

MATHEMATICS, PH.D.

The Ph.D degree in mathematics at the University of South Carolina serves to prepare students for professional careers in academic research, college and university teaching, business, industry, and government.

Learning Outcomes

- Students will demonstrate mastery of the core mathematical areas of analysis and either abstract algebra or foundations of computational mathematics. Students will not only master content in these areas, but they will also develop and hone expository skills approaching the level necessary for them to write a dissertation.
- Students will select a research problem or problems in consultation with their dissertation advisor (major professor). Students will then write a dissertation on the results of their research, consisting of publishable contributions that build on the existing literature.
- We expect all students to write cogent and convincing mathematics, using contemporary presentation standards.
- The Department expects graduates to be able to orally communicate sophisticated mathematics at the level of a professional mathematician.
- Students will demonstrate proficient teaching in a variety of settings. These include, for example, serving as a teaching assistant for calculus I or II, or serving as instructor of record for college algebra, pre-calculus, calculus for business and social sciences, finite math, discrete math, calculus I, II, III, or elementary differential equations.

Degree Requirements (60 Post-Baccalaureate Hours)

The PhD is designed to produce a skilled, professional mathematician who is trained to conduct research in mathematics, function effectively as a classroom teacher at the college level, or become a professional practitioner in an industrial, business, government, or national laboratory setting.

Each candidate for the PhD degree is required to complete a minimum of 60 hours of course work beyond the baccalaureate degree, including 12 credit hours of dissertation research and writing (MATH 899). Students are advised by a doctoral committee. This committee is generally chaired by the major professor (dissertation supervisor) and consists of at least four members, one from outside the department. The core members are writers of the student's Comprehensive Exams.

Students pursuing the PhD degree in mathematics are required to take three examinations: the Admission to Candidacy, Comprehensive, and Doctoral Defense Examinations. These examinations are described in detail in the Graduate Handbook.

To complete the program, the student must write a dissertation, under the direction of a member of the graduate faculty, and defend the content of the dissertation in a final examination before the doctoral committee. It is expected that the content of the student's dissertation will be a significant contribution to the body of current research and will be published in a reputable journal.

To ensure breadth of mathematical training, each student is required to satisfactorily complete (B or better) 12 credit hours of course work in subject areas not covered by the Comprehensive Examination. Directed reading courses (MATH 798) may not be used to satisfy this requirement. Particular courses may be stipulated by the student's

doctoral committee. The selection of the courses is subject to approval by the Graduate Director.

Doctor of Philosophy Degree: Concentration in Applied and Computational Mathematics (ACM)

Within the course, exam, and dissertation framework of the PhD, a student may, by selecting courses with some care, complete a program of study with an ACM Concentration; this will be denoted as an "Area of Emphasis" on the final transcript. The concentration is distinguished from the ordinary Ph.D. by three year-long sequences (18 credit hours).

The breadth requirement for the ACM Concentration is the same as for the ordinary PhD (12 credit hours drawn from subjects not covered by the Comprehensive Examination). A well-rounded program of study will normally encompass four different subjects, as listed in the Graduate Handbook. These should be selected in consultation with major professor, doctoral committee, and Graduate Director.