

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

1. 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.
2. 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.
3. We expect all students to write cogent and convincing mathematics, using contemporary presentation standards.
4. The Department expects graduates to be able to orally communicate sophisticated mathematics at the level of a professional mathematician.
5. 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.

Admissions

For admission into the M.S., M.A., M.M., or Ph.D. degree programs, applicants must have a bachelor's degree from an approved institution and should have an undergraduate foundation in mathematics equivalent to that of a major in mathematics at the University of South Carolina. A minimum B (3.0) average in all college-level math courses is required for full admission.

Applicants should submit an official transcript from each school or college previously attended, and at least two letters of recommendation from persons familiar with their abilities in mathematics. Applicants whose native language is not English are also required to submit a satisfactory score on the iBT TOEFL exam. The minimum score for admission to the program is 80. A minimum iBT TOEFL score of 100 is required for consideration for a teaching assistantship.

Application and materials should be submitted online (<http://www.gradschool.sc.edu/apply.html>) or be mailed to:

The Graduate School
University of South Carolina
Columbia, SC 29208

Degree Requirements (60 Post-Baccalaureate Hours)

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Coursework Requirements

I. Credit requirements

- The Graduate School requires Ph.D students to complete a minimum of 60 credits beyond the baccalaureate degree.
- A minimum of 12 of these credits must come from MATH 899, Dissertation preparation.
- Students must take 12 credits beyond the courses covering their qualifying exams and comprehensive exams for breadth.

II. Typical coursework

- Most but not all students will take the following courses as a Ph.D student.
- Four courses on material covered by the qualifying exam: 2 year-long sequences (12 crs.).
- Six courses on material covered by comprehensive exam: 3 year-long sequences (18 crs.).
- Four courses for breadth (12 crs.).
- At most two further elective courses (0 - 6 crs.).
- 12 - 18 credits of MATH 899.
- MATH 791 (Pedagogy I) and MATH 792 (Pedagogy II), 1 credit each. It is necessary for students to pass these courses in order to qualify to be the instructor of record for lower division courses (e.g., MATH 111, MATH 115, MATH 122, MATH 170) in the Department.

Examination Requirements

1. Qualifying Exam

A. Structure

The Ph.D. qualifying exam consists of two four-hour written exams. The Department offers these exams two times per year, once in August, and once in January.

B. Coverage

Students take exams on two year-long course sequences:

Analysis: MATH 703 and MATH 704.

either of

a. Algebra: MATH 701 and MATH 702.

b. Applied and Computational Math: MATH 708 and MATH 709.

C. Rules

Number of attempts. A student gets at most two attempts per exam on two exams. (A student does not get two attempts on each of the three exams.)

Standard exam schedule.

A student's first attempt on both exams should take place on or before August of the start of the second year.

A student's second attempt at one or both exams, if necessary, must take place on or before January of the second year.

A student with exceptional preparation may make a first attempt on one or both exams on entrance (August of the first year) or in January of the first year.

A student may attempt the qualifying exam without having taken corresponding

preparatory coursework.

A student must pass both exams within two years of admission to the Ph.D program. Hence, the last opportunity to take exams is January of the second year.

The exams are uncoupled. If a student chooses to attempt only one exam in a given exam period, the student does not forfeit an attempt on the exam that they did not take.

2. Comprehensive Exam

The Ph.D comprehensive examination is an in-depth examination consisting of

written and oral parts. There are two options for the exam, Options I and II, explained below.

A. Structure

(a) Option I.

The written part consists of 3 four-hour exams. The exams are offered two times per year, once in August, and once in January.

The oral part is scheduled for two hours.

(b) Option II.

i. Written part. The student is required to write a document on an advanced topic in the student's research area, chosen in consultation with, and approved by, their advisor. The document must address the student's research plans.

ii. Oral part. The oral part consists of a short (30 - 45 minute) presentation summarizing the document produced for the written part of the exam. After the presentation, the Committee will ask questions designed to ascertain the student's readiness to carry out research in the student's specialty area.

B. Rules

Committee: The Comprehensive Exam Committee must have at least four faculty, exactly one of which must be from an external unit.

Number of attempts. A student gets at most two attempts to pass the comprehensive exam.

Standard exam schedule.

Typically, a student's first attempt takes place in August after the second year. The first attempt must take place by August after the third year.

A student's second attempt must occur within one year of the first attempt.

Dissertation requirement

The doctoral dissertation is the ultimate requirement for a student to earn the Ph.D degree. The dissertation should be original work which contributes significantly to the body of current research and which has the potential for publication in a reputable journal. The Dissertation Committee has the same requirements as the Comprehensive Exam Committee. While these committees do not have to be the same, they frequently are. The final requirement is the student's defense of the dissertation in an examination before the Dissertation Committee.