

# PH.D. IN MATHEMATICS

<http://www.math.miami.edu/>

## Overview

The Department of Mathematics offers a program leading to the Doctor of Philosophy (Ph.D.) degree. The Ph. D. program requires advanced course work, three qualifying exams (one of which can be a special topic of the student's choice), a language exam, and a dissertation.

The dissertation can be in any area within the broad expertise of the faculty, including:

- Algebraic Combinatorics
- Algebraic Geometry and the Mathematics of String Theory
- Differential Equations and Dynamical Systems
- Differential Geometry and General Relativity
- Mathematical Biology
- Stochastic Processes and Mathematical Finance
- Topology and Gauge Theory

<https://www.math.miami.edu/graduate/phd-program-timeline/>

## Curriculum Requirements

The following requirements are in addition to the general requirements for the Doctor of Philosophy Degree as described by the Graduate School.

Code	Title	Credit Hours
<b>Required Courses</b>		
MTH 733 & MTH 734	Real Variables and Real Variables	6
MTH 735 & MTH 736	Complex Variables and Complex Variables	6
MTH 741 & MTH 742	Algebraic Topology and Algebraic Topology	6
MTH 761 & MTH 762	Abstract Algebra I and Abstract Algebra II	6
MTH 700 level and higher		12
Preliminary and three written qualifying exams must be passed. Of these written exams, two must be from the above basic sequences; the other may be another from the basic sequences or in the candidate's area of specialty		
A proficiency in one of the languages French, German, or Russian must be demonstrated.		
Additional Courses		12
<b>Dissertation</b>		<b>12</b>
MTH 830	Pre-Candidacy Doctoral Dissertation	
MTH 840	Post-Candidacy Doctoral Dissertation	
MTH 845	Research in Residence	
<b>Total Credit Hours</b>		<b>60</b>

## Mission

The Doctor of Philosophy degree is the highest degree attainable in mathematics. The objective of this degree program is to prepare students for careers in mathematical research. Each student in the program must successfully complete a substantial number of advanced mathematics courses and attain expertise in a specific area of specialization. Under the guidance of a faculty advisor, the student must produce significant original research and must present it in the form of a dissertation that is approved by a supervisory committee.

## Student Learning Outcomes

- Students will demonstrate proficiency in the fundamentals of at least two of the following broad subdivisions of mathematics: algebra, topology and analysis .

- Students will demonstrate a deep understanding of the following four core areas of mathematics: abstract algebra, algebraic topology, real analysis, and complex analysis.
- Students will demonstrate readiness for conducting original research.
- Students will produce and defend a dissertation based on his/her research, and the student will have the skills to effectively communicate mathematical ideas pertaining to that research both orally and in writing.