APPLIED MATHEMATICS AND STATISTICS, PHD

Financial Assistance

A limited number of teaching and research assistantships providing full tuition and a competitive academic year stipend are available to qualified full-time Ph.D. candidates. Furthermore, the following special fellowships are awarded:

- The Rufus P. Isaacs Fellowship, named in honor of a late member of the faculty acclaimed for his contributions to operations research.
- The Charles and Catherine Counselman Fellowship, generously endowed by Hopkins alumnus Charles Counselman.

In addition, summer employment opportunities are often available within the university and in the Baltimore-Washington corridor.

Program Requirements

The objective of the department's Ph.D. program is to produce graduates who are broadly educated in applied mathematics and statistics and who can work at the current frontiers of their chosen specialized disciplines. The introductory phase of graduate study acquaints the student with a spectrum of topics, provides an opportunity to fill gaps in their background, and affords a close view of the doctoral research process and of potential research areas and advisors. Continuation to advanced study and dissertation research is based upon favorable evaluation of preparedness and potential. The progress of students is evaluated at the end of every semester. The culmination of the program is the doctoral dissertation, representing an original and significant contribution to knowledge in applied mathematics.

In addition to fulfilling the university requirement of a minimum of two consecutive semesters of registration as a full-time resident graduate student, completion of academic ethics training and the responsible conduct of research course, the student must accomplish the following to obtain departmental certification for the Ph.D.:

- Pass the Introductory Examination, normally offered immediately before each semester.
- Pass the Ph.D. Candidacy Examination. This oral examination is normally taken in the third year of residency. The scope of the exam will be governed by a syllabus prepared by the student with the help of the student's mentor or advisor.
- Pass the Graduate Board Oral Examination, normally taken in the third year of residence.
- Acquire and hone their teaching and research experience under the supervision of faculty by successfully completing either a TA or RA assignment every semester while a fulltime, resident student.
- Complete at least 12 one-semester courses of graduate work in a coherent program approved by the faculty advisor.
- Demonstrate a working knowledge of the utilization of computers in applied mathematics and statistics.
- Complete a program of original research and its clear exposition in a written dissertation. The dissertation must be approved by at least two faculty readers and be certified by them to be a significant contribution to knowledge and worthy of publication in scholarly journals. The candidate defends the dissertation in a public examination held under the auspices of the department.

Additional details on these items may be found on the department's website.

Course Program

The most common way for students to gain the knowledge and skills to succeed in the Ph.D. program is through course work. In consultation with their advisor, each student will develop a program of proposed course work. The relevant courses for the Ph.D. are of three types: basic graduate-level courses, additional specialized courses appropriate to the student's field of research, and an elective one year course selected to broaden the student in applied mathematics. To promote a well-rounded education and record, all full-time graduate students are expected to enroll in an appropriate number of courses for their stage in the program. Students are required to enroll in and attend EN.553.801 Department Seminar, every semester. Grades of B- or better (or equivalent level of performance in pass/fail courses) are expected of all department Ph.D. graduate students in their course work.

Basic Courses

All students are encouraged to master basic material in:

- probability (EN.553.720 Probability Theory I), statistics (EN.553.730 Statistical Theory), and stochastic processes (EN.553.626 Introduction to Stochastic Processes);
- optimization (EN.553.761 Nonlinear Optimization I);
- matrix analysis (EN.553.792 Matrix Analysis and Linear Algebra); and
- discrete mathematics (EN.553.671 Combinatorial Analysis EN.553.672 Graph Theory).

Normally, a student will have completed at least eight basic courses by the end of the fourth semester of residence.

Specialized Courses

Each student takes advanced courses appropriate to the proposed area of dissertation research, with the approval of the research advisor.

Elective Courses

Students are encouraged to take additional elective course work, either covering one area in depth or covering two areas. Typical areas in other departments are biology, econometrics, mathematical economics, mathematical ecology, computational geometry, systems theory, health systems, mathematics, facility location, psychometrics, and physics. These courses may complement or supplement the student's previous experience, but if a student has no previous experience in an area some elementary course work may be necessary as a prerequisite to acceptable graduate level courses.