

BA IN MATHEMATICS



SACRAMENTO STATE

In Workflow

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3. NSM College Committee Chair (mikkel.jensen@csus.edu)
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Approval Path

1. 2025-10-05T19:28:59Z
Vincent Pigno (vincent.pigno): Approved for MATH Committee Chair
2. 2025-10-07T23:44:07Z
Kimberly Elce (kelce): Approved for MATH Chair
3. 2025-10-15T22:45:05Z
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. 2025-10-15T23:24:24Z
Chris Taylor (ctaylor): Approved for NSM Dean

History

1. May 1, 2018 by clmig-jwehrheim
2. May 14, 2018 by 212408496
3. Aug 10, 2018 by 212408496
4. Oct 2, 2018 by 212408496
5. Apr 28, 2020 by 220267334
6. Apr 20, 2021 by 220267334
7. Mar 6, 2024 by Kimberly Elce (kelce)

Date Submitted: 2025-10-03T20:46:03Z

Viewing: BA in Mathematics

Last approved: Wed, 06 Mar 2024 19:50:47 GMT

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Changes proposed by: Kimberly Elce (101052896)

Academic Group: (College)

Natural Sciences & Mathematics

Academic Organization: (Department)

Mathematics & Statistics

Catalog Year Effective:

2026-2027 Catalog

Individual(s) primarily responsible for drafting the proposed degree major program:

Name (First Last)	Email	Phone 999-999-9999
Kimberly Elce	kelce@csus.edu	916-278-5641

Type of Program:

Major

Program Change Type:

Substantive

Delivery Format:

Fully Face to Face

Title of the Program:

BA in Mathematics

Designation: (degree terminology)

Bachelor of Arts

Briefly describe the program proposal (new or change) and provide a justification:

We have updated our applied mathematics curriculum, creating two new courses (Math 144 and 146) that will now replace our former applied core courses, Math 105A/B. In addition, we have created a new computational linear algebra course (Math 152) that we will be adding to the elective choices for three of the emphases. Lastly, upon evaluating our applied math emphasis, we felt there was a deficit in statistical knowledge. An applied mathematician should have some knowledge of statistics. Therefore, we are adding a statistics requirement (Stat 1 or Stat 50) to the applied emphasis. These changes will not affect the units in any of the emphases except the applied emphasis. The change in the applied emphasis will be an additional 1 or 2 units, depending on which statistics course is chosen.

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Intellectual and practical skills

Program Learning Outcomes

Program Learning Outcomes

Learning Outcome
Explain and apply concepts from abstract algebra and real analysis.
Identify and describe a variety of areas of mathematics.
Construct, analyze, and critique mathematical arguments.
Identify and integrate techniques from a variety of areas in mathematics to solve complex problems.
Communicate mathematical arguments in a variety of written forms, such as proofs, expository writing, and reports.
Communicate mathematical arguments orally in formats such as presentations or discussions.
Use appropriate technological tools to analyze and solve mathematical problems.
Engage with the mathematics community and use their mathematical and statistical knowledge to contribute to the broader community.
Locate, analyze, and critique mathematical content appearing in a variety of sources.

Learning Outcomes Display

[illegible]

STAT 115B									
STAT 128									
STAT 129									
STAT 155									
STAT 50									
STAT 1									
STAT 115A									
STAT 115B									
MATH 101									
MATH 117									
MATH 134									
MATH 150									
MATH 170									
STAT 128									
STAT 129									
STAT 155									
STAT 1									
MATH 102									
MATH 121									
MATH 190									
MATH 193									

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

Yes

For the Council for the Preparation of School Personnel (to be filled out with assistance of your department chair):

Does this program change impact your department's currently written Program Standards Document?

No

Common Standards: In what way does this course or program change impact the currently written Common Standards document? Please include any suggested language changes.

no impact

Is this change in response to program or unit assessment activities?

No

Will this program introduce any new or changes to program assessments?

No

Please attach a Comprehensive Program Assessment Plan

MathAssessmentPlan.xlsx

Please attach a Curriculum Map Matrix

MathMajor Curriculum Map.xlsx

Please attach a five-year budget projection

budget.docx

Do these changes impact the degree roadmap?

Yes

Please attach the updated roadmap:

4YearRoadMapsFall2025Edit.xlsx

Briefly describe the change:

Change is only in applied emphasis. Addition of Stat 50 to semester 4. Replace Math 105A/B with Math 144/146.

Catalog Description:

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: Course prerequisites and other criteria for admission of students to the degree major program, and for their continuation in it.

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.

As defined by policy <http://www.csus.edu/umannual/acadaff/fsm00010.htm>, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

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	
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
MATH 101	Combinatorics	
MATH 102	Number Theory	
MATH 104	Vector Analysis	
MATH 121	College Geometry	
MATH 150	Introduction to Numerical Analysis	
MATH 144 Applied Dynamical Systems		
MATH 146 Partial Differential Equations		
MATH 152 Computational Linear Algebra		
MATH 161	Mathematical Logic	
MATH 162	Set Theory	
MATH 170	Linear Programming	
MATH 190	History Of Mathematics	
STAT 115A	Introduction to Probability Theory **	
STAT 115B	Introduction to Mathematical Statistics **	
Total Units		12

** Has an extra prerequisite that is not in the lower or upper division core.

Emphasis in Applied Mathematics

Code	Title	Units
STAT 50	Introduction to Probability and Statistics *	4 - 3
or STAT 1	Introduction to Statistics	
MATH 144 Applied Dynamical Systems		3
MATH 146 Partial Differential Equations		3
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 152 Computational Linear Algebra		

MATH 170	Linear Programming	
STAT 115A	Introduction to Probability Theory	
STAT 115B	Introduction to Mathematical Statistics **	
STAT 128	Statistical Computing	
STAT 129	Analyzing and Processing Big Data	
STAT 155	Introduction to Techniques of Operations Research **	
Total Units		16-15

* STAT 50 is the preferred course

** Has an extra prerequisite that is not in the lower or upper division core.

Emphasis in Statistics

Code	Title	Units
STAT 50 or STAT 1	Introduction to Probability and Statistics *	4 - 3
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 152	Computational Linear Algebra	
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		16-15

* <p>STAT 50 is the preferred course</p>

** <p>Has an extra prerequisite that is not in the lower or upper division core.</p>

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 (<https://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 (<https://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 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>

Fiscal Impact to Change an Existing Program

Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:

none

Provide a fiscal analysis of the proposed changes:

no change to current fiscal impact

How will the above changes be accommodated within the department/College existing fiscal resources?

n/a

Will the proposed changes require additional resources?

No

What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?

none

Key: 314