MATHEMATICS

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (https://gradschool.psu.edu/graduate-education-policies/)

For the M.A. degree the department offers two tracks:

1. the thesis track requires 12 credits of approved 500-series or 600-series courses in mathematics, 6 to 9 credits of thesis, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a final oral examination based on the thesis and general course material; and
2. the nonthesis track requires 18 credits of 500-series courses in mathematics, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a term paper on an approved topic in mathematics. No final examination is given in this tracks.

For both tracks, a grade of A or B is required in all courses.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (https://gradschool.psu.edu/graduate-education-policies/)

All doctoral students are required to pass a single multi-part examination that is composed of three written qualifying examinations and the completion of one required course with a grade of A- or better. All qualifying exams and the course must be completed by the end of students' third semester (excluding summer sessions) of entry into the doctoral program.

-The real analysis qualifying exam is mandatory for all students.

-Students will choose one of the following qualifying exams: linear algebra or abstract algebra.

-Students will choose one of the following qualifying exams: functional analysis or topology

- Students will choose and pass with a grade of A- or better one of the following courses: Complex Analysis (MATH 502), Differential Manifolds (MATH 528), Mathematical Logic (MATH 557), Algebraic Number Theory I (MATH 567), Numerical Analysis I (MATH 523), PDE 2 (MATH 514). This list may be modified after approval by the graduate studies committee of the program.

• **Optional route:** students may choose to take both the functional analysis and topology qualifying exams, and not be required to complete the course requirement above.

Qualifying examinations are offered twice a year: in May, after the end of the Spring semester and in December/January, after the end of the Fall semester. The corresponding semester-long graduate-level courses that prepare for these qualifying exams are offered every year: Linear algebra (MATH 535), Abstract algebra (MATH 536), Real analysis (MATH 501) in the Fall semesters, and Functional analysis (MATH 503) and Topology (MATH 527) in the Spring semesters.

The other courses are offered at least once every two years. They are required to have a final exam, and their final grade must be based at least for 60% on written tests (quizzes, midterm, final exam).

After passing all three qualifying exams and the course, students are expected to select a dissertation adviser and form a Ph.D. committee. The committee administers the comprehensive exam (no later than the end of the sixth semester of study) and offers counsel to the student as their research progresses.

In addition to the qualifying examination, Ph.D. degree requirements include successful completion of the following: English competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Fox Graduate School.