Mathematics B.A.

Mathematics Major

The B.A. Mathematics major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours. Students are encouraged to discuss Undergraduate Research (MATH 4990) with their advisor.

Common core:		
MATH 1420	Calculus I *	4
MATH 1421	Calculus II	4
MATH 2422	Calculus III	4
MATH 2500	Linear Algebra for Applications	3
MATH 2900	Discrete and Argumentative Mathematics	3
STAT 1772	Introduction to Statistical Methods *	3
Seminar/Research:		1-3
MATH 4900	Senior Mathematics Seminar	
or MATH 4990	Undergraduate Research in Mathematics	
Choose emphasis below		21-22
Total Hours		**43-46**

Emphases

General Mathematics

Required:		
Mathematics:		
MATH 4420/5420	Advanced Calculus I	3
MATH 4421/5421	Advanced Calculus II	3
MATH 4500/5500	Modern Algebra I	3
MATH 4501/5501	Modern Algebra II	3
Probability/Statistics:		3
Select one of the following:		
STAT 3771/5771	Applied Statistical Methods for Research	
MATH/STAT 3752	Introduction to Probability	
Electives: Choose 2 of the following. MATH/STAT 3752/5752 cannot be used if used for the Probability/Statistics requirement. Other junior/senior level mathematics courses may be substituted with approval of advisor and Department Head.		6
MATH 3410/5410	Dynamical Systems: Chaos Theory and Fractals	
MATH 3425/5425	Differential Equations	
MATH 3440/5440	Numerical Analysis *	
MATH 3530	Combinatorics	
MATH 3600	Euclidean Geometry	
MATH 3610/5610	Modern Geometries	
MATH 3630/5630	Differential Geometry	
MATH 3640/5640	History of Mathematics	
MATH/STAT 3752	Introduction to Probability	
MATH/ACT SCI 3780	Mathematics of Finance	
MATH 4460/5460	Introduction to Complex Analysis	
MATH 4510/5510	Elementary Number Theory	
MATH 4615/5615	Geometric Transformations	
MATH 4641/5641	Topology I	
Total Hours		**21**

Mathematics of Artificial Intelligence

Required:		
Mathematics of Artificial Intelligence:		
MATH/STAT 3752	Introduction to Probability	3
MATH 4520/5520	Computational Linear Algebra	3
MATH 4540/5540	Introduction to Optimization	3
MATH 4790/5790	Mathematics of Deep Learning	3
STAT 4772/5772	Statistical Computing I	3
STAT 4784/5784	Introduction to Machine Learning	3
Electives:		3-4
Select one of the following:		
CS 1510	Introduction to Computing	
CS 2150	Computing for Data Science *	
CS 3610/5610	Artificial Intelligence *	
MATH 3530	Combinatorics	
STAT 3775/5775	Introduction to Mathematical Statistics	
STAT 4782/5782	Statistical Computing II	
Total Hours		**21-22**

* These courses have additional prerequisites as follows:
MATH 1420 has prerequisite of a satisfactory score on a mathematics placement exam, or subsequent remediation.
STAT 1772 has prerequisite of Satisfactory score on ALEKS exam.
MATH 3440/5440 has prerequisite of CS 1130, CS 1160, or CS 1510.
CS 2150 has a prerequisite of CS 1510 and consent of department.
CS 3610/5610 has a prerequisite of CS 1520; CS 1800; and junior standing.

Four-Year Plan

Mathematics: General Mathematics, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
ENGLISH 1005	College Writing and Research	3
MATH 1420	Calculus I	4
STAT 1772	Introduction to Statistical Methods	3
UNIFI/General Education or University Electives		6
	Hours	**16**
Spring		
COMM 1000	Oral Communication	3
MATH 1421	Calculus II	4
UNIFI/General Education or University Electives		9
	Hours	**16**
Sophomore		
Fall		
MATH 2422	Calculus III	4
MATH 2900	Discrete and Argumentative Mathematics	3
UNIFI/General Education or University Electives		9
	Hours	**16**
Spring		
MATH 2500	Linear Algebra for Applications	3
UNIFI/General Education or University Electives		12
	Hours	**15**
Junior		
Fall		
MATH 3752/5752	Introduction to Probability	3
MATH 4500/5500	Modern Algebra I (or Math elective)	3
UNIFI/General Education or University Electives		9
	Hours	**15**
Spring		
MATH 4501/5501	Modern Algebra II	3
STAT 3771/5771	Applied Statistical Methods for Research (or Math elective)	3
UNIFI/General Education or University Electives		9
	Hours	**15**
Senior		
Fall		
MATH 4420/5420	Advanced Calculus I	3
MATH 4900	Senior Mathematics Seminar (or MATH 4990)	1
UNIFI/General Education or University Electives		11
	Hours	**15**
Spring		
MATH 4421/5421	Advanced Calculus II	3
UNIFI/General Education or University Electives		9
	Hours	**12**
	Total Hours	**120**

* Note: A student who has a grade point average of less than 2.25 in all departmental courses used for this major may not apply a departmental course in which a grade of less than C- is earned.

Mathematics: Mathematics of Artificial Intelligence, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
MATH 1420	Calculus I	4
STAT 1772	Introduction to Statistical Methods	3
UNIFI/General Education or University Electives		9
	Hours	**16**
Spring		
MATH 2500	Linear Algebra for Applications	3
MATH 1421	Calculus II	4
UNIFI/General Education or University Electives		9
	Hours	**16**
Sophomore		
Fall		
MATH 2422	Calculus III	4
MATH 2900	Discrete and Argumentative Mathematics	3
STAT 4772/5772	Statistical Computing I	3
UNIFI/General Education or University Electives		6
	Hours	**16**
Spring		
Mathematics elective as specified		3
UNIFI/General Education or University Electives		13
	Hours	**16**
Junior		
Fall		
MATH 4520/5520	Computational Linear Algebra	3
MATH 3752/5752	Introduction to Probability	3
UNIFI/General Education or University Electives		8
	Hours	**14**
Spring		
STAT 4784/5784	Introduction to Machine Learning	3
Mathematics elective as specified		3
UNIFI/General Education or University Electives		9
	Hours	**15**
Senior		
Fall		
MATH 4540/5540	Introduction to Optimization	3
UNIFI/General Education or University Electives		11
	Hours	**14**
Spring		
MATH 4790/5790	Mathematics of Deep Learning	3
MATH 4900	Senior Mathematics Seminar	1
UNIFI/General Education or University Electives		9
	Hours	**13**
	Total Hours	**120**

Learning Outcomes

Mathematics, B.A.

Goal 1. Problem Solving Specification:

- Understanding: Students will understand or state problems and definitions correctly;
- Modification: Students will modify problems when necessary to make them tractable;
- Reaching a solution: Students will articulate assumptions and reason logically to conclusions;
- Communication and Interpretation: Students will communicate steps and interpret results intelligently when necessary.

Goal 2. Content Specification:

- Knowledge Foundation: Students will demonstrate an understanding of the core knowledge of mathematics.
- Advanced Content: Students will demonstrate comprehension of upper-level content of mathematics, statistics and actuarial science.
- Communication and Interpretation: Students will communicate using correct content terms and interpret concepts when necessary.

Goal 3. Technology/Software:

- Software Proficiency: Students will demonstrate basic proficiency with mathematical and statistical software.
- Analytical Skills: Students will be able to make informed choices about when the use of technology or data analysis is viable and useful.
- Communication and Interpretation: Students will communicate using the right language and interpret results intelligently.

Goal 4. Professional Development:

- Proof and Argument Specification: Students will be able to compose and explain proofs in clear mathematical style, both orally and in writing, and to critically evaluate mathematical arguments made by others. Students will be able to use a variety of techniques of proof, including direct proof, proof by contradiction, and mathematical induction.

Policies

Notes:

1. A student majoring or minoring in mathematics, who has a grade point average of less than 2.25 in all departmental courses used for that major or minor may not apply a departmental course in which a grade of less than C- is earned to her/his major or minor.
2. A student with a major within the Department of Mathematics may declare a second major and/or a certificate within the Department. Interested students should work closely with an advisor.
3. The declaration of both a major and a minor with the Department of Mathematics is limited to the following. Interested students should work closely with an advisor.
    - A student with any Mathematics major may declare the interdisciplinary Data Science Minor.
    - A student with the Mathematics Major or the Mathematics-Teaching Major may declare the Statistics emphasis of the Statistics and Actuarial Science Minor.

Related Programs

- Mathematics: Statistics/Actuarial Science B.A.
- Mathematics - Teaching B.A.
- Mathematics M.A.