

BA IN MATHEMATICS

Units required for BA: 48-54

Total units required for BA: 120

Program Description

In today's highly technological society, the study of Mathematics takes on an increasingly important role. The Sacramento State Mathematics Department designs its courses with the goal of providing students with the mathematical concepts appropriate to the student's field.

Placement - Mathematics Courses

Students who have not completed four years of high school mathematics consisting of

- Beginning Algebra (one year)
- Geometry (one year)
- Intermediate Algebra-Trigonometry (one year)
- Analytic Geometry-Mathematical Analysis (one year)

may need to complete part of this preparation at the University. The following diagram, which is based upon course prerequisites and major objectives, may be of assistance in selecting the necessary coursework.

Satisfactory completion of the Entry Level Mathematics (ELM) requirement is a prerequisite to enrollment in any mathematics or statistics course in Area B-4 (Quantitative Reasoning) of General Education. The mathematics and statistics courses listed in Area B-4 are:

Code	Title	Units
MATH 1	Mathematical Reasoning	3
MATH 17	An Introduction to Exploration, Conjecture, and Proof in Mathematics	3
MATH 24	Modern Business Mathematics	3
MATH 26A	Calculus I for the Social and Life Sciences	3
MATH 26B	Calculus II for the Social and Life Sciences	3
MATH 29	Pre-Calculus Mathematics	4
MATH 30	Calculus I	4
MATH 31	Calculus II	4
MATH 35	Introduction to Linear Algebra	3
STAT 1	Introduction to Statistics	3
STAT 50	Introduction to Probability and Statistics	4

Students Planning to take any of the following courses must pass a diagnostic test.

Code	Title	Units
MATH 9		
MATH 11		
MATH 17	An Introduction to Exploration, Conjecture, and Proof in Mathematics	3
MATH 24	Modern Business Mathematics	3
MATH 26A	Calculus I for the Social and Life Sciences	3
MATH 29	Pre-Calculus Mathematics	4
MATH 29A	Pre-Calculus Mathematics A	2
MATH 30	Calculus I	4

MATH 107A	Fundamental Mathematical Concepts	3
STAT 1	Introduction to Statistics	3

A brochure describing the diagnostic tests and containing sample questions is available in the campus bookstore. The following table gives the course and appropriate diagnostic test.

Those students who want to prepare for the ELM may purchase the Entry Level Mathematics workbook at the Hornet Bookstore (see Placement Tests section of this catalog).

All students planning to take MATH 30, Calculus I, must take the Calculus Readiness test prior to the semester of enrollment in MATH 30.

Prerequisite 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.
- 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
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	
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	
STAT 155	Introduction to Techniques of Operations Research 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
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 155	Introduction to Techniques of Operations Research ¹	
Total Units		14

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 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

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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>