ENGINEERING, PHD: COMPUTER SCIENCE

The Doctor of Philosophy, the highest degree offered by the University, is conferred in recognition of marked scholarship in a broad field of knowledge as well as distinguished critical or creative achievement within a special area of the general field (the special area being the subject of the doctoral dissertation). The Doctor of Philosophy (PhD) program in the College of Engineering and Applied Science (CEAS) is designed to meet the traditional high standards for such programs. The PhD in Engineering is administered by the CEAS Graduate Program Subcommittee (GPSC). Some aspects of the program are delegated to the CEAS Graduate Office and to the various departments of the College.

There are six major areas in the PhD program:

- Biomedical Engineering
- Civil Engineering
- Computer Science
- Electrical Engineering
- Industrial Engineering
- Materials Engineering
- Mechanical Engineering

Each major is flexible, allowing the student to develop a plan of studies tailored to meet individual needs. Evaluation of the study plan is based on its appropriateness as an engineering or computer science program, the availability within the University of appropriate course offerings, and the availability within the College of a faculty member who is qualified to serve as the student's major professor.

The PhD degree requires a minimum of 66 credits beyond the baccalaureate, including a dissertation. The student must also satisfy a residence requirement.

Many of the courses leading toward graduate degrees in CEAS are offered in the late afternoon or evening. So, students can complete much of their coursework on a part-time basis.

Admission Requirements

Application Deadlines
Application deadlines vary by program, please review the application deadline chart (http://uwm.edu/graduateschool/program-deadlines/) for specific programs. Other important dates and deadlines can be found by using the One Stop calendars (https://uwm.edu/onestop/dates-and-deadlines/).

Admission
An applicant must meet Graduate School requirements (http://uwm.edu/graduateschool/admission/) plus these College requirements to be considered for admission to the program:

1. A bachelor's or master's degree:
   a. Applicants holding a BS or MS degree in engineering or computer science, depending on the major area selected will generally be admitted without deficiencies.
   b. Applicants holding BS or MS degrees from domains outside of engineering or computer science may be admitted with specific program-defined course deficiencies, provided that the deficiencies amount to no more than two courses. The student is expected to satisfy deficiency requirements within three enrolled semesters. The deficiencies are monitored by the Graduate School and the individual graduate program unit. No course credits earned in making up deficiencies may be counted as program credits required for the degree. For the Engineering major areas, the BS or MS preparation generally must include mathematics equivalent to ELECENG 234 or MATH 234. For the Computer Science major area, the mathematics preparation must generally include mathematics equivalent to MATH 232. Otherwise, the made-up deficiencies must be sufficient to assure the Graduate Program Subcommittee that the applicant is able to proceed with advanced work directed toward the doctoral degree.

2. A minimum grade point average of 3.0 on the basis of 4.0, in the highest degree granted. An applicant with a master's degree in engineering or computer science having a GPA of less than 3.0, but at least equal to 2.75, may be admitted if substantial evidence can be submitted demonstrating that the applicant has the capacity to perform satisfactory doctoral work.

3. All applicants are required to submit a brief (1 or 2 page) statement describing their professional goals and at least two letters of reference.

4. The Graduate Record Examination (GRE) is required for all international and domestic applicants.

5. International students require proof of English language proficiency.

Complete information is available at the UWM Center for International Education (http://www.uwm.edu/Dept/CIE/)

6. Applicants with a relevant master's degree who intend to complete an additional master's in engineering at UWM should announce their plans at the time of admission, and not later than the start of their second year into the PhD program.

Reapplication
A student who receives a master's degree at UWM must formally apply for admission to the Graduate School as a doctoral student before continuing studies that will be credited toward the Doctor of Philosophy in Engineering.

Credits and Courses
The minimum degree requirement is 66 graduate credits beyond the bachelor's degree. The minimum credit distribution of coursework to be undertaken must be as follows depending on the option selected:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select 21 credits in the major area of concentration</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits in an approved minor area</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits in mathematics and/or quantitative methods</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits of approved electives</td>
<td>9</td>
</tr>
<tr>
<td>Complete 3 credits of:</td>
<td>COMPSCI 700 CEAS Graduate Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Complete 18 credits of:</td>
<td>COMPSCI 998 Doctoral Thesis</td>
<td>18</td>
</tr>
</tbody>
</table>

Total Credits 66

The 6-credit requirement in mathematics and/or quantitative methods may be met by satisfactorily completing certain courses specified by the GPSC or by taking the minor in mathematics. When such courses also count for either the major area or the minor area, the remaining credits may be taken as approved electives.
The Computer Science major area of concentration is one of the seven major areas of the PhD in Engineering. The student must achieve a 3.0 GPA separately in each of the following areas: the Computer Science major area, the minor area, and the quantitative methods area.

The minor is normally taken in one of the other major areas of the PhD in Engineering or in the physical sciences or mathematics or in business management. Consideration of any other area as a minor requires the prior approval of the GPSC.

A minimum of 33 credits, including doctoral thesis, must be completed while enrolled at UWM in the PhD degree program. For students entering with a relevant master’s degree who intend to complete a second master's and a PhD in Engineering at UWM, a minimum of 27 credits, including doctoral thesis, must be completed while enrolled in the doctoral program.

Students entering the program without a prior applicable master's degree are limited to a total maximum transfer of 9 credits for courses taken elsewhere. Independent study courses (699 and 999) may be included in the minimum course credit requirements provided GPSC approval has been obtained prior to registration in such course. Typically no more than six credits of independent study are allowed in the PhD program. Guidelines on acceptable independent study courses are available in the CEAS Graduate Studies Office.

The GPSC or the major department may require candidates to complete certain courses as part of the requirement for the specific major or to meet the mathematics and/or quantitative methods requirement.

### Additional Requirements

#### Advising and the Major Professor

Upon admission to the doctoral program in Educational Psychology, students are assigned a temporary advisor in their area of emphasis (e.g., Counseling Psychology, Cognitive and Developmental Sciences, Educational Statistics and Measurement, or School Psychology). This person is available to discuss initial course selection and provide general advice about the program. After beginning the program and before filing a Student Academic Plan, students should seek a Major Professor. The permanent Major Professor may—but does not have to be—the same person who is the temporary advisor. Students must select an advisor in their area of emphasis. Selection of a Major Professor is by mutual consent between the student and the faculty member. Students should notify the Training Director within their emphasis when the Major Professor has been selected.

#### Residence

The student must meet minimum Graduate School residence requirements (http://uw.edu/graduateschool/doctoral-requirements/#residence) of one continuous academic year of full-time graduate studies at UWM. This can be satisfied by completing at least 8 graduate credits in each of two consecutive semesters, or 6 or more graduate credits in each of three consecutive semesters, exclusive of summer sessions. Residence credit cannot be earned at the master's level.

#### Practicum

Students in the Counseling Psychology and School Psychology concentrations are required to complete practicum requirements to become licensed.

#### Internship

Following Practicum, students in the Counseling Psychology and School Psychology concentrations are required to complete a year-long internship in order to be licensed.

#### Publishable Paper

Students are required to work with faculty to have a “publishable” paper within 30 credits of admission to the doctoral program. This may be their master's theses and/or master's papers, where original research is generated or a critical review of research is developed. It may also be a collaborative effort, such as publishing a chapter or article with a faculty advisor or other faculty collaborator.

#### Minor

Counseling Psychology and School Psychology students must complete 9 credits in the Department of Psychology. The minor will be optional for students in Cognitive and Developmental Sciences and Educational Statistics and Measurement, based on consultation with an advisor.

#### Doctoral Preliminary Examination

The Doctoral Preliminary Examination is taken at the end of a student's coursework. A description of the Preliminary Examination is provided in the doctoral handbook corresponding to the student's specialization area within Educational Psychology.

The Preliminary Examination consists of a written component and, in some specializations, an oral component. The purpose of the Preliminary Examination is to determine whether the student demonstrates understanding of coursework and related bodies of knowledge and is qualified to proceed with dissertation planning. A minimum of three faculty members in the specialization area shall participate on a student's Preliminary Examination.

#### Proposal Hearing

A doctoral student qualifies as a "doctoral candidate" upon completion of the doctoral Student Academic Plan, successful completion of the Doctoral Preliminary Examination for the PhD degree, and successfully passing a dissertation proposal hearing. The hearing is open and the date, time and location must be announced by the Doctoral Coordinator. Each member of the committee must sign the doctoral dissertation proposal hearing form, and indicate approval or disapproval. A simple majority of all committee members is required. No absentee ballots are acceptable.

#### Dissertation Defense

The candidate must write a dissertation that demonstrates the ability to pursue independent research. The candidate must pass an oral exam in defense of the dissertation.

#### Exit Requirements

Contingent upon satisfactory completion of program requirements, passage of the preliminary qualifying examination, and successful oral defense of the dissertation, the Chair of the Department of Educational Psychology will give final approval of the PhD in Educational Psychology.

#### Time Limit

It is expected that most students will complete all degree requirements within six years of initial enrollment in the doctoral program. All requirements MUST be completed within ten years from the date of initial enrollment.