

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 (not including MthSC 800) 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 part of the examination covers foundation material necessary for a Ph.D. in the mathematical sciences. It is made up of tests in three subjects of the

mathematical sciences and will be administered by the Graduate Affairs Committee. Normally, students will take this part of the examination shortly after completing their master's degree. Each student is required to pass tests in three of the following subjects:

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| 1) Algebra | 4) Operations Research |
| 2) Analysis | 5) Statistics |
| 3) Computational Mathematics | 6) Stochastic Processes |

An outline of topics to be covered in each of these subjects is available upon request.

Courses which help prepare a student for the Preliminary Examination are as follows:

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| 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 will be given a second opportunity to pass any failed tests and has the option to choose tests from any subjects except those for which tests have already been passed.

Second attempts must be taken at the next regularly scheduled offering of the tests.

Ordinarily, a student who has not passed three tests after the second attempt will be dropped from the Ph.D. program. However, a student may petition the Graduate Affairs committee for permission to re-take the examination. Conditions for a re-examination will be set by the Graduate Affairs committee. Such conditions will typically include the date and subjects for the re-examination and a recommendation relative to continued departmental support prior to the re-examination.

Comprehensive: This examination is required by the Graduate School. It may be oral and/or written and will be constructed by the student's Ph.D. advisory 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 form of the examination.

The Graduate School requires that the student have an advisory committee and file a plan of study (GS2) prior to this examination. The advisory committee is required to notify the Graduate School of the results of the examination within three weeks of its completion. In the event of failure, the advisory committee can recommend that a second examination be given. Failure of a second examination precludes the student from receiving the Ph.D. degree from Clemson University. After passing the examination, the Graduate School will formally admit the student to candidacy for the Ph.D. degree. The exam must be passed at least six months prior to the expected Ph.D. graduation date.

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 obtained prior to enrollment at Clemson). In order to meet this expectation the following guidelines should be followed. Full-time Ph.D. students are expected to take the preliminary exams at the end of 5 semesters of graduate study (two semesters if MS obtained prior to enrollment at Clemson). A Ph.D. advisor and committee should be determined and the GS2 filed at the end of six semesters (two semesters if MS received prior to enrollment at Clemson). The Ph.D. comprehensive

exam should be completed by the end of seven semesters (three semesters if MS received prior to enrollment at Clemson).

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.