Applied Mathematical and Computational Sciences, Ph.D.

Requirements

The Doctor of Philosophy program in applied mathematical and computational sciences (AMCS) requires a minimum of 72 s.h. of graduate credit. The Ph.D. program is autonomous, broadly based, and interdisciplinary. It is designed to help students achieve a command of theoretical and applied mathematics and obtain basic knowledge in another area (engineering, medicine, or one of the behavioral, biological, physical, or social sciences).

The program is flexible; students can concentrate on applied mathematics, such as differential equations and numerical analysis, or on other applicable techniques in mathematics. Scientific computing is an important part of applied mathematics, so it is often a part of student training and dissertation research.

Prospective students should have a desire to apply a mathematical science (mathematics or statistics) to relevant problems in another area.

Course of Study

Faculty members help each student plan a course of study that is consistent with the student's background, interests, and goals.

These individual programs are designed to help students develop expertise in methods of applied mathematics and build a good foundation in related topics of theoretical mathematics. The individual programs also provide sufficient knowledge in an outside area to enable students to use mathematical techniques in that area.

Students can arrange their study plans to earn a master's degree from another department after they complete part of their plan. Students find suitable thesis problems and supervisors with the help of the faculty.

Required Courses

Students must successfully complete these four core course sequences in the first two years of graduate study.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:5200</td>
<td>Introduction to Analysis I-II</td>
<td>8</td>
</tr>
<tr>
<td>MATH:5210</td>
<td>Introduction to Analysis I-II</td>
<td></td>
</tr>
<tr>
<td>MATH:5400</td>
<td>General Topology - Introduction to Smooth Manifolds</td>
<td>8</td>
</tr>
<tr>
<td>MATH:5410</td>
<td>General Topology - Introduction to Smooth Manifolds</td>
<td></td>
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<tr>
<td>MATH:5600</td>
<td>Nonlinear Dynamics with Numerical Methods - Partial Differential Equations with Numerical Methods</td>
<td>8</td>
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<tr>
<td>MATH:5700</td>
<td>Nonlinear Dynamics with Numerical Methods - Partial Differential Equations with Numerical Methods</td>
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</tr>
<tr>
<td>MATH:5800</td>
<td>Numerical Analysis: Nonlinear Equations and Approximation Theory</td>
<td>8</td>
</tr>
<tr>
<td>MATH:5810</td>
<td>Numerical Analysis: Differential Equations and Linear Algebra</td>
<td></td>
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Outside Area Courses

Students must take and pass a Ph.D.-level course sequence area outside of mathematics in which mathematics is applied. The sequence must consist of two courses at the 6000-level or above.

Advanced Mathematics Course Requirement

In order to establish a solid foundation in mathematics, students must successfully complete at least 12 s.h. of graduate mathematics courses numbered MATH:6000 to MATH:7799, with the exception of seminar courses. The courses should be chosen to obtain mathematical breadth and must be approved by the AMCS chair.

Comprehensive Examination

Students complete a comprehensive examination that covers their outside research area within three-and-a-half years after beginning graduate study. The examination is typically based on the outside area courses and/or directed readings.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations of the Graduate College on the Graduate College website. To be prepared for graduate-level coursework in mathematics and an additional area, applicants should have a bachelor's or master's degree with a strong mathematics component and some background in the additional area.

Applications for fall admission are due on January 15. For application forms and more information about the academic program, contact the chair of the Applied Mathematical and Computational Sciences Program.

Financial Support

Financial support is provided to every student admitted. Fellowships and research and teaching assistantships are available to qualified applicants and fellowship support is available during summer sessions.

Career Advancement

Career opportunities for applied mathematicians include positions in colleges, universities, governmental laboratories, business, industry, and consulting firms.