BA IN MATHEMATICS

Units required for BA: 48-54
Total units required for BA: 120

Program Description

The mathematics bachelor's degree provides students with a firm foundation in mathematics. Mathematics is a discipline that studies patterns, numbers, shapes, structures, and their relationships. It is fundamental for making sense of the world around us, providing a precise and systematic framework for logical reasoning, modeling, and problem-solving. Mathematics plays a crucial role in advancing human knowledge, serving as the language of science and the foundation of many other disciplines such as statistics, computer science, and engineering.

All mathematics majors complete the same core coursework, and then select an area of emphasis. The applied emphasis and the statistics emphasis provide a strong background for students interested in pursuing quantitative careers in industry, government, or academia. The pure emphasis prepares students to pursue higher-level degrees in mathematics. The teacher preparation emphasis prepares students to teach mathematics at the middle or high school level.

Admission Requirements

All students planning to take MATH 30, Calculus I, must first satisfy one of the following criteria.

- Receive a score of 3 on the Calculus AB AP Exam.
- Receive a C- or better in Math 29 (or equivalent).
- Receive a score of 76+ on an ALEKS PPL proctored exam.

For more information about ALEKS PPL and placement into mathematics and statistics courses visit the department website (https://www.csus.edu/math (https://www.csus.edu/math/)).

Minimum Grade Requirements

- Prerequisites must be completed with grade "C-" or better.
- Grade "C-" or better required in all courses applied to Mathematics major or to the Mathematics or Statistics minors.

Recommended Coursework

- PHYS 11A and PHYS 11C are recommended for all Mathematics majors.

Program Requirements

Code	Title	Units
Lower Division Core Courses (21 Units)		
MATH 30	Calculus I [1]	4
MATH 31	Calculus II [1]	4
MATH 32	Calculus III	4
MATH 35	Introduction to Linear Algebra	3
MATH 45	Differential Equations for Science and Engineering	3
Select one of the following:		3
MATH 64	Mathematical Programming	
CSC 10	Introduction to Programming Logic	
CSC 15	Programming Concepts and Methodology I	
CSC 22	Visual Programming in BASIC	
CSC 25	Introduction to C Programming	

Code	Title	Units
Upper Division Core Courses (15 Units)		
MATH 108	Introduction to Formal Mathematics	3
MATH 110A	Modern Algebra	3
MATH 110B	Modern Algebra	3
MATH 130A	Functions of a Real Variable	3
MATH 130B	Functions of a Real Variable	3
Additional Requirements for Specialized Study (12-18 Units)		
Select an emphasis from the following four options:		12-18
Emphasis in Pure Mathematics		
Emphasis in Applied Mathematics		
Emphasis in Statistics		
Teacher Preparation Program		
Total Units		**48-54**

[1] Course also satisfies General Education (GE)/Graduation Requirement.

Emphasis in Pure Mathematics

Code	Title	Units
MATH 117	Linear Algebra	3
MATH 134	Functions of a Complex Variable and Applications	3
Select two of the following:		6-11
MATH 101	Combinatorics	
MATH 102	Number Theory	
MATH 104	Vector Analysis	
MATH 105A	Advanced Mathematics for Science and Engineering I	
MATH 105B	Advanced Mathematics for Science and Engineering II	
MATH 121	College Geometry	
MATH 150	Introduction to Numerical Analysis	
MATH 161	Mathematical Logic	
MATH 162	Set Theory	
MATH 170	Linear Programming	
MATH 190	History Of Mathematics	
STAT 115A	Introduction to Probability Theory [1]	
STAT 115B	Introduction to Mathematical Statistics [1]	
Total Units		**12-17**

[1] Has an extra prerequisite that is not in the lower or upper division core.

Emphasis in Applied Mathematics

Code	Title	Units
MATH 105A	Advanced Mathematics for Science and Engineering I	4
MATH 105B	Advanced Mathematics for Science and Engineering II	4
Select two of the following:		6-10
MATH 101	Combinatorics	
MATH 102	Number Theory	

MATH 104	Vector Analysis	
MATH 117	Linear Algebra	
MATH 134	Functions of a Complex Variable and Applications	
MATH 150	Introduction to Numerical Analysis	
MATH 170	Linear Programming	
STAT 115A	Introduction to Probability Theory [1]	
STAT 115B	Introduction to Mathematical Statistics [1]	
STAT 128	Statistical Computing	
STAT 129	Analyzing and Processing Big Data	
STAT 155	Introduction to Techniques of Operations Research [1]	
Total Units		**14-18**

[1] Has an extra prerequisite that is not in the lower or upper division core.

Emphasis in Statistics

Code	Title	Units
STAT 1	Introduction to Statistics	3 - 4
or STAT 50	Introduction to Probability and Statistics	
STAT 115A	Introduction to Probability Theory	3
STAT 115B	Introduction to Mathematical Statistics	3
Select two of the following:		6
MATH 101	Combinatorics	
MATH 117	Linear Algebra	
MATH 134	Functions of a Complex Variable and Applications	
MATH 150	Introduction to Numerical Analysis	
MATH 170	Linear Programming	
STAT 128	Statistical Computing	
STAT 129	Analyzing and Processing Big Data	
STAT 155	Introduction to Techniques of Operations Research	
Total Units		**15-16**

Emphasis in Teacher Preparation

Code	Title	Units
STAT 1	Introduction to Statistics	3
MATH 102	Number Theory	3
MATH 121	College Geometry	3
MATH 190	History Of Mathematics	3
MATH 193	Capstone Course for the Teaching Credential Candidate	3
Total Units		**15**

General Education Requirements [1]

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		3
Area B: Physical Universe and Its Life Forms (10 Units)		
B1 - Physical Science		3
B2 - Life Forms		3
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5)		1
B4 - Math Concepts [2]		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.		3
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 - Area C Course		3
C1/C2 - Area C Course - Take upper-division course to complete Area & upper division requirements.		3
Area D: The Individual and Society (9 Units)		
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements.		3
Area E: Understanding Personal Development (3 Units)		
Area E Course		3
Area F: Ethnic Studies (3 Units)		
Area F Course		3
Total Units		**46**

[1] To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

[2] Required in Major; also satisfies GE.

Graduation Requirements [1]

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (12 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement [2]		6

[1] To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).
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[2] If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency

Requirement are described here: https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html