MATHEMATICAL & SCIENTIFIC COMPUTATION, BACHELOR OF SCIENCE

College of Letters & Science

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 (https://www.math.ucdavis.edu/undergrad/advising/advisers/) or contact Student Services (studentservices@math.ucdavis.edu).

Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 017A, MAT 019A, 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) (http://www.math.ucdavis.edu/undergrad/math_placement/), well in advance of enrolling.

Department Honors

Students who meet the minimum GPA requirement for honors at graduation for 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 M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website or contacting Student Services (studentservices@math.ucdavis.edu).

The major requirements below are in addition to meeting University Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/) & College Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/); unless otherwise noted. The minimum number of units required for the Mathematical & Scientific Computation Bachelor of Science is 82.

Code	Title	Units
Preparatory Subject Matter		
Mathematics		
MAT 017A	Calculus for Biology & Medicine	4
or MAT 021A	Calculus	
MAT 017B	Calculus for Biology & Medicine	4
or MAT 021B	Calculus	
MAT 017C	Calculus for Biology & Medicine	4
or MAT 021C	Calculus	
MAT 021D	Vector Analysis	4
MAT/BIS 027B	Differential Equations with Applications to Biology	3-4
or MAT 022B	Differential Equations	
Linear Algebra & Proof-Writing		
Choose one option:		4-8
(a)		
MAT 108	Introduction to Abstract Mathematics	
or MAT 108V	Introduction to Abstract Mathematics	
MAT/BIS 027A	Linear Algebra with Applications to Biology	
or MAT 022A	Linear Algebra	
or		
(b)		
MAT 067	Modern Linear Algebra	
Choose one:		0-1
MAT 022AL	Linear Algebra Computer Laboratory	
Equivalent MATLAB knowledge. [1]		
Programming		
ECS 032A	Introduction to Programming	4
or ECS 032AV	Introduction to Programming	
ENG 006	Engineering Problem Solving	4
Preparatory Subject Matter Subtotal		31-37
Depth Subject Matter		
A. Core Courses		
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 128A	Numerical Analysis	4
MAT 128B	Numerical Analysis in Solution of Equations	4
MAT 128C	Numerical Analysis in Differential Equations	4

MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
B. Enrichment Courses		
Choose two:		8
MAT 111-MAT 185B worth at least 4 units each. [2]		
C. Emphasis		
Choose one:		8
Computational & Mathematical Biology Emphasis		
MAT 124	Mathematical Biology	
And		
One approved upper division course in Biology; please consult with a math advisor before selecting a course.		
OR		
Computational & Mathematics Emphasis		
MAT 168	Optimization	
And		
One approved upper division course involving extensive computation or theory of computation; please consult with a math advisor before selecting a course.		
D. Capstone Course		
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		**82-89**

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

2

Excluding MAT 180. Note that core math major classes cannot be used to satisfy this requirement.