APPLIED MATHEMATICS, B.S.

Objectives

This degree program is designed for students who want an interdisciplinary program that combines the study of applied and computational mathematics with a scientific area of specialization. This program can be tailored to meet the needs of students who expect to pursue a graduate degree in applied mathematics or science, expect to double-major or minor in a scientific field, or intend to work in a mathematics-related interdisciplinary field in industry.

Learning Outcomes

1. Content Proficiency. In each of the following subject areas of mathematics:
    a. calculus and analysis,
    b. abstract and linear algebra,
    c. probability and statistics,
    d. numerical methods and scientific computation,
    e. partial differential equations and Fourier analysis.
       Students will be able to:
       i. State and use basic definitions and theorems.
       ii. Solve problems using a variety of techniques including: methods of proof, geometric reasoning, algebraic thinking, algorithmic techniques, and the application of computer software and programming.
       iii. Explain the central concepts of the area.
       iv. Apply mathematical methods to problems of science, engineering or related fields.
2. Communication. Students will be able to communicate mathematics both orally and in writing. They will do so according to accepted standards in mathematics.
3. Tools. Students will employ a variety of tools such as the library, Internet, computers, and calculators to solve problems and do undergraduate research.
4. Independent Learners. Students will be able to independently investigate a mathematical topic.
5. Career and Professional Preparation. LMU mathematics graduates will be prepared to engage in mathematics-related professions or in a graduate school academic environment. This preparation will include significant pre-professional experiences.

General Major Requirements

Students must complete the corresponding Bachelor of Science University Core requirements as defined by the Frank R. Seaver College of Science and Engineering; students will choose the proper sequence of University Core courses in consultation with their advisor.

Mathematics majors and minors are not permitted to enroll in a mathematics course without a minimum grade of C (2.0) in that course's prerequisite. A minimum grade of C (2.0) is required in each course in the lower division major requirements. A minimum cumulative grade point average of C (2.0) is required in the upper division major requirements for graduation.

Code	Title	Semester Hours
Lower Division Requirements		
MATH 131	Calculus I	4
MATH 132	Calculus II	4
MATH 181	Introduction to Programming	2
MATH 190	Workshop in Mathematics I	2
MATH 205	Applied Statistics	4
MATH 234	Calculus III	4
MATH 246	Differential Equations and Linear Algebra	4
MATH 249	Introduction to Methods of Proof	4
MATH 251	Applied Linear Algebra	4
MATH 290	Workshop in Mathematics II	1
Select two of the following:		6-8
BIOL 101	General Biology I	
BIOL 102	General Biology II	
CHEM 110	General Chemistry I	
CHEM 112	General Chemistry II	
CHEM 114	General Chemistry for Engineers	
CMSI 1010	Computer Programming and Laboratory	
CMSI 2120	Data Structures and Applications	
PHYS 1100	Introduction to Mechanics	
PHYS 2100	Introduction to Electricity and Magnetism	
Subtotal		39-41
Upper Division Requirements		
MATH 323	Real Analysis I	4
MATH 333	Abstract Algebra I	4
MATH 356	Methods of Applied Mathematics	4
MATH 361	Probability and Mathematical Statistics	4
MATH 382	Applied Numerical Methods	4
MATH 390	Workshop in Mathematics III	1
MATH 492	Workshop in Mathematics IV	1
Select one of the following:		4
MATH 423	Real Analysis II	
MATH 433	Abstract Algebra II	
MATH 450	Advanced Linear Algebra	
MATH 460	Advanced Topics in Probability	
MATH 472	Topology	
MATH 482	Advanced Numerical Methods	
MATH 496	Mathematical Modeling	
One 4 semester hour upper division MATH elective chosen in consultation with their faculty advisor		4
One upper division course in a scientific area of specialization chosen in consultation with their faculty advisor and approved by the Chairperson of the Mathematics Department.		4
Subtotal		34
Total Semester Hours		**73-75**

Note: Some areas of specialization require additional sophomore-level classes before upper division coursework can begin; the faculty advisor will discuss these details with the student.

Bachelor of Science in Applied Mathematics Curriculum

(124-127 S.H.)

Course	Title	Semester Hours
First Year		
Fall		
MATH 131	Calculus I	4
MATH 190	Workshop in Mathematics I	2
FFYS 1000	First Year Seminar	4
ORNT 1000	First Year Forum	0
Select one of the following:		3-4
	University Core	
	Science Requirement	
	Semester Hours	**13-14**
Spring		
MATH 132	Calculus II	4
MATH 181	Introduction to Programming	2
RHET 1000	Rhetorical Arts	3-4
Select one or both of the following:		3-8
	University Core	
	Science Requirement	
	Semester Hours	**12-18**
Sophomore Year		
Fall		
MATH 246	Differential Equations and Linear Algebra	4
MATH 249	Introduction to Methods of Proof	4
University Core		4
University Core		3-4
	Semester Hours	**15-16**
Spring		
MATH 205	Applied Statistics	4
MATH 234	Calculus III	4
MATH 251	Applied Linear Algebra	4
MATH 290	Workshop in Mathematics II	1
University Core		3-4
	Semester Hours	**16-17**
Junior Year		
Fall		
MATH 323	Real Analysis I	4
MATH 361	Probability and Mathematical Statistics	4
University Core		4
Elective		3-4
	Semester Hours	**15-16**
Spring		
MATH 333	Abstract Algebra I	4
MATH 382	Applied Numerical Methods	4
MATH 390	Workshop in Mathematics III	1
University Core		3-4
Upper Division Elective		3-4
	Semester Hours	**15-17**
Senior Year		
Fall		
MATH 4xx Requirement [1]		4
Upper Division Science Requirement [2]		3-4
University Core		4
Upper Division Elective		4
	Semester Hours	**15-16**
Spring		
MATH 356	Methods of Applied Mathematics	4

MATH 492	Workshop in Mathematics IV	1
MATH 3xx or 4xx Mathematics Elective		4
University Core		3-4
Upper Division Elective		3-4
	Semester Hours	**15-17**
	Minimum Semester Hours	**116-131**

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One upper division course is required from MATH 423 Real Analysis II, MATH 433 Abstract Algebra II, MATH 450 Advanced Linear Algebra, MATH 460 Advanced Topics in Probability, MATH 472 Topology, MATH 482 Advanced Numerical Methods, or MATH 496 Mathematical Modeling

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One upper division course is required in a scientific area of specialization chosen with faculty advisor and approved by the Chairperson of the Mathematics Department.

Note:

- Dean's list requires a minimum of 14 semester hours.
- Some areas of specialization require additional sophomore-level classes before upper division coursework can begin; the faculty advisor will discuss these details with the student.