

MATHEMATICS (PH.D.)

Admission to this program is contingent upon admission to the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/admission/>). Doctoral applicants must have completed a master's degree in mathematics or reached an equivalent level of advancement. The Department Graduate Committee may make exceptions to this rule in cases where unusual ability has been demonstrated. Admission to the doctoral program will be granted only to those whose records indicate an ability to succeed in advanced study and research. Applicants are admitted for the fall term only. All applications require a statement of purpose and three letters of recommendation. View the Mathematics Department website (<https://clas.wayne.edu/math/admissions/>) for additional admissions information.

All applicants for the degree of Doctor of Philosophy with a major in mathematics are urged first to study the general doctoral degree requirements (<http://bulletins.wayne.edu/graduate/general-information/degree-certificate-requirements/#doctoraldegreesphdtext>) and to plan their programs so that all those requirements are fulfilled in the proper order and at the proper times. On the next tab are the major steps in earning this degree. Specific requirements of the Mathematics Department are included.

Candidates for the doctoral degree must complete ninety credits in course work beyond the bachelor's degree, including thirty credits of dissertation direction. Specific requirements for this degree in mathematics are as follows:

Qualifying Examinations: These are two-hour written examinations covering undergraduate level material from a sophisticated point of view. Students are required to pass a qualifying exam in Algebra or Analysis, as well as one additional exam from the following four choices:

- Algebra
- Analysis
- Applied Mathematics
- Probability and Statistics

Students may choose to take exams in any of their first three semesters in the Ph.D. program, in which case they must have passed both exams by the end of the following semester (this allows for at most one retake of a failed exam). Students must select their exam areas at the beginning of each semester. If a first semester student wishes to take the Qualifying exams during their first semester, they must select their exam areas before the beginning of the first semester.

Under special circumstances, the Departmental Graduate Committee may approve petitions on an individual basis for exceptions to these rules. In the possible exceptions, every student still needs to fulfill the requirements by the end of the second year in the Ph.D. program.

Course Requirements: Before advancement to candidacy: every student in the Ph.D. program must show competency in five core areas of mathematics (Algebra, Analysis, Applied Mathematics, Probability/Statistics, and Topology) by both passing two Qualifying Examinations as explained above, and by earning a grade of 'B' or better in one course in each of the three subject areas in which they do not take a Qualifying Examination. The courses may be selected from the following choices:

| Code | Title | Credits |
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| MAT 7400 | Advanced Algebra I (Subject: Algebra) | 3 |
| MAT 7600 | Real Analysis I (Subject: Analysis) | 3 |
| MAT 7200 | Ordinary Differential Equations (Subject: Applied Mathematics) | 3 |

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| or MAT 7210 | Partial Differential Equations | |
| MAT 7700 | Advanced Probability Theory I (Subject: Probability and Statistics) | 3 |
| or STA 7810 | Advanced Statistics Theory I | |
| MAT 7500 | Topology II (Subject: Topology) | 3 |
| or MAT 7510 | Algebraic Topology I | |

As a general rule, students are expected to take at least one required course each semester until they fulfill their course requirements. Under special circumstances, the Departmental Graduate Committee may approve petitions on an individual basis for exceptions to these rules.

Dissertation Prospectus: PhD students are required to give a presentation to their thesis committee no later than three and a half years into their PhD program. The presentation should include the student's thesis project and any progress up to date. The advisor and the thesis committee should make a decision whether the student should move forward to her/his thesis project or is not ready for the thesis project. The decision and any other feedback should be sent back to the student in a timely manner. In the case the thesis committee believes the student is not ready for the thesis project, it may advise the student to leave the Ph.D. program or to make a second try. In the case the student is advised to make a second try, the second chance should take place by the end of the fourth year into the student's PhD program.

Dissertation: The thirty-credit dissertation registration requirement is fulfilled by registering for the courses MAT 9991, MAT 9992, MAT 9993, and MAT 9994 (Doctoral Dissertation Research and Direction I, II, III, and IV, respectively), in consecutive academic year semesters.

Defense of Dissertation: Candidates must pass a final oral examination covering their research after the candidate's advisor has approved the completed dissertation.

Academic Scholarship: All course work must be completed in accordance with the regulations of the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/academic-regulations/>) and the College of Liberal Arts and Sciences (<http://bulletins.wayne.edu/graduate/college-liberal-arts-sciences/academic-regulations/>).