

BA IN MATHEMATICS



SACRAMENTO STATE
Redefine the Possible

In Workflow

1. MATH Committee Chair (vincent.pigno@csus.edu)
2. MATH Chair (kelce@skymail.csus.edu)
3. NSM College Committee Chair (mikkel.jensen@csus.edu)
4. NSM Dean (datwyler@csus.edu)
5. Academic Services (catalog@csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Council on the Preparation of School Personnel Chair (mae.chaplin@csus.edu)
8. Dean of Undergraduate (gardner@csus.edu)
9. Dean of Graduate (cnewsome@skymail.csus.edu)
10. Catalog Editor (catalog@csus.edu)
11. Registrar's Office (k.mcfarland@csus.edu)

Approval Path

1. Tue, 18 Oct 2022 02:08:22 GMT
Lisa Taylor (taylorlm): Approved for MATH Committee Chair
2. Tue, 18 Oct 2022 02:18:28 GMT
Kimberly Elce (kelce): Approved for MATH Chair
3. Wed, 19 Oct 2022 22:32:06 GMT
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Fri, 21 Oct 2022 20:33:19 GMT
Shannon Datwyler (datwyler): Approved for NSM Dean
5. Wed, 02 Nov 2022 23:56:06 GMT
Katie Hawke (katiedickson): Approved for Academic Services
6. Wed, 23 Nov 2022 03:59:08 GMT
Rachel Miller (rachel.miller): Rollback to Initiator
7. Fri, 13 Oct 2023 14:45:10 GMT
Vincent Pigno (vincent.pigno): Approved for MATH Committee Chair
8. Fri, 13 Oct 2023 15:26:37 GMT
Kimberly Elce (kelce): Approved for MATH Chair
9. Wed, 18 Oct 2023 22:45:35 GMT
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
10. Thu, 19 Oct 2023 15:27:05 GMT
Shannon Datwyler (datwyler): Approved for NSM Dean
11. Thu, 02 Nov 2023 22:45:17 GMT
Katie Hawke (katiedickson): Approved for Academic Services

History

1. May 1, 2018 by clmig-jwehrheim
2. May 14, 2018 by Kaitlyn Ehrmantrout (k.ehrmantrout)
3. Aug 10, 2018 by Kaitlyn Ehrmantrout (k.ehrmantrout)
4. Oct 2, 2018 by Kaitlyn Ehrmantrout (k.ehrmantrout)
5. Apr 28, 2020 by 220267334
6. Apr 20, 2021 by 220267334

Date Submitted: Thu, 12 Oct 2023 23:51:36 GMT

Viewing: BA in Mathematics**Last approved: Tue, 20 Apr 2021 21:13:04 GMT****Last edit: Thu, 02 Nov 2023 22:44:49 GMT**

Changes proposed by: Kimberly Elce (101052896)

Academic Group: (College)

Natural Sciences & Mathematics

Academic Organization: (Department)

Mathematics & Statistics

Catalog Year Effective:

2024-2025 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	916-769-4896

Type of Program Proposal:

Major

Program Change Type:

Non-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:

General update of information to include new courses added to elective list and remove outdated placement information.

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.

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.

n/a

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

No

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

No

Do these changes impact the Smart Planner roadmap?

No

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 - 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/>).

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:

We have added a mathematics course as an option for the programming requirement. When this course was proposed we consulted with the Computer Science Department. The email from the assistant chair is attached. No concerns were raised.

Note: The course was originally run as an experimental course under the number Math 96F, which is the number referred to in the email thread. The course has been submitted as a permanent course under the number Math 64.

Attach a copy of correspondence with these units:

CSConsultation.docx

Provide a fiscal analysis of the proposed changes:

All courses that have been added to the elective list are already being taught, so there is no fiscal change to the current situation.

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

All courses that have been added to the elective list are already being taught.

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?

All courses that have been added to the elective list are already being taught, so these changes do not require additional space, etc.

Reviewer Comments:

Rachel Miller (rachel.miller) (Wed, 23 Nov 2022 03:59:08 GMT): Rollback: The Catalogue Description is too short and general. Please provide a more detailed description of your program for students. The Program Learning Outcomes do not use measurable verbs. Please use Bloom's Taxonomy to describe what students will be able to do when they come out of your program. We are trying to move away from statements about understanding because this is difficult to assess. How will students demonstrate that they will develop an understanding?

Key: 314