Mathematics M.A.

Mathematics Major

The M.A. major in Mathematics is available in four emphases: Mathematics, Secondary Teaching, Community College Teaching, and Actuarial Science.

Only graduate courses (course numbers 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.

The Mathematics emphasis is available on the **thesis** and **non-thesis** options. A **minimum of 36 hours** is required for the **thesis** option, including 6 hours of MATH 6299 and a **minimum of 15 additional hours of 6000-level course work.** A **minimum of 33 hours** is required for the **non-thesis** option, including a minimum of 3 hours of MATH 6299 and a **minimum of 15 additional hours of 6000-level course work.**

The Secondary Teaching emphasis is offered on a **non-thesis** option only; a **minimum of 30 hours,** including a **minimum of 18 hours of 6000-level course work** is required.

The Community College Teaching emphasis is offered on a **non-thesis** option only; **a minimum of 30 hours**, including a **minimum of 15 hours of 6000-level course work** is required.

The Actuarial Science emphasis is offered on a **non-thesis** option only; a **minimum of 30 hours**, including a **minimum of 12 hours of 6000-level course work** is required.

Students interested in this program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNIverse Student Center To-Do list or contact the Department of Mathematics for other application requirements. Graduate information and application for graduate admission can be found at https://admissions.uni.edu/application.

The Graduate Record Examination (General Test) **is not** required for admission to the program.

Courses taken to satisfy B.A. requirements may not be repeated to count toward the graduate program.

Successful completion of a final written comprehensive examination is required for the **non-thesis option on the Mathematics and Actuarial Science emphases only**.

Mathematics Emphasis

Required		
Mathematics:		
MATH 3630/5630	Differential Geometry	3
or MATH 4615/5615	Geometric Transformations	
MATH 6420	Mathematical Analysis I	3
MATH 6460	Complex Analysis I	3
MATH 6500	Abstract Algebra I	3
Select at least two of the following:		6
MATH 6421	Mathematical Analysis II	
MATH 6461	Complex Analysis II	
MATH 6501	Abstract Algebra II	
Research:		3 or 6
MATH 6299	Research	
Thesis option (6 hours)		
Non-thesis option (3 hours)		
Electives		**12**
Mathematics:		
Select 12 hours from any of the courses listed above that were not used for the requirements there or from among the following:		
ACT SCI 4739/5739	Topics in Actuarial Science	
MATH 3425/5425	Differential Equations	
MATH 3430/5430	Partial Differential Equations	
MATH 3440/5440	Numerical Analysis	
MATH 3530	Combinatorics	
MATH 3640/5640	History of Mathematics	
MATH/STAT 3752	Introduction to Probability	
MATH 4421/5421	Advanced Calculus II	
MATH 4460/5460	Introduction to Complex Analysis	
MATH 4501/5501	Modern Algebra II	
MATH 4641/5641	Topology I	
MATH 6510	Theory of Numbers	
MATH 6640	Topics in the History of Mathematics	
MATH 6650	Topics in Mathematical Logic and Set Theory	
MATH 6779	Topics in Probability and Statistics	
STAT 3775/5775	Introduction to Mathematical Statistics	
STAT 3776/5776	Regression Analysis	
STAT 4777/5777	Statistical Quality Assurance Methods	
STAT 4779/5779	Applied Multivariate Statistical Analysis	
Total hours thesis option		36
Total hours non-thesis option		33

Secondary Teaching Emphasis

The Secondary Teaching emphasis is designed for secondary school mathematics teachers interested in developing a deeper background in mathematics and pedagogy to enhance teaching and increase student learning.

Required		
Mathematics Education:		
MATH 6201	Foundations of Mathematics Education	3
MATH 6381	Current Research in Mathematics Education	3

MATH 6209	Mathematics Curriculum and Assessment	3
MATH 6225	Teaching and Learning Mathematics	3
MATH 6236	Equity and Mathematics Education	3
Mathematics:		
MATH 6371	Probability and Statistical Inference	3
MATH 6370	Applied Linear Statistical Methods	3
Select one course from the following:		
MATH 6212	Foundations of Algebraic Reasoning	3
or MATH 6504	Advanced Linear Algebra	
Select One Course from the Following:		
MATH 6215	Foundations of Geometric Reasoning	3
or MATH 6670	Non-Euclidean Geometry	
Select One Course from the Following:		
MATH 6410	Foundations of Calculus	3
or MATH 6205	Teaching Rational Numbers and Proportionality	
Total Hours		**30**

Community College Teaching Emphasis

The Community College Teaching emphasis is designed to serve those seeking to prepare for a career in community college teaching or working professionals in the field who are seeking career advancement.

Required:		
Mathematics Education:		
MATH 6201	Foundations of Mathematics Education	3
MATH 6225	Teaching and Learning Mathematics	3
MATH 6236	Equity and Mathematics Education	3
MATH 6209	Mathematics Curriculum and Assessment	3
Mathematics:		
MATH 6504	Advanced Linear Algebra	3
MATH 6520	Complex Functions and Solving Polynomial Equations	3
MATH 6370	Applied Linear Statistical Methods	3
MATH 6371	Probability and Statistical Inference	3
MATH 6410	Foundations of Calculus	3
MATH 6670	Non-Euclidean Geometry	3
Total Hours		**30**

Actuarial Science Emphasis

Required		
ACT SCI 5735	Actuarial Mathematics	3
ACT SCI 5788	Loss Models	3
ACT SCI 6784	Predictive Analytics in Insurance I	3
ACT SCI 6785	Predictive Analytics in Insurance II	3
STAT 5784	Introduction to Machine Learning	3
STAT 4786/5786	Statistics for Risk Modeling	3
Select One Course from the Following:		3
ACT SCI 6735	Advanced Actuarial Mathematics	
or ACT SCI 6788	Advanced Loss Models	
Electives		9
Select 9 hours, including one or more 6000-level courses not selected in the above required category, from among the following:		
ACT SCI 5739	Topics in Actuarial Science	
ACT SCI 5780	Mathematics of Finance	
ACT SCI 5785	Introduction to Financial Engineering	
STAT 5752	Introduction to Probability	
STAT 5771	Applied Statistical Methods for Research	
STAT 5772	Statistical Computing I	
STAT 5775	Introduction to Mathematical Statistics	
STAT 5779	Applied Multivariate Statistical Analysis	
STAT 5782	Statistical Computing II	
ACT SCI 6735	Advanced Actuarial Mathematics	
ACT SCI 6788	Advanced Loss Models	
STAT 6772	Advanced Statistical Methods	
STAT 6779	Topics in Probability and Statistics	
Total Hours		**30**

Learning Outcomes

Mathematics, M.A.

Goal 1. Graduates will be able to undertake advanced mathematical reasoning:

- Students will construct logically valid mathematical arguments;
- Students will apply information learned in one setting to different situations;
- Students will make connections between seemingly different concepts.

Goal 2. Graduates will be able to conduct independent work and develop new mathematical ideas:

- Students will demonstrate that they can work independently;
- Students will identify problems in their readings and to find ways to fix them;

- Students will create original method(s) for solving known problem(s) or find solution(s) to new problem(s) in their theses or culminating papers.

Goal 3. Graduates will be able to solve problems at the level of graduate mathematics:

- Students will use/apply research-level (advanced) methods used to solve problems in their theses or culminating papers;
- Students will solve problems in graduate courses. Department faculty will identify 1-2 problems on the final examinations to assess this goal.

Goal 4. Graduates will be able to comprehend and communicate advanced mathematics both orally and in writing:

- Students will clearly state the goal(s) of their theses or paper;
- Students will place the questions/problems they addressed in their theses or papers in context (history, literature review, etc);
- Students will describe in detail the method(s) they used to answer the questions/problems in their theses or papers;
- Students will demonstrate mastery of the subject matter covered in their theses by answering questions from the theses committees about the theses.

Related Programs

- Mathematics for the Elementary and Middle Grades (K-8) M.A.
- Mathematics B.A.