The PhD degree in Mathematics is intended as a research degree and is awarded based on scholarly proficiency (as demonstrated by course work and the Qualifying Examination) and the ability to conduct independent, original research (demonstrated by the PhD dissertation).

Admissions

The Doctor of Philosophy degree in Mathematics is intended as a research degree and is awarded based on scholarly proficiency (as demonstrated by course work and the Qualifying Examination) and the ability to conduct independent, original research (demonstrated by the PhD dissertation).

In addition to the minimum Graduate School admission requirements, to be considered for regular admission an application must include:

- A resume/CV
- 3 letters of recommendation.

Scores on the general test of the GRE are optional. We encourage applicants to submit GRE scores if they think doing so will boost their chance of getting admitted. However, applications with and without GRE scores will both get full consideration.

See the Admission Criteria section of this catalog for more information.

Curricular Requirements

Students must complete 48 credit hours in order with a minimum of 39 hours in Mathematics. The following courses do not count toward this requirement:

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- MAT, W/Applictn I: MATH 504 Topics Mod Math Teachers, MATH 505 Geometry.
- Secondary Teachers, MATH 508 Topics In Algebra, MATH 551 Math Stats W/Applictn I, MATH 552 Math Stats W/Applictn II, MATH 570 Prin Modern Algebra I, MATH 572 Linear Algebra MATH 586 Intro Real Analysis I, and MATH 587 Intro to Real Analysis II

Most of the courses required for a Master's Degree, but not all, are part of the approved collection. In consultation with the student's dissertation advisor, the Graduate Program Director must approve the student's program of study. Study plans for students wishing to focus in Algebra, Analysis, Scientific Computing/PDE, Topology, Math Education, or Optimization can be found in the student handbook.

The following core course requirements must be completed: One course with grade of B or better from each of the following two categories representing Pure and Applied areas respectively, and three two-course sequences.

Category 1: Pure (Choose 1)

- MATH 571 Prin Modern Algebra II
- MATH 573 Abstract Algebra I
- MATH 674 Abstract Algebra II
- MATH 580 Real Analysis I
- MATH 681 Real Analysis II
- MATH 565 Intro General Topology
- MATH 566 Intro Algebraic Topology

Category 2: Applied (Choose 1)

- MATH 510 Numerical Linear Algebra
- MATH 511 Numerical Analysis I
- MATH 512 Numerical Analysis II
- MATH 520 Linear Optimization Theory
- MATH 521 Non-Linear Optimization Theory

Total Hours: 72

Transfer Credit

See the Graduate School policy.

Doctoral Plan of Study Requirement

See the Graduate School Policy on the Doctoral plan of study.

Comprehensive Exams

PhD students must pass two qualifying exams from five subjects: Algebra; Topology; Real Analysis; Numerical Analysis and Partial Differential Equations within three exam sessions by the beginning of
their seventh semester in order to remain in the PhD program. Exams are given twice a year, during the week before the fall and the spring semesters begin, lasting four hours each. Students may take one qualifying exam at a time, until they have passed two subject areas within three exam sessions and the specified time limit. A student may not fail any qualifying exam more than twice. If a student takes a given exam and fails, and then chooses a different exam (e.g., replacing the analysis exam with the PDEs exam), the first exam failure will still count. If a dispute arises, the final interpretation of the exam scores will be made by the Graduate Program Committee.

Each exam is written and graded by a committee consisting of at least two faculty members selected by the Chair in consultation with the graduate program committee (GPC) in the subject area of the exam. After the qualifying exam is graded, the exam committee makes a recommendation of a grade of Fail or to the GPC and the Graduate Director. The GPC will have the final authority to assign the grade, which is then conveyed to each student by the Graduate Director.

Admission to Candidacy Requirements
Advancing to candidacy requires the passing of the qualifying examination, the completion of all the coursework as listed on the approved plan of study, and the approval of the dissertation subject by the supervisory dissertation committee.

Continuous Enrollment Policy
See the Graduate School policy.

Dissertation Requirements
See the Graduate School policy.

Time Limits for Degree Completion Requirements
See the Graduate School policy.

Student Progress Requirement
The following is an acceptable progress toward a PhD in Mathematics.

- 1st Year – Satisfy the Preliminary Test Requirements, maintain a 3.00 GPA or higher, and take 3 courses per semester.
- 2nd Year – Complete three of the 2-course PhD sequences and core courses with a satisfactory GPA and pass two qualifying exams.
- 3rd Year – Maintain a satisfactory GPA, apply for candidacy, form a Supervisory Committee by the middle of the 3rd year, do a research proposal presentation, obtain approval of the research proposal from the Supervisory Committee and begin dissertation research. Although optional, it is recommended that one of the Committee members be from outside the Department of Mathematics.
- 4th Year – Complete the 48 hours with a satisfactory GPA, submit the Plan of Study to the graduate school, and form a Dissertation Committee by the end of the fourth year. One of the Committee members must be from outside the Department of Mathematics.
- 5th Year – Check the student deadlines from the graduate school’s website. At least one month before the deadline for submission of the dissertation to the graduate school, students must distribute a hardcopy of their dissertation to committee members, and the defense needs to be scheduled to give students at least one week to make corrections.
- Provided satisfactory progress towards the PhD is being made, a student’s advisor may request an extension for a 6th year of support.

This request must be made before the end of the semester before the last semester of funding.

Students required to take the Master’s sequences in Real Analysis (MATH 586 and MATH 587) and in Linear Algebra (MATH 572 and MATH 510 or MATH 570) will be given additional time to satisfy the milestones listed above.

Additional Academic Requirements

Preliminary Test Requirement
All first year PhD students are required to take two preliminary tests (PT), one in Real Analysis and the other in Linear Algebra. These tests take place the week before the start of the fall semester in August. Each test is either assigned a passing or a failing grade. A comprehensive description of all possible outcomes is given below.

- Passing both PTs allows students to take any of the PhD core sequences provided the course prerequisites are satisfied. See the graduate catalog for the latter.
- If students fail the Linear Algebra PT, they must take the MATH 572 Linear Algebra course in the fall and obtain at least a grade of B. Otherwise, the Linear Algebra PT must be retaken the following August.
- If students fail the Real Analysis PT, they must take the MATH 586 Intro Real Analysis I course in the fall and MATH 587 Intro to Real Analysis II course in the spring and obtain at least a grade of B in both courses. Otherwise, the Real Analysis PT must be retaken the following August.
- If students fail one of the PTs for a second time, they will not be able to continue in the PhD program and would have to transfer to the Master’s program.

Note that students entering the PhD program in the spring will have to take the preliminary tests in August.

Academic Misconduct Information
See the Graduate School Policy.

Withdrawals and Leave of Absence Information
See the Graduate School Policy.

Academic Grievances Information
See the Graduate School Policy.

Scholastic Requirements
See the Graduate School Policy.

Graduate School Deadlines Information
See the Graduate School Deadlines.

Application for Graduation Information
See the Graduate School Policy on application for graduation.