

APPLIED MATHEMATICS, BACHELOR OF SCIENCE

College of Letters & Science

The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

The Program

After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

Major Advisors

For a current list of faculty and staff advisors, see Math Department Advising or contact the Student Services office (studentservices@math.ucdavis.edu).

Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see Math Placement Requirement (MPR), well in advance of enrolling.

Department Honors

Students who meet the minimum GPA requirement for honors at graduation from the College of Letters & Science and who complete a senior project as part of MAT 194 or MAT 199 units in consultation with their faculty advisor may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see Honors & Awards (<https://www.math.ucdavis.edu/research/honors/>).

Graduate Study

The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting Graduate

Information (<https://www.math.ucdavis.edu/grad/>), and by email (studentservices@math.ucdavis.edu).

Code	Title	Units
Preparatory Subject Matter		
<i>Calculus</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
<i>Linear Algebra & Proof-Writing</i>		
Choose one option:		4-8
(a)		
MAT 022A	Linear Algebra	
MAT 108	Introduction to Abstract Mathematics	
(b)		
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	
(c)		
MAT 067	Modern Linear Algebra	
<i>MATLAB</i> ¹		
Choose one:		0-1
MAT 022AL	Linear Algebra Computer Laboratory	
Equivalent MATLAB knowledge.		
<i>Differential Equations</i>		
MAT/BIS 027B	Differential Equations with Applications to Biology	3-4
or MAT 022B	Differential Equations	
<i>Programming</i>		
ECS 032A	Introduction to Programming	4
ENG 006	Engineering Problem Solving	4
Choose one two-quarter sequence:		8-10
<i>Physics</i>		
PHY 009A & PHY 009B	Classical Physics and Classical Physics	
<i>Biological Science</i>		
BIS 002A & BIS 002B	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution	
<i>Chemistry</i>		
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
<i>Economics</i>		
ECN 001A & ECN 001B	Principles of Microeconomics and Principles of Macroeconomics	
<i>Statistics</i>		
STA 032 & STA 100	Gateway to Statistical Data Science and Applied Statistics for Biological Sciences	
or Other applied preparatory courses approved by your advisor.		
Preparatory Subject Matter Subtotal		39-47
Depth Subject Matter		
<i>A. Core Courses</i>		

MAT 119A	Ordinary Differential Equations	4
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
MAT 185A	Complex Analysis	4
Choose two:		8
MAT 128A	Numerical Analysis	
MAT 128B	Numerical Analysis in Solution of Equations	
MAT 128C	Numerical Analysis in Differential Equations	
<i>B. Enrichment Courses</i>		
1. Choose two ²		8
2. Choose one approved upper division course outside the Department of Mathematics with extensive use of mathematics. Please consult with a math advisor before selecting a course.		4
<i>C. Capstone Courses</i>		
Choose one:		3-4
MAT 115B	Number Theory	
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	
MAT 119B	Ordinary Differential Equations	
MAT 135B	Stochastic Processes	
MAT 146	Algebraic Combinatorics	
MAT 150B	Modern Algebra	
MAT 150C	Modern Algebra	
MAT 180	Special Topics	
MAT 185B	Complex Analysis	
MAT 189	Advanced Problem Solving	
MAT 192	Internship in Applied Mathematics (Must take 3 units.)	
MAT 194	Undergraduate Thesis	
Depth Subject Matter Subtotal		51-52
Total Units		90-99

¹ **Note:** Basic knowledge of MATLAB is required for both MAT 022A and MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the 1 unit course MAT 022AL (can be taken concurrently).

² MAT 111-185B; excluding MAT 180, core courses, and courses being used as a capstone.