

Clemson University
Mathematical Sciences Ph.D. Program

Clemson University has pioneered the concept of integrating the areas of the mathematical sciences (algebra/combinatorics, analysis, computational mathematics, operations research and statistics/probability) into a balanced educational program. The Ph.D. degree structures the five areas of the mathematical sciences into three disciplines: applied and computational analysis (continuous modeling), discrete mathematics (discrete modeling) and statistics and probability (stochastic modeling). Ph.D. students may pursue their interests in any area of the mathematical sciences by choosing one of these disciplines. Doctoral research within each discipline may range from topics having a strong emphasis on modeling to those that are purely theoretical. All graduate students have a significant exposure to modeling throughout the curriculum. The department believes that a generous exposure to modeling is valuable for all students as preparation for academic as well as industrial careers.

Students are admitted to candidacy for the Ph.D. degree upon successful completion of the preliminary examination and the comprehensive examination. The preliminary examination consists of three tests chosen from any of the areas of algebra, analysis, computing, operations research, statistics or stochastic processes. The comprehensive examination assesses the student's readiness to perform independent research and competency in advanced graduate material. After completion of the thesis, a final oral examination is administered by the advisory committee.

Guidelines

- (1) The composition of the candidate's Ph.D. advisory committee should reflect the breadth and interdisciplinary nature of the department's doctoral program.
- (2) The plan of study should include at least two graduate courses in each of the five areas: algebra/combinatorics, analysis, computational mathematics, operations research and statistics/probability.
- (3) The plan of study should include twenty or more 800 or 900 level graduate courses constructed to give depth to the student's concentration area and to supporting secondary area. Here area refers to those listed in (2).
- (4) Normally, students should begin to participate in seminars and pursue independent research no later than the third year of graduate studies.

If these guidelines are not met, the Director of Graduate Studies will discuss the student's plan of study with the student's advisor and with the Graduate Affairs Committee.

Mathematical Sciences Ph.D. Examinations

The Ph.D. qualifying examination consists of two parts:

Preliminary: This examination covers material essential to research in the mathematical sciences and it is administered by the Graduate Affairs Committee. Students are encouraged to take preliminary exams as soon as the required course work is completed. Examinations will be given in mid July and early January of each year. Students entering the PhD program with a Masters (Bachelors) Degree in mathematical sciences or equivalent must pass all three exams within two (three) calendar years of full-time enrollment in the PhD program. A student who has not passed three exams within the specified time limits or has failed more than three attempted exams will be dropped from the Ph.D. program. Each student is required to pass three of the following six exams:

Algebra	Analysis
Computational Mathematics	Statistics
Operations Research	Stochastic Processes

An outline of topics to be covered in each is available upon request. Relevant coursework is as follows:

MthSc 860, 865 – Computational Mathematics	MthSc 851, 853 – Algebra
MthSc 813, 814 – Mathematical Programming	MthSc 821, 822 – Analysis
MthSc 803, 817 – Stochastic Processes	MthSc 801, 881 – Statistics

A student is granted the opportunity to retake any failed exam when it is next offered. A student may choose exams from any subjects except those for which exams have already been passed.

Comprehensive: This examination may be oral and/or written and is constructed by the student's Ph.D. committee. It serves three purposes:

- (1) to assess the student's readiness to perform independent research;
- (2) to assess the student's competency in advanced graduate material relevant to the student's research area;
- (3) to provide a forum for members of the committee to learn about and provide input into the student's proposed research program.

A thesis proposal is not a required part of the comprehensive examination, although such a proposal is frequently included in the examination. The primary objective of the examination is to assess the student's readiness for doctoral research. The student's entire committee should determine the nature of the examination.

The Graduate School requires that a student have an advisory committee and file a plan of study (GS2) prior to his/her comprehensive examination. The advisory committee is required to notify the Graduate School of a pass or fail within three weeks of the examination. In the event of failure, the advisory committee may recommend a second attempt. Failure of a second examination precludes the student from receiving a Ph.D. degree from Clemson University in Mathematical Sciences. Once the comprehensive examination is passed, the Graduate School will formally admit the student to candidacy for the Ph.D. degree. The comprehensive exam must be passed within two semesters of completing preliminary exams.

Degree Progress

Full time Ph.D. students are expected to complete all degree requirements within five years of graduate study at Clemson (three years if MS in mathematical sciences obtained prior to enrollment). In order to meet this expectation, some preliminary exams and the comprehensive exam may have to be taken concurrently rather than sequentially.

A student not making satisfactory progress toward a degree as outlined by these guidelines is in jeopardy of losing departmental support or being dropped from the doctoral program. A student must petition the Graduate Affairs Committee in order to relax these guidelines.