APPLIED MATHEMATICS, BS

Bachelor of Science in Applied Mathematics (345001BS)

More on the Applied Mathematics major (https://www.uakron.edu/math/academics/undergraduate/applied-mathematics-program.dot)

Do a Google search for "What is mathematics" and you will find such descriptions as: "the abstract science of number, quantity, and space. Mathematics may be studied in its own right (pure mathematics), or as it is applied to other disciplines such as physics and engineering (applied mathematics)." In our modern world, it is hard to think of many things that we interact with on a daily basis (computers, the internet, or even your cell phone) that do not involve numbers, quantity, or space in some way. This is the reason that of all the STEM fields, arguably the most applicable and generic is that of Mathematics. This makes it one of the most useful fields you could study in order to be prepared for today's (and tomorrow's) jobs.

The program here at UA allows you to explore a mix of mathematical topics ranging across the spectrum of mathematical focus areas so that you can gain the expertise you need to succeed in today's jobs, whether you want to analyze data for Google, work on cybersecurity for the NSA, or be part of an interdisciplinary team solving problems at the cutting edge of science or engineering. The great strength of mathematics is that new applications needed for tomorrow's jobs are built on the same mathematical concepts you will be learning in your degree program today, and so mathematicians are one of the most employable groups of graduates, with one of the highest self-reported levels of job satisfaction.

Our BS in Applied Mathematics provides a core of mathematics courses that prepare you for in-depth study of mathematical concepts and their applications, while the later courses allow the flexibility for you to tailor your program to your specific areas of interest (both in and out of mathematics).

Our accelerated BS/MS program allows you to earn a BS in Applied Mathematics as well as a Master's degree in just 5 years, decreasing both your investment of time and tuition dollars when compared to more traditional paths to earning these degrees.

The following information has official approval of **The Department of Mathematics** and **The College of Engineering and Polymer Science**, but is intended only as a supplemental guide. Official degree requirements are established at the time of transfer and admission to the degree-granting college. Students should refer to the Degree Progress Report (DPR) which is definitive for graduation requirements. *Completion of this degree within the identified time frame below is contingent upon many factors, including but not limited to: class availability, total number of required credits, work schedule, finances, family, course drops/withdrawals, successfully passing courses, prerequisites, among others.* The transfer process is completed through an appointment with your academic advisor.

Three year accelerated option: for first time students who have earned credits for at least the first year of courses. Credits can be earned through qualifying scores on appropriate Advanced Placement (AP) exams or through College Credit Plus Program (CCP) courses. Credits for qualifying AP scores or CCP courses are determined by the appropriate academic department. Departments may assign varied course credit, depending on the student's score on an AP exam or grade in a CCP course. Students may also receive credit by examination or via placement tests, where appropriate.

Requirements Summary

Code	Title	Hours
General Education Requirements (https://bulletin.uakron.edu/undergraduate/general-education/)		36
Applied Mathematics Core		29-30
Applied Mathematics Focus Area		15-13
Applied Mathematics Electives		15
Additional Credits for Graduation *		25-27
Total Hours		**120-121**

* Bachelor's degrees require a minimum of 120 credit hours for graduation.

Note: A 2.0 GPA in all MATH courses is required for graduation.

General Education Courses

Code	Title	Hours
Students pursuing a bachelor's degree must complete the following General Education coursework. Diversity courses may also fulfill major or Breadth of Knowledge requirements. Integrated and Applied Learning courses may also fulfill requirements in the major.		
Academic Foundations		**12**
	Mathematics, Statistics and Logic: 3 credit hours	
	Speaking: 3 credit hours	
	Writing: 6 credit hours	
Breadth of Knowledge		**22**
	Arts/Humanities: 9 credit hours	
	Natural Sciences: 7 credit hours	
	Social Sciences: 6 credit hours	
Diversity		
	Domestic Diversity	
	Global Diversity	
Integrated and Applied Learning		**2**
	Select one class from one of the following subcategories:	
	Complex Issues Facing Society	
	Capstone	
	Review the General Education Requirements page for detailed course listings.	
Total Hours		**36**

Applied Mathematics Core

Code	Title	Hours
MATH:221	Analytic Geometry-Calculus I	4
MATH:222	Analytic Geometry-Calculus II	4
MATH:223	Analytic Geometry-Calculus III	4
MATH:307	Fundamentals of Advanced Mathematics	3-4
or MATH:208	Introduction to Discrete Mathematics	
MATH:312	Linear Algebra	3
MATH:335	Introduction to Ordinary Differential Equations	3

CPSC:209	Computer Science I	4
or CPSC:200	Programming for Data Science	
STAT:461	Applied Statistics	4
Total Hours		**29-30**

Complete one of the following three focus areas

Focus Area 1 - Computational Science and Mathematical Analysis

Code	Title	Hours
MATH:421	Advanced Calculus I	3
MATH:422	Advanced Calculus II	3
or MATH:425	Complex Variables	
MATH:427	Applied Numerical Methods I	3
MATH:428	Applied Numerical Methods II	3
MATH:436	Mathematical Models	3
or MATH:439	Applied Analysis and PDEs	
Total Hours		**15**

Focus Area 2 - Mathematical Data Science

Code	Title	Hours
Required courses		
MATH:200	Introduction to Data Science	3
MATH:300	Tools for Data Science	3
MATH:450	Optimization	3
MATH:455	Deep Learning	3
STAT:480	Statistical Data Management	3
or ISM:324	Database Management for Information Systems	
Total Hours		**15**

Focus Area 3 - Foundations

Code	Title	Hours
MATH:401	History of Mathematics	3
MATH:411	Abstract Algebra I	3
MATH:421	Advanced Calculus I	3
MATH:441	Concepts in Geometry	4
Total Hours		**13**

Applied Mathematics Electives

Code	Title	Hours
Select 15 credits at the 300/400 level of which at least 6 credits are from some approved area such as Chemistry, Computer Science, Economics, Education, Engineering, Physics, Statistics, etc.		**15**
Total Hours		**15**

Note:

- A minimum of 14 credits of MATH, CPSC, & STAT must be taken at The University of Akron.
- The courses MATH:135 Mathematics for Everyday Life, MATH:140 Mathematics for Early/Middle Teachers 1, MATH:145 Algebra for Calculus, MATH:149 Precalculus Mathematics; STAT:250 Statistics for Everyday Life, STAT:260 Basic Statistics-STAT:262 Introductory Statistics II, and most CPSC courses do not meet these degree requirements.
- Please see the Graduate Bulletin for BS/MS program information (https://bulletin.uakron.edu/graduate/colleges-programs/arts-sciences/math/applied-mathematics-accelerated-bs-ms/).

Recommended Sequences

Computational Science and Mathematical Analysis

1st Year		
Fall Semester		**Hours**
ENGL:111	English Composition I	3
CPSC:200	Programming for Data Science	4
MATH:200	Introduction to Data Science	3
MATH:221	Analytic Geometry-Calculus I	4
	Elective	3
	Hours	**17**
Spring Semester		
ENGL:112	English Composition II	3
MATH:222	Analytic Geometry-Calculus II	4
MATH:300	Tools for Data Science	3
	Natural Science Requirement	3
	Elective	3
	Hours	**16**
2nd Year		
Fall Semester		
MATH:223	Analytic Geometry-Calculus III	4
MATH:307	Fundamentals of Advanced Mathematics	3
STAT:461	Applied Statistics	4
ACCT:250	Spreadsheet Modeling & Decision Analysis	3
	Hours	**14**
Spring Semester		
MATH:312	Linear Algebra	3
MATH:335	Introduction to Ordinary Differential Equations	3
	Speaking Requirement	3
	Natural Science with Lab	4
	Social Science with Domestic Diversity	3
	Hours	**16**
3rd Year		
Fall Semester		
MATH:421	Advanced Calculus I	3
	Social Science Requirement	3
	Upper-level math elective	3
	Upper-level applied elective	3
	Art/Humanities with Global Diversity	3
	Hours	**15**
Spring Semester		
MATH:422 or MATH:425	Advanced Calculus II or Complex Variables	3
	Art/Humanities Requirement	3

	Integrated and Applied Learning Requirement	3
	Upper-level math requirement	3
	Upper-level math requirement	3
	Hours	**15**
4th Year		
Fall Semester		
MATH:427	Applied Numerical Methods I	3
	Art/Humanities Requirement	3
	Upper-level math requirement	3
	General elective	3
	General elective	3
	Hours	**15**
Spring Semester		
MATH:428	Applied Numerical Methods II	3
MATH:436 or MATH:439	Mathematical Models or Applied Analysis and PDEs	3
	Upper-level applied elective	3
	General Elective	3
	Hours	**12**
	Total Hours	**120**

Mathematical Data Science

1st Year		
Fall Semester		**Hours**
ENGL:111	English Composition I	3
MATH:200	Introduction to Data Science	3
MATH:221	Analytic Geometry-Calculus I	4
	Elective	3
CPSC:200	Programming for Data Science	4
	Hours	**17**
Spring Semester		
ENGL:112	English Composition II	3
MATH:222	Analytic Geometry-Calculus II	4
MATH:300	Tools for Data Science	3
	Natural Science Requirement	3
	Elective	3
	Hours	**16**
2nd Year		
Fall Semester		
MATH:223	Analytic Geometry-Calculus III	4
MATH:208	Introduction to Discrete Mathematics	4
STAT:461	Applied Statistics	4
ACCT:250	Spreadsheet Modeling & Decision Analysis	3
	Hours	**15**
Spring Semester		
MATH:312	Linear Algebra	3
MATH:335	Introduction to Ordinary Differential Equations	3
	Speaking Requirement	3
	Natural Science with Lab	4
	Social Science with Domestic Diversity	3
	Hours	**16**
3rd Year		
Fall Semester		
STAT:480 or ISM:324	Statistical Data Management or Database Management for Information Systems	3
	Social Science Requirement	3
	Upper-level applied elective [2]	3
	Upper-level applied elective [2]	3
	Art/Humanities with Global Diversity	3
	Hours	**15**
Spring Semester		
MATH:450 or MATH:455	Optimization or Deep Learning	3
	Art/Humanities requirement	3
	Integrated and Applied Learning Requirement	3
	Upper-level math elective	3
	Upper-level math elective	3
	Hours	**15**
4th Year		
Fall Semester		
	Art/Humanities Requirement	3
	Upper-level applied elective [2]	3
	Upper-level math elective	3
	General elective	3
	General elective	3
	Hours	**15**
Spring Semester		
MATH:455 or MATH:450	Deep Learning or Optimization	3
	Upper-level math elective	3
	Upper-level math elective	3
	General elective	3
	Hours	**12**
	Total Hours	**121**

[2] It is recommended that the upper-level applied electives for the Mathematical Data Science focus area be in Statistics or Economics.

Foundations

1st Year		
Fall Semester		**Hours**
ENGL:111	English Composition I	3
CPSC:200	Programming for Data Science	4
MATH:221	Analytic Geometry-Calculus I	4
MATH:200	Introduction to Data Science	3
	Elective	3
	Hours	**17**
Spring Semester		
ENGL:112	English Composition II	3

MATH:222	Analytic Geometry-Calculus II	4
MATH:300	Tools for Data Science	3
	Natural Science Requirement	3
	Elective	3
	Hours	**16**
2nd Year		
Fall Semester		
MATH:223	Analytic Geometry-Calculus III	4
MATH:307	Fundamentals of Advanced Mathematics	3
STAT:461	Applied Statistics	4
ACCT:250	Spreadsheet Modeling & Decision Analysis	3
	Hours	**14**
Spring Semester		
MATH:312	Linear Algebra	3
MATH:335	Introduction to Ordinary Differential Equations	3
	Speaking requirement	3
	Natural Science Requirement with Lab	4
	Social Science with Domestic Diversity	3
	Hours	**16**
3rd Year		
Fall Semester		
MATH:411	Abstract Algebra I	3
MATH:441	Concepts in Geometry	4
	Social Science requirement	3
	Upper-level applied elective	3
	Art/Humanities with Global Diversity	3
	Hours	**16**
Spring Semester		
MATH:401	History of Mathematics	3
	Art/Humanities requirement	3
	Integrated and Applied Learning Requirement	3
	Upper-level math elective	3
	Upper-level math elective	3
	Hours	**15**
4th Year		
Fall Semester		
MATH:421	Advanced Calculus I	3
	Art/Humanities requirement	3
	Upper-level math elective	3
	General elective	3
	General elective	3
	Hours	**15**
Spring Semester		
	Upper-level applied elective	3
	Upper-level applied elective	3
	Upper-level applied elective	3
	General elective	3
	Hours	**12**
	Total Hours	**121**