MATHEMATICS, PHD: ACTUARIAL SCIENCE

The Department of Mathematical Sciences at the University of Wisconsin-Milwaukee is home to an active community of teachers, scholars, undergraduates, and graduate students. In addition to most traditional areas of Pure and Applied Mathematics, the department contains all UWM programs in Actuarial Science and Atmospheric Science.

The department offers Bachelor's, Master's, and Doctoral studies in all of these areas, in addition to several interdisciplinary programs. Established in 1963, the PhD in Mathematics is the original doctoral program at UWM, founded by Dr. Morris Marden (http://uwm.edu/math/graduate/resources/history-of-our-graduate-program/morris-mardens-biography).

Application Deadlines
If at any time you are unsure about a published date or deadline (http://uwm.edu/graduateschool/program-deadlines), call the Registrar's Office at (414) 229-3800 or submit a contact form (http://uwm.edu/registrar/contact-us) online.

Admission
Applicant must meet Graduate School requirements (http://uwm.edu/graduateschool/admission) plus departmental requirements as given for admission to the master's program. A master's degree is not a prerequisite for admission to this Ph.D. program.

Reaplication
A student who receives the master's degree must formally reapply for admission to the Graduate School before continuing studies toward the Ph.D.

Major Professor as Advisor
The student must have a major professor to advise and supervise the student's studies as specified in Graduate School regulations. The entering graduate student is assigned a temporary advisor by the Department Graduate Program Coordinator.

Credits and Courses
Minimum degree requirement is 54 graduate credits beyond the bachelor's degree, at least 27 of which must be earned in residence at UWM. The student, in consultation with the major professor, must select both a primary and a secondary area of specialization. The primary area may be chosen from one of the following seven fields:

- Algebra
- Analysis
- Applied Mathematics
- Probability and Statistics
- Topology
- Industrial Mathematics
- Actuarial Science

The secondary area may be chosen from another of these fields or may be chosen from another appropriate department. Minimum course requirements for all work in both areas of specialization require approximately two full years of study.

Foreign Language
Each student must pass a written examination in one foreign language; the examination is administered by the Department's Language Committee. Acceptable languages are French, German, and Russian; exceptions may be permitted upon written request of advisor.

Computer Proficiency
The student shall pass an examination on a higher programming language and/or other appropriate advanced computer skills; the examinations administered by the Department's Computer Committee. The Computer Committee may accept advanced computer science coursework in lieu of the examination.

Residence
The student must meet minimum Graduate School residence requirements.

Doctoral Preliminary Examination
When the student is sufficiently prepared — normally when the student has earned 24 credits in specified areas above the 700 level — a doctoral preliminary examination to determine the student's knowledge and achievement is taken. For students in mathematics, the exam evaluates the student's general knowledge of mathematics, as well as the student's knowledge of the major area of concentration. Students must pass this examination to continue in the program. With permission of the examination committee, the student may repeat this examination once. If the student does not have a master's degree in mathematics before this examination, the committee will determine whether the student's performance is sufficient to qualify for the master's degree.

Doctoral Dissertation Proposal Hearing
After passing the language requirements and the doctoral preliminary examination, the student participates in a doctoral dissertation proposal hearing. At this hearing, the student is examined on the student's chosen area of research and a dissertation topic is approved.

Dissertation
The primary requirement for the Ph.D. in mathematics is the candidate's completion, under the supervision of the Department advisor, of an original and significant mathematical investigation presented in the form of a dissertation. The investigation is to be in the field of algebra, analysis, applied mathematics, probability and statistics, topology. A dissertation for the industrial mathematics field must involve an industrial problem requiring a mathematical solution.

Dissertation Defense
The candidate must, as the final step toward the degree, present a colloquium based on the dissertation and must pass an oral examination in defense of the dissertation. If the candidate does not successfully defend a thesis within five years of admission to candidacy, the candidate may be required to take another doctoral preliminary examination and be readmitted to candidacy.
**Time Limit**

All degree requirements must be completed within ten years from the date of initial enrollment in the doctoral program.

**Minor Area for Other Ph.D. Majors**

A doctoral student planning a physical science major other than mathematics may fulfill requirements for mathematics as the minor area of concentration by completing 12 credits of approved mathematics courses with a grade of B or better, at least 6 credits of which must be in courses 700 or above.

A doctoral student planning a non-physical science major may fulfill requirements for mathematics as the minor area of concentration by completing 12 credits with a grade of B or better in approved mathematics courses 300 or above.

For additional information on the Ph.D., see the Graduate School Doctoral Requirements (http://uwm.edu/graduateschool/doctoral-requirements) page.

**Actuarial Science Concentration**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 credits in actuarial science</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 in applied mathematics</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 in probability and statistics</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 in real analysis</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3 in business or economics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>27</strong></td>
<td></td>
</tr>
</tbody>
</table>

*NOTE:* Admission to this program is limited to students who have made significant progress towards and are close to achieving a professional designation from an internationally recognized actuarial organization.