    |
| HEAL | 8200 | Methods and Materials in Public Health  |
| HEAL | 8300 | Community Health Organization           |
| HEAL | 8460 | Health Promotion Programs               |
| HEAL | 8600 | Health Behavior                         |
| HEAL | 8640 | Issues in Public Health                 |
| HEAL | 8800 | Evaluation of Health Programs           |
| HEAL | 8900 | Grant Writing                           |

#### Elective courses:

Consult with adviser to develop appropriate sequence of courses to meet student's goals.

### C. Cognate Areas (12 credit hours)

Consult with adviser.

### D. Doctoral Dissertation (10 credit hours)

## Severe Behavioral Spectrum

*Dr. Marion Boss, graduate faculty, S.B.S. adviser*

The College of Health and Human Services provides coursework for the master of education, education specialist and doctor of philosophy

degrees in curriculum and instruction for the severe behavioral spectrum. See the College of Education section for the program description.

This course of study includes evening academic offerings including graduate level educational, legal, medical and biomedical research, reading and writing requirements specifically pertaining to serious emotional disturbance and/or behavioral disorders. The severe behavioral spectrum also addresses toddlers, preschoolers and elementary children with pervasive developmental disorders, multisystem developmental disorders and autistic spectrum disorders.

## College of Pharmacy

### Graduate Programs

### Master of Science in Pharmaceutical Sciences

#### Degrees Offered

The master of science in pharmaceutical sciences degree is designed to prepare an individual for responsibilities in professional practice, the pharmaceutical industry and scientific research beyond those possible with a baccalaureate.

Although a single degree is conferred, specialization is possible in that the curriculum is organized into three distinct disciplines. Applicants must select the program of study (option) they wish to pursue.

The master of science in pharmaceutical sciences is granted to the student who satisfactorily completes a minimum of 30 semester hours of graduate credit with a 3.0 or better GPA. Of the 30 semester hours, a maximum of 6 semester hours are granted for thesis research.

#### Admission Requirements

In general, a baccalaureate in the sciences is required for admission, although applicants possessing other bachelor's degrees will be considered if the latter represent adequate preparation. Certain options and graduate courses require undergraduate preparation as prerequisites, and this preparation should be completed as soon as possible upon admission to the Graduate School. The total time required for completion of the graduate program leading to the master of science in pharmaceutical sciences degree will depend upon the preparation of the student entering the Graduate School. Normally two years of study and research are required.

The admission requirements of the Graduate School of the University apply. The basic requirement is a 2.7 (on a 4.0 scale) GPA on all undergraduate work leading to the bachelor's degree. Applicants having less than a 2.7 GPA on all undergraduate work will be considered for admission if other criteria for estimation of potential success in graduate studies are positive.

Each student must submit three copies of transcripts, one of which must be official, showing all post-secondary academic work and degrees granted; three letters of recommendation from college faculty members acquainted with the applicant's character and ability; and scores from the aptitude portion of the GRE.

International students are required to take the TOEFL, which will be given in their own country by the Educational Testing Service.

Normally acceptance will be decided by the third week in May for admission during the following fall semester. Completed applications should be received within the first week of April. (International students are encouraged to submit applications one month prior to the stated deadline to allow for delays in international correspondence). Applications received after April, including those for summer or spring semesters, may be held for consideration for the subsequent fall semester if existing graduate positions have been filled.

## Curriculum and Options — M.S. Program in Pharmaceutical Science

The options available to graduate students are: pharmacology/toxicology, administrative pharmacy and industrial pharmacy.

### Pharmacology/Toxicology option:

#### Undergraduate courses required (or their equivalents):

|           |   |   |
|-----------|---|---|
| PHCL 2600 | Functional Anatomy and Pathophysiology I                | 4 |
| PHCL 2620 | Functional Anatomy and Pathophysiology II               | 4 |
| MBC 3310  | Medicinal Chemistry I: Drug Action and Design           | 3 |
| MBC 3320  | Medicinal Chemistry II: Drug Targeting To Receptors     | 3 |
| MBC 4300  | Medicinal Chemistry III: Chemotherapy and Immunotherapy | 3 |
| MATH 1750 | Mathematics For The Life Sciences I                     | 4 |
| MATH 1760 | Mathematics For The Life Sciences II                    | 3 |
| CHEM 3710 | Physical Chemistry For The Biosciences I                | 3 |
| CHEM 3720 | Physical Chemistry For The Biosciences II               | 3 |

#### Graduate courses required:

|           |   |     |
|-----------|---|-----|
| PHCL 5700 | Pharmacology I-Principles of Pharmacology, Autonomic Pharmacology and Non-Steroidal Anti-Inflammatory Agents and Related Pharmacology | 3   |
| PHCL 5720 | Pharmacology II: Endocrine and CNS Pharmacology   | 3   |
| PHCL 5900 | Drug Disposition  | 2   |
| PHCL 6150 | Advanced Pharmacokinetics   | 2   |
| PHCL 6600 | Seminar in Pharmacology   | 1   |
| PHCL 6700 | Pharmacology III: CNS and Cardiovascular/Renal Pharmacology   | 3   |
| PHCL 6720 | Pharmacology IV: Chemotherapeutics  | 3   |
| BIOL 5610 | Advanced Biostatistics or   |     |
| PHCL 5140 | Interpretation of Pharmaceutical Data   | 2-4 |
| MBC 6190  | Advanced Medicinal Chemistry  | 4   |
| CHEM 6310 | Separation Methods  | 2-4 |

#### Additional course work may be selected from the following:

|           |                                  |   |
|-----------|----------------------------------|---|
| MBC 5620  | Biochemical Techniques           | 2 |
| PHCL 5600 | Research Methods in Epidemiology | 4 |
| PHCL 5620 | Pharmacoepidemiology             | 4 |
| PHCL 5730 | Toxicology I                     | 3 |
| PHCL 5750 | Toxicology II                    | 3 |
| PHCL 5760 | Toxicokinetics                   | 3 |

### Administrative Pharmacy option:

#### Undergraduate courses required (or their equivalents):

|           |   |   |
|-----------|---|---|
| BUAD 2040 | Financial Accounting Information                | 3 |
| ECON 1200 | Principles of Microeconomics                    | 3 |
| PHPR 3510 | Pharmaceutical Dimensions of Health Care System | 3 |
| PHPR 4250 | Sterile Product Technology                      | 2 |

#### Required courses include (or their equivalents):

|           |                            |   |
|-----------|----------------------------|---|
| MKTG 5410 | Marketing Systems          | 3 |
| MGMT 5110 | Introduction to Management | 3 |
| FINA 5310 | Managerial Finance         | 3 |

|           |  |     |
|-----------|--|-----|
| RESM 5110 | Quantitative Methods I                     | 3   |
| RESM 6120 | Quantitative Methods II                    | 3   |
| PHPR 6520 | Analysis of the Pharmaceutical Environment | 3   |
| PHPR 6530 | Research Methods in Pharmacy Practice      | 3   |
| PHPR 6600 | Seminar in Administrative Pharmacy         | 1   |
| PHPR 6960 | M. S. Thesis Research in Pharmacy          | 1-6 |

#### Additional course work may be selected from or equivalents; others as approved by adviser.

|           |  |     |
|-----------|--|-----|
| PHPR 5990 | Problems in Pharmacy Practice                          | 1-6 |
| PHPR 6510 | Pathophysiology and Pharmacotherapy: Poison Management | 1   |
| PHPR 6810 | Hospital Pharmacy Administration                       | 3   |
| PHPR 6820 | Selected Topics in Hospital Pharmacy                   | 3   |
| PHPR 6830 | Advanced Community Pharmacy Administration             | 3   |
| PHPR 6840 | Selected Topics in Community Pharmacy                  | 3   |
| ACCT 6000 | Accounting for Managers                                | 3   |
| OPMT 5220 | Analysis of Manufacturing & Service Systems            | 3   |
| INFS 6460 | Management Information Systems                         | 3   |
| FINA 6130 | Managerial Finance                                     | 3   |
| BLAW 5150 | Dynamics of Legal Environment of Business              | 3   |
| ORGD 6170 | The Individual and the Organization                    | 3   |
| ORGD 6590 | Organization Theory and Design                         | 3   |
| BANS 5210 | Economics for Business Decisions                       | 3   |
| BANS 6520 | Managerial Economics                                   | 3   |

### Industrial Pharmacy option:

#### Undergraduate courses required:

Courses will be evaluated for students with a B.S. in pharmacy.

|           |  |            |
|-----------|--|------------|
| PHPR 3070 | Pharmaceutics and Pharmaceutical Technology I                                  | <b>and</b> |
| PHPR 3080 | Pharmaceutics and Pharmaceutical Technology II                                 | <b>or</b>  |
| CHEM 3710 | Physical Chemistry for the Biosciences I                                       | <b>and</b> |
| CHEM 3720 | Physical Chemistry for the Biosciences II                                      | <b>and</b> |
| CHEM 3730 | Physical Chemistry I   | 8-9        |
| MBC 3550  | Physiological Chemistry I: Structure and Function of Biological Macromolecules | 3          |
| MBC 3560  | Physiological Chemistry II: Chemical Regulation of Cells and Organisms         | 3          |
| PHPR 4520 | Pharmaceutical Management and Marketing  | 3          |
| PHPR 4550 | Analysis of the Pharmaceutical Environment                                     | 3          |

#### Graduate required courses:

|           |                                    |     |
|-----------|------------------------------------|-----|
| CHEM 6300 | Advanced Analytical Chemistry      | 2-4 |
| CHEM 6310 | Separation Methods                 | 2-4 |
| PHCL 6150 | Advanced Pharmacokinetics          | 2   |
| EEES 5710 | Advanced Biostatistics             | 4   |
| PHPR 5690 | Dosage Form Design                 | 3   |
| PHPR 5700 | Equilibrium Phenomenon             | 2   |
| PHPR 5720 | Pharmaceutical Rate Processes      | 3   |
| PHPR 6600 | Seminar in Administrative Pharmacy | 1   |
| PHPR 6850 | Product Development                | 3   |

#### Additional course work may be selected from the following:

|           |   |     |
|-----------|---|-----|
| PHPR 5680 | Parenteral Manufacturing                          | 2   |
| PHPR 5710 | Selected Topics in Pharmaceutical Technology      | 2-4 |
| PHPR 5990 | Problems in Pharmacy Practice                     | 1-6 |
| PHPR 6530 | Research Methods in Pharmacy Practice             | 3   |
| PHPR 6610 | Seminar I   | 1   |
| PHPR 6960 | M.S. Thesis Research in Pharmacy                  | 1-6 |
| PHCL 5760 | Toxicokinetics                                    | 3   |
| CHEM 6320 | Characterization of Condensed Phases and Surfaces | 2-4 |
| CHEM 6330 | Spectroscopic Methods and Analysis of Spectra     | 2-4 |
| CHEM 6720 | Physical Chemistry of Material Transformations    | 2-4 |
| CHEM 6810 | Materials Science I                               | 4   |
| CHEM 6820 | Materials Science II                              | 4   |
| CHEM 6980 | Special Topics in Chemistry                       | 2-4 |

Applicants for the administrative pharmacy and industrial pharmacy options who possess B.S. degrees in pharmacy from an ACPE accredited institution will be given preference for admission into those options.

## Master of Science in Medicinal Chemistry

### Admission Requirements

Satisfactory completion of a bachelor's degree in chemistry, biology, pharmacy or a related discipline is required. It is assumed that the undergraduate training will include differential and integral calculus, college physics, a one-year course in general and inorganic chemistry including a laboratory, a year's duration course in organic chemistry including a laboratory, and training in analytical chemistry. An undergraduate course in physical chemistry is recommended.

The admission requirements of the Graduate School of the University apply.

### Degree Requirements

Master's students need to complete the following courses as partial fulfillment of their requirement for an M.S. degree:

|  |   |      |
|--|---|------|
| MBC 5100                                 | Research Practices in Medicinal Chemistry .....                         | 4    |
| MBC 5620                                 | Biochemical Techniques .....  | 2    |
| MBC 5900                                 | Medicinal Chemistry Seminar (2 hours required) .....                    | 1    |
| MBC 6190                                 | Advanced Medicinal Chemistry .....                                      | 4    |
| MBC 6200                                 | Biomedical Chemistry .....  | 4    |
| MBC 6550                                 | Biochemistry .....  | 4    |
| MBC 6960                                 | M.S. Thesis Research in<br>Medicinal Chemistry (6 hours required) ..... | 1-15 |
| Other 5000-6000 level courses as advised |   |      |

In addition, the following items also must be completed:

- Minimum of 30 semester hours graduate credit of which no more than 6 hours are counted from the category of M.S. thesis or Ph. D. dissertation research (MBC 6960/8960)
- Preparation of a written M.S. thesis based upon the results of an original research investigation performed by the student during the M.S. program at The University of Toledo.
- Successful oral defense of the thesis before the thesis advisory committee (consisting of the thesis adviser and two other members) and presentation of the results of the thesis research in a seminar before the department of medicinal and biological chemistry.
- Acceptance of this thesis by the M.S. thesis adviser and the thesis advisory committee.
- Maintenance of a GPA of 3.0 or higher.

## Doctor of Philosophy in Medicinal Chemistry

### Admission Requirements

Satisfactory completion of a bachelor's degree in chemistry, biology, pharmacy or a related discipline is required. It is assumed that the undergraduate training will include differential and integral calculus, college physics, a one-year course in general and inorganic chemistry including a laboratory, a one-year course in organic chemistry including

a laboratory, and training in analytical chemistry. An undergraduate course in physical chemistry is recommended.

The ability to excel in graduate studies and research must be evident based upon grades from undergraduate studies, recommendations from college faculty, results from standardized aptitude and achievement examinations (GRE), and performance in research and independent study.

Students with an M.S. degree in medicinal chemistry or a related field may be admitted directly to the Ph.D. program.

### Ph.D. Degree Requirements

Ph.D. students need to complete the following courses as partial fulfillment of their requirement for a Ph.D. degree: MBC 5100/7100, 5620/7620, 5900 (3 hours required), 6190/8190, 6200/8200, 6550/8550, 6300/8300, 6310/8310 and other 5000-6000 level courses as advised. In addition, the following items must also be completed: MBC 7900 (4 hours required), 8960 (30 hours required), a minimum of 8 semester hours of graduate-level chemistry, biology or medicinal and biological chemistry, selected from CHEM 6400/8400, 6410/8410, 6510/8510, 6520/8520, 6530/8530, BIOL 6010/8010, 6020/8020, 6090/8090, 6100/8100 or MBC 6800/8800, 6100/8100, 5380/7380 or other 7000-8000 level courses as advised.

|               |   |      |
|---------------|---|------|
| MBC 5100/7100 | Research Practices in Medicinal Chemistry .....                                 | 1    |
| MBC 5620/7620 | Biochemical Techniques .....  | 2    |
| MBC 5900/7900 | Medicinal Chemistry Seminar (4 hours required) .....                            | 1    |
| MBC 6190/8190 | Advanced Medicinal Chemistry .....  | 4    |
| MBC 6200/8200 | Biomedical Chemistry .....  | 4    |
| MBC 6550      | Biochemistry .....  | 4    |
| MBC 6300/8300 | Biomedical Chemistry Laboratory I .....   | 4    |
| MBC 6310/8310 | Biomedical Chemistry Laboratory II .....  | 4    |
| MBC 8960      | Ph.D. Dissertation Research in Medicinal<br>Chemistry (30 hours required) ..... | 1-15 |

### Select 8 hours in chemistry, biology, or medicinal and biological chemistry from the following:

|                              |   |     |
|------------------------------|---|-----|
| CHEM 6400/8400               | Advanced Organic Chemistry .....                    | 2-4 |
| CHEM 6410/8410               | Organic Synthesis .....                             | 2-4 |
| CHEM 6510/8510               | Protein Chemistry .....                             | 2-4 |
| CHEM 6520/8520               | Enzymology .....                                    | 2-4 |
| CHEM 6530/8530               | Nucleic Acid Chemistry .....                        | 2-4 |
| BIOL 6010/8010               | Advanced Molecular Biology .....                    | 4   |
| BIOL 6020/8020               | Advanced Molecular Biology Laboratory .....         | 3   |
| BIOL 6090/8090               | Advanced Cell Biology .....                         | 4   |
| BIOL 6100/8100               | Research Methodology: Cell and Molecular Biology .. | 3   |
| MBC 5380/7380                | Medicinal and Poisonous Plants .....                | 3   |
| MBC 6100/8100                | Advanced Immunology .....                           | 2   |
| MBC 6800/8800                | Methods in Biotechnology .....                      | 3   |
| Other MBC courses as advised |   |     |

In addition, all students must satisfy the following:

- Minimum of 60 semester hours of graduate credit past the master's level (see master of science in medicinal chemistry), including a minimum of 30 hours of courses, laboratories and seminars (exclusive of dissertation research) and a minimum of 30 hours of Ph.D. dissertation research.
- Satisfactory overall performance on a written qualifying examination covering graduate-level medicinal chemistry, biochemistry and either organic chemistry or advanced cell/molecular biology.

3. Selection of a doctoral research adviser, preparation of an acceptable written Ph.D. dissertation proposal in consultation with the adviser, and the satisfactory oral defense of the proposal before the dissertation advisory committee. The written qualifying examination and the defense of the dissertation proposal will constitute the examination requirements necessary for advancement to candidacy for the Ph.D. in medicinal chemistry. The chair of the doctoral dissertation advisory committee will be the student's doctoral research adviser. The dissertation advisory committee will consist of two additional faculty plus one member from outside the student's department or college.
4. Subsequent to admission to candidacy for the Ph.D. degree, the student is expected to spend a minimum of two semesters in full-time study at The University of Toledo.
5. Preparation of a Ph.D. dissertation based upon the results of an original research investigation performed by the student during his/her Ph.D. program at The University of Toledo.
6. Successful oral defense of the dissertation before the dissertation advisory committee and presentation of the results of the dissertation research in a seminar before the department of medicinal and biological chemistry.
7. Acceptance of the dissertation by the Ph.D. dissertation adviser and the dissertation advisory committee.
8. Maintenance of a GPA of 3.0 or higher

## Doctor of Pharmacy Degree Programs

### Admission Requirements

An applicant is considered for admission to the doctor of pharmacy program on the basis of general criteria as well as minimum specific requirements listed below. General criteria include: the performance of the applicant in the undergraduate program; the performance of the applicant in the professional setting; and recommendations from college faculty members and professional colleagues acquainted with the student's character and ability. Specific requirements include: bachelor of science in pharmaceutical sciences degree in the Pharm.D. track from The University of Toledo or a bachelor of science in pharmacy degree earned from a school or college of pharmacy accredited by the American Council on Pharmaceutical Education and a written statement of purpose stating the applicant's short-term and long-term goals after obtaining the doctor of pharmacy degree. For individuals without a B.S.P.S. degree from The University of Toledo, an on-site interview may be required of qualified candidates prior to the final decision for admission.

All applications should be completed by January 15 in order to be considered for admission into the doctor of pharmacy program starting the subsequent June. Normally, notification of acceptance into the program will be sent by the first week in March.

### Program Requirements

The curriculum consists of a minimum of 50 semester hours of didactic course work at the graduate level and 32 semester hours (8 months) of experiential training.

In addition, students entering the program through the B.S.P.S./Pharm.D. track are required to successfully complete PHPR 6940 (Professional Practice Exposure, 2 semester hours), PHPR 8260 (Pharmacy Jurisprudence & Ethics, 1 semester hour) and five hours of graduate electives. Students who hold a bachelor of science in pharmacy from a

school or college of pharmacy accredited by the American Council on Pharmaceutical Education are required to successfully complete course work equivalent to PHPR 4440 (PPT: Immunology) and PHPR 4450 (PPT: Renal).

## Subsequent Graduate Courses in the Pharm.D. program

### First Semester: Summer between Fourth and Fifth Year

|             |   |        |
|-------------|---|--------|
| PHCL 5140   | Statistics .....  | 2      |
| PHPR 6210   | Research Methods .....                                    | 2      |
| PHPR 6940   | Professional Practice Exposure .....                      | 2*     |
| (PHPR 6940) | will consist of 80 hours of pharmacy practice experience) |        |
|             | Total hours .....   | 4 (6)* |

### Second Semester: Fall Semester-Fifth Year

|           |                                 |    |
|-----------|---------------------------------|----|
| PHPR 6160 | Advanced Pharmacokinetics ..... | 3  |
| PHPR 6230 | Patient Care Rounds I .....     | 3  |
| PHPR 6420 | PPT: Cardiology .....           | 4  |
| PHPR 6430 | PPT: Pulmonary .....            | 3  |
| PHPR 6440 | PPT: Infectious Disease .....   | 4  |
|           | Total hours .....               | 17 |

### Third Semester: Spring Semester-Fifth Year

|           |                                       |          |
|-----------|---------------------------------------|----------|
| PHPR 6240 | Patient Care Rounds II .....          | 3        |
| PHPR 6250 | Self Care .....                       | 3        |
| PHPR 6370 | PPT: Nutrition .....                  | 1        |
| PHPR 6490 | PPT: Hematology/Oncology .....        | 3        |
| PHPR 6510 | PPT: Toxicology .....                 | 1        |
| PHPR 6550 | Management Topics .....               | 2        |
| PHPR 6610 | Seminar I .....                       | 1        |
| PHPR 8390 | PPT: Gastro-Intestinal .....          | 2        |
|           | Graduate Professional Electives ..... | 2*       |
|           | Total hours .....                     | 16 (18)* |

### Fourth Semester: Summer between Fifth and Sixth Year

|           |                                       |          |
|-----------|---------------------------------------|----------|
| PHPR 6380 | PPT: Endocrine .....                  | 2        |
| PHPR 8470 | PPT: Rheumatology .....               | 1        |
| PHPR 8480 | PPT: Psychiatric/Neurological .....   | 3        |
| PHPR 8500 | PPT: Pediatrics/Geriatrics .....      | 2        |
| PHPR 8630 | PPT: Capstone .....                   | 2        |
| PHPR 8620 | Seminar II .....                      | 1        |
| PHPR 8260 | Pharmacy Jurisprudence & Ethics ..... | 1*       |
|           | Graduate Professional Electives ..... | 3*       |
|           | Total hours .....                     | 11 (15)* |

### Fifth Semester: Fall Semester-Sixth Year

|               |                     |    |
|---------------|---------------------|----|
| PHPR 8940:001 | Clerkship I .....   | 4  |
| PHPR 8940:002 | Clerkship II .....  | 4  |
| PHPR 8940:003 | Clerkship III ..... | 4  |
| PHPR 8940:004 | Clerkship IV .....  | 4  |
| PHPR 8630     | Seminar III .....   | 2  |
|               | Total hours .....   | 18 |

### Sixth Semester: Spring Semester-Sixth Year

|               |                                   |    |
|---------------|-----------------------------------|----|
| PHPR 8940:005 | Clerkship V .....                 | 4  |
| PHPR 8940:006 | Clerkship VI .....                | 4  |
| PHPR 8940:007 | Clerkship VII .....               | 4  |
| PHPR 8940:008 | Clerkship VIII .....              | 4  |
|               | Total hours .....                 | 16 |
|               | * Track-in Pharm.D. students only |    |

**Note:** At the end of the sixth year, students are candidates for a Pharm.D. degree.

## Doctor of Pharmacy Clerkship

### Academic Performance Policy of the College of Pharmacy

#### For Doctor of Pharmacy Clerkship Students

Any student who fails to pass a single clerkship rotation or is dismissed from a single clerkship rotation (for reasons other than an action detrimental to patient care and/or to the clinical service) will be placed on academic probation *immediately* upon completion or dismissal from the rotation. The student will continue on academic probation *for the duration* of his/her clerkship rotation experience.

Any student on probation who fails to pass a clerkship rotation or is dismissed from a clerkship rotation will be immediately removed from the clerkship program, receive a record review by the Academic Performance Committee, and be subject to dismissal from the doctor of pharmacy program. All previously scheduled clerkship sites will become available for other clerkship students.

If the situation leading to the dismissal of a student from a clerkship rotation is related to an action that is detrimental to patient care and/or the clinical service, the student will be *immediately* removed from the clerkship program. The Academic Performance Committee will review the situation and the student may be subject to dismissal from the doctor of pharmacy program. All previously scheduled clerkship sites will become available for other clerkship students.

Actions that are subject to dismissal are outlined in the *Clerkship Dismissal Policy*.

#### Clerkship Dismissal Policy

Pharmacy students may be dismissed from a clerkship site at any time during the rotation by the clerkship site and/or preceptor through the initiation of the dismissal procedure described below.

#### Actions that are Subject to Dismissal

Circumstances or actions under which clerkship students may be dismissed using the dismissal procedure described below:

- Failure to adhere to clerkship site policy and/or procedure
- Failure to adhere to UT clerkship program policy and/or procedure
- Failure to meet a UT clerkship program requirement
- Blatantly unacceptable or continuously unacceptable clerkship program performance
- Mistreatment of University of Toledo and/or clerkship site employees
- The performance of an action that is detrimental to the care of a patient
- The performance of an action that is detrimental to the clinical service provided by the site and/or preceptor

#### Dismissal Procedure

When a circumstance or action occurs which is determined to be grounds for dismissal, the clerkship preceptor will inform the student and director of experiential programs of the situation. The situation will then be handled as follows:

- a) If the situation is related to: failure to meet a requirement, failure to follow policy or procedure, improper behavior, or inadequate clerkship performance, the student will be given a specific outline by the clerkship preceptor as to how his/her performance must improve and/or meet expectations within five (5) class days. A copy of this outline will be sent to the director of experiential programs. If after five (5) class days such performance has not been achieved, the student will be removed from the clerkship site and will receive either a grade of U or I as determined by the director of experiential programs.
- b) If the situation is related to an action that is detrimental to patient care and/or to the clinical service, upon discussion of the situation between the clerkship preceptor and clinical coordinator, the student shall be subject to immediate removal from the clerkship site and shall receive a grade of U.

If a student has any question over the handling of his/her dismissal procedure by the director of experiential programs and/or preceptor, he/she should contact the chair of the department of pharmacy practice.

