MATHEMATICAL SCIENCES PH.D.

All students must meet the Requirements for the Doctor of Philosophy Degree

OVERVIEW

The Department of Mathematics and Statistics offers programs towards the Doctor of Philosophy in Mathematical Sciences in 3 areas of concentration: applied mathematics, pure mathematics and statistics.

Opportunities for research arise from the research interests of the Department faculty, which include: algebraic geometry, algebraic and computational topology, arithmetic geometry, combinatorics/ graph theory, complex systems, computational social science, logic, mathematical cryptography, network science, number theory, topological data analysis, fluid mechanics, numerical methods for, and analytical theories of, partial differential equations. Research foci in statistics include bioinformatics, classification methods, time series analysis, survival analysis, discriminant analysis, bootstrap methods, categorical data analysis, measurement error models, and experimental design. Opportunities are available for biostatistical research related to problems in agriculture and the life sciences, health and medicine, and natural resources and the environment.

SPECIFIC REQUIREMENTS

Minimum Degree Requirements for the Degree of Doctor of Philosophy

Each student must complete the comprehensive examination and an approved plan of study including at least 75 credits in course work or dissertation research. Students must take, or acquire the knowledge of the content in, both MATH 6441 and MATH 6444 or, alternatively, 2 of MATH 5230, MATH 6230 and MATH 6737. The student is required to write a doctoral dissertation and pass a final oral defense of that dissertation. The department requires 2 semesters of college-teaching experience. There is no formal language requirement.

MASTER'S DEGREE CREDENTIAL: Students who do not have a master's in mathematical science in the track they are pursuing for the doctorate may petition their doctoral Studies Committee and the Graduate College to receive a master's degree during the progression of their doctoral studies. Students must complete the requirements of the course-based option for the master's in the relevant discipline (mathematics, biostatistics or statistics). Students should indicate their intent to pursue the master's degree prior to the second year in the doctoral program to provide appropriate advising for completion of the master's degree requirements. Completion of the requirements for the master's and the petition to the Graduate College to award the master's degree must occur before completion of the final component of the doctoral comprehensive examination.

Comprehensive Examination

PURE AND APPLIED MATHEMATICS TRACKS: The Examination consists of 3 parts: 2 written exams and 1 written survey of the proposed research area accompanied by an oral presentation. Syllabi for these exams are available from the Director of Graduate Studies in Mathematics. All 3 must be satisfactorily completed in order to advance to candidacy. For students with a concentration in Pure Mathematics, 2 3-hour written exams are chosen from among 3 options: real and complex analysis, algebra, and combinatorics. For students with a concentration in Applied Mathematics, 1 three-hour written exam is in numerical analysis and the other 3-hour written exam is in differential equations.

The written survey and accompanying oral presentation should be on a topic chosen by the student in consultation with their Studies Committee. Both must be completed to the satisfaction of the committee in order for this part of the Comprehensive Examination to be passed.

The 2 written examinations must be passed by the middle of the second year in the program. All 3 exams must be passed by the beginning of the third year.

STATISTICS TRACK: The Examination consists of 3 parts, 2 written and 1 oral. They are taken at distinct times and all 3 must be satisfactorily completed in order to advance to candidacy. The first written exam is based on the courses STAT 5230, STAT 5310, and STAT 5510. The first component of the comprehensive exam is typically held 2 weeks after the final exam period in the spring semester. The second written exam is an extensive literature review of a topical area written in the form of a review paper and must be passed by the middle of the second year in the program. The oral exam is scheduled after successful completion of both written exams and must be passed by the beginning of the third year. The oral exam is a presentation of the current state of research in a defined area and proposal for the future work to be conducted.

Requirements for Advancement to Candidacy for the Degree of Doctor of Philosophy

Successful completion of the comprehensive examination.