

DOCTOR OF PHILOSOPHY IN NATURAL SCIENCES: MATHEMATICS

Student Learning Outcomes

Students graduating from this program will:

As part of the Natural Sciences Ph.D. program, students in a primary discipline of Mathematics must meet the minimum Ph.D. program requirements. These can be found within the main program page (<https://catalog.umkc.edu/colleges-schools/graduate-studies/phd-programs/>) and subsequent requirement pages.

Mathematics

Please see the School of Graduate Studies web page (<https://sgs.umkc.edu/academics/nat-sci-coordinators.html>) for the contact information for the discipline Coordinator. To view all doctoral and graduate faculty in Mathematics, see this web page (<https://sgs.umkc.edu/faculty-and-staff/doctoral-graduate-faculty-lists.html>).

Admission Requirements

Applicants must meet both the general and the discipline-specific criteria for admission and be recommended for admission by the faculty review group. Upon approval by the graduate dean, students are admitted to the School of Graduate Studies.

Please see the website (<https://sgs.umkc.edu/admissions/natural-sciences-apply.html>) for updated application deadlines.

Primary Discipline

For full admission, an applicant should have a bachelor's degree or a master's degree in mathematics/statistics (or equivalent) from an accredited college or university. Applicants who do not have a master's degree are expected to provide strong evidence of academic ability and research capability. GRE General score submission is not required, but is recommended.

A student who is admitted to the Ph.D. program while having not completed all of the qualifying/pre-requisite coursework as described below must complete the missing courses with a GPA of 3.0 or better to be deemed qualified to continue in the Ph.D. program.

Secondary Discipline

For full admission, an applicant should have a bachelor's degree in mathematics/statistics from an accredited college or university, or a bachelor's degree in another subject including evidence of a strong performance in at least three mathematics courses beyond Calculus I, II, and III.

Applicants may be provisionally admitted if the above conditions are not fully satisfied at the time of application.

Qualifying Coursework Requirements

Students in Mathematics and Statistics emphases have differing Qualifying coursework, which must be completed prior to the core coursework and may have been previously completed in a different degree program

Qualifying courses for Mathematics:

Code	Title	Credits
MATH 5509	Algebra I	3
MATH 5510	Complex Variables I	3
MATH 5513	Real Variables I	3
MATH 5521	Differential Equations	3
MATH 5532	Numerical Linear Algebra	3

Qualifying courses for Statistics:

Code	Title	Credits
MATH 5513	Real Variables I	3
STAT 5501	Statistical Design Of Experiments	3
STAT 5537	Mathematical Statistics I	3
STAT 5547	Mathematical Statistics II	3
STAT 5551	Applied Statistical Analysis	3
STAT 5565	Regression Analysis	3
STAT 5572	Multivariate Analysis	3

Core Coursework Requirements

Students with a Mathematics primary discipline will complete a minimum of 42 credit hours for the degree. This includes at least 12 credit hours in the primary discipline, 9 hours outside the primary discipline (decided in consultation between the student and primary advisor), 9 credit hours of electives, and at least 12 hours of dissertation credit in the primary discipline.

Primary Discipline

Mathematics focus:

Code	Title	Credits
A minimum of 12 credit hours of coursework, completed with at least a B (3.0) average.		12
MATH 5519	Algebra II	
MATH 5523	Real Variables II	
MATH 5542	Advanced Numerical Analysis	
STAT 5576	Probability	
or STAT 5578	Advanced Mathematical Statistics	
or STAT 5588	Theory of Linear Model	
Coursework Outside of Primary Discipline (either in designated secondary discipline or multiple other disciplines) ¹		9
Electives (coursework can be from any discipline)		9
Dissertation		12
Total Credits		42

Statistics focus:

Code	Title	Credits
A minimum of 12 credit hours of coursework, completed with at least a B (3.0) average.		12
STAT 5576	Probability	
STAT 5578	Advanced Mathematical Statistics	
STAT 5588	Theory of Linear Model	
MATH 5519	Algebra II	
or MATH 5523	Real Variables II	
or MATH 5542	Advanced Numerical Analysis	
Coursework Outside of Primary Discipline (either in designated secondary discipline or multiple other disciplines) ¹		9
Electives (coursework can be from any discipline)		9
Dissertation		12
Total Credits		42

Total Credit Hours: 42

¹ Minimum of 9 hours with possibility of more required. Decided in consultation with primary advisor.

Secondary Discipline

Students with a Mathematics secondary discipline will complete a minimum of 9 credit hours in the discipline.

Code	Title	Credits
At least 9 hours of graduate coursework in Mathematics or Statistics, with at least a B (3.0) average. Up to 3 hours may be at the 400-level.		9
Total Credits		9

Qualifying Exams

Within a year of completing the doctoral Core Coursework, Ph.D. students with a primary discipline in Mathematics are required to complete qualifying examinations. The written examinations for either focus are based on two of the three doctoral core courses.

- For the Mathematics focus, the written examinations are based on two of the following Doctoral Core Courses: MATH 5519 (<https://catalog.umkc.edu/search/?P=MATH%205519>), MATH 5523 (<https://catalog.umkc.edu/search/?P=MATH%205523>), and MATH 5542 (<https://catalog.umkc.edu/search/?P=MATH%205542>).
- For the Statistics focus, the written examinations are based on two of the following Doctoral Core Courses: STAT 5576 (<https://catalog.umkc.edu/search/?P=STAT%205576>), STAT 5578 (<https://catalog.umkc.edu/search/?P=STAT%205578>), and STAT 5588 (<https://catalog.umkc.edu/search/?P=STAT%205588>).
- The student may take one written examination from the opposite focus if the supervisory committee deems it in the best interest of the student's Plan of Study.

- If a student fails either one or more qualifying exams on the first attempt, they may retake the failed exam(s) at the beginning of the subsequent semester. If the student fails the qualifying examination(s) a second time, they will be terminated from the program.

Comprehensive Examinations

Following the completion of the qualifying examinations, the student is deemed fully qualified to carry out doctoral-level research. At this stage, the student begins his or her doctoral research. Within two years of successful completion of the qualifying examination, the student is required to complete the Ph.D. Comprehensive Examination. The Comprehensive Exam consists of submitting a fully developed proposal of the Ph.D. research topic, together with an oral presentation to the student's full Ph.D. committee. The exact timing and topic of this written and oral comprehensive exam will be determined by the student and their supervisory committee.

Dissertation and Final Oral Examination

Within two years of admission to Candidacy, the student is required to have completed the necessary research and writing to form the Dissertation. Once this is complete, the student must complete the Final Oral Examination. The Final Oral Examination is a two-hour discussion with the student and the supervisory committee. The student must prepare a presentation that outlines the content of the dissertation. The presentation is a public event, so anyone is free to attend. Following the completion of the presentation, a closed-door session with the student and the Supervisory Committee is held in which the Candidate fields questions and comments regarding the content of the Dissertation. Following successful completion of the Final Oral Examination, the committee will make recommendations for revisions to the dissertation, and the Candidate is required to address these recommendations in order to complete the Ph.D.

Other Requirements

All Ph.D. students with Mathematics as the primary discipline are required to attend the department graduate seminar at least five times per semester. Those who cannot fulfill this requirement must contact the graduate seminar coordinator.

The student must satisfy all requirements set forth by the School of Graduate Studies.