MATHEMATICS BS

More Information

Advising Requirement

Advising is mandatory for this program. Consult your department advisor or program coordinator for information.

E-advising Tools

Students are encouraged to use the interactive e-advising tools that have been designed to help them graduate within four years. These tools can be accessed through the Student Center.

Mathematics is the language for understanding patterns and developing abstractions. It is the science of number, structure, shape, and change. Practitioners learn to think analytically and critically, and to formulate and solve problems. The role of mathematics is vital and growing, providing solutions to problems in a wide range of disciplines including physics, chemistry, biology, engineering, computer science, and economics. As a result, employment opportunities in the mathematical sciences are expected to continue to expand.

The option in general mathematics. This option prepares students to assume attractive and challenging positions in industry and government (e.g. data scientist, software engineer, or financial analyst) or to pursue graduate work in mathematics or a related field. Students develop strong problem-solving and critical thinking skills. A degree in mathematics is preparation for solving mathematical problems in the sciences, engineering, business, finance, and health care. Combined with a California Single Subject Credential in Mathematics, a BS in General Mathematics prepares students to teach at the high school level. Alternatively, combined with a master's degree, a BS in General Mathematics prepares students to teach at the community college level.

The option in applied mathematics. This option prepares students to assume attractive and challenging positions in industry and government, or to pursue graduate work in pure or applied mathematics. A degree in applied mathematics is preparation for solving mathematical problems in the sciences, engineering, business, finance, and health care.

The option in mathematics education. This option fulfills all requirements for the Single Subject Preparation Program in Mathematics for those students wishing to pursue a California single subject credential in mathematics. Students first complete the BS in mathematics education, then they enroll in a one-year postbaccalaureate credential program. Graduates of the credential program are qualified to teach high school in California and other states with reciprocity agreements.

The mathematics education option also prepares students to pursue graduate degrees in mathematics education.

The option in mathematics education-credential path. Students wishing to obtain a degree and a high school teaching credential should choose this option, which allows students to earn both a degree and credential in four years.

The option in statistics. This is a modern program balanced between theoretical and applied statistics. Statistics graduates are well prepared to pursue a higher degree in statistics or data science. Statisticians offer essential insight in determining which data and conclusions are trustworthy. They can find many career opportunities in cutting-edge research in applied fields such as medicine, pharmaceuticals, business, insurance, and other actuarial applications, quality control, and the social sciences.

The option in foundational mathematics education. This option fulfills all requirements for the Single Subject Preparation Program in Mathematics for those students wishing to pursue a California single subject credential in mathematics. Students are also prepared to pursue graduate degrees in mathematics education.

Grading Requirement

All courses taken to fulfill program course requirements must be taken for a letter grade except those courses specified by the department as credit/no credit grading only.

Enrollment in any mathematics course requires a grade of C- or higher in all prerequisite courses or their transfer equivalents.

All courses taken to fulfill credential course requirements must be taken for a letter grade (except those courses specified by the department as credit/no credit grading only) and must be completed with a grade of C- or higher. Students must attain a cumulative 3.0 Grade Point Average (GPA) in credential courses.

Course Requirements for the Major: 46-56 units

Completion of the following courses, or their approved transfer equivalents, is required of all candidates for this degree. Courses in this program may complete more than one graduation requirement.

Course	Title	Units
Major Core		
MATH 120	Analytic Geometry and Calculus [1]	4
MATH 121	Analytic Geometry and Calculus [1]	4
MATH 235	Elementary Linear Algebra	3
MATH 330W	Methods of Proof (W)	3
MATH 350	Introduction to Probability and Statistics	3
Select four to six units from the following:		4-6
MATH 220	Analytic Geometry and Calculus [1]	
MATH 125 & MATH 225	Advanced Number and Operation and Algebra Functions, Real and Complex Number Systems	
Select one of the following:		3
MATH 420W	Advanced Calculus (W)	
MATH 425W	Computational and Communication in Mathematical Modeling (W)	
Computer Literacy		
Select one of the following:		3-4
CSCI 111	Programming and Algorithms I	
MATH 230	An Introduction to Computational Mathematics	
Major Option		
Select one of the following options:		19-26
Applied Mathematics (p. 2)		
Foundational Mathematics Education (p. 2)		
General Mathematics (p. 2)		
Mathematics Education (p. 2)		
Mathematics Education - Credential Path (p. 2)		

Statistics (p. 3)		
Total Units		**46-56**

[1] The MATH 120, MATH 121, MATH 220 sequence should be started as early as possible, provided the student has the necessary background. MATH 118 and MATH 119 (or their equivalents) are required pre-calculus courses for MATH 120.

Some upper-division courses require only MATH 120 or MATH 121 as a prerequisite. Refer to catalog course listings when choosing courses.

Major Option Course Requirements

Students must select one of the following options for completion of the major course requirements.

A student may complete more than one option in the major. Only courses specifically required by both options may be double counted.

The Option in Applied Mathematics: 22 units

Course	Title	Units
MATH 260	Elementary Differential Equations	4
MATH 360	Ordinary Differential Equations	3
MATH 361	Boundary Value Problems and Partial Differential Equations	3
MATH 461	Numerical Analysis	3
MATH 465	Introduction to Complex Variables	3
MATH 480	Mathematical Modeling	3
Select one of the following:		3
MATH 472	Introduction to Chaotic Dynamical Systems	
MATH 475	Calculus of Variations	
Total Units		**22**

The Option in Foundational Mathematics Education: 19 units

The following program, together with the major core program, fulfills all requirements for the Foundational Subject Matter Preparation Program in Mathematics.

Course	Title	Units
MATH 305	Conceptual and Practical Statistics	3
MATH 310	Patterns and Structures in Mathematics	3
MATH 333	History of Mathematics	3
MATH 341	Mathematical Topics for the Credential	3
MATH 342	Math Topics for the Credential	3
MATH 346	College Geometry	3
Select one of the following:		1
MATH 195	Project MATH Seminar Year 1	
MATH 241	Secondary Math Early Field Experience	
Total Units		**19**

The Option in General Mathematics: 25 units

Course	Title	Units
MATH 260	Elementary Differential Equations	4
MATH 421	Advanced Calculus	3
MATH 449	Modern Algebra	3
MATH 465	Introduction to Complex Variables	3

Select one of the following:		3
MATH 337	Introduction to the Theory of Numbers	
MATH 344	Graph Theory	
Select one of the following:		3
MATH 428	Differential Geometry	
MATH 437	Topology	
Select one of the following:		3
MATH 435	Linear Algebra	
MATH 451	Modern Algebra II	
Select three units from the following:		3
Upper-division Mathematics (MATH) courses [1]		
Total Units		**25**

[1] Except MATH 305, MATH 310, MATH 311, MATH 341, MATH 342, and MATH 441.

The Option in Mathematics Education: 22 units

The following program, together with the major core program, fulfills all requirements for the Single Subject Matter Preparation Program in Mathematics.

Course	Title	Units
MATH 305	Conceptual and Practical Statistics	3
MATH 333	History of Mathematics	3
MATH 337	Introduction to the Theory of Numbers	3
MATH 341	Mathematical Topics for the Credential	3
MATH 342	Math Topics for the Credential	3
MATH 346	College Geometry	3
MATH 449	Modern Algebra	3
Select one of the following:		1
MATH 195	Project MATH Seminar Year 1	
MATH 241	Secondary Math Early Field Experience	
Total Units		**22**

Subject matter preparation requirements are governed by federal and state legislative action and approval of the California Commission on Teacher Credentialing. Requirements may change between catalogs. Please consult with your departmental credential advisor for current information.

The Option in Mathematics Education - Credential Path: 70 units

The following program, together with the major core program, fulfills all requirements for both a degree in Mathematics (Mathematics Education Option) and the Single Subject Credential in Mathematics.

Course	Title	Units
Mathematics		
MATH 305	Conceptual and Practical Statistics	3
MATH 333	History of Mathematics	3
MATH 337	Introduction to the Theory of Numbers	3
MATH 341	Mathematical Topics for the Credential	3
MATH 342	Math Topics for the Credential	3
MATH 346	College Geometry	3
MATH 449	Modern Algebra	3

Select two units from the following: 2

MATH 195	Project MATH Seminar Year 1	
MATH 241	Secondary Math Early Field Experience	
Education		
EDTE 302	Access and Equity in Education	3
EDTE 530	Fundamentals of Teaching Practice for Secondary Teachers	3
EDTE 532	Literacy Development	3
EDTE 534	Teaching Special Populations	2
EDTE 535A	Teaching Practicum I for Blended Mathematics Candidates	3
EDTE 536	Subject Area Pedagogy II	3
EDTE 537	Applications for Democratic Education	3
EDTE 538	Teaching Practicum II	9
EDTE 580	Educational Psychology	3
Additional Requirements		
CMST 131	Speech Communication Fundamentals	3
EDTE 451	Health Education for Secondary School Teachers	3
ENGL 471	Intensive Theory and Practice of Second Language Acquisition	3
POLS 155	American Government: National, State, and Local	3
HIST 130	United States History	3
Total Units		**70**

The Option in Statistics: 25-26 units

Course	Title	Units
MATH 260	Elementary Differential Equations	4
MATH 351	Introduction to Probability and Statistics	3
MATH 450	Mathematical Statistics	3
MATH 456	Applied Statistical Methods II	3
MATH 458	Sampling Methods	3
Select one of the following:		3-4
MATH 314	Probability and Statistics for Science and Technology	
MATH 315	Applied Statistical Methods I	
Select six units from the following:		6
Upper-division mathematics (MATH) courses [1]		
Total Units		**25-26**

[1] except MATH 310, MATH 311, MATH 341, MATH 342, and MATH 441.

Electives Requirement

To complete the total units required for the bachelor's degree, select additional elective courses from the total University offerings. You should consult with an advisor regarding the selection of courses which will provide breadth to your University experience and possibly apply to a supportive second major or minor.

Honors in the Major

Honors in the Major is a program of independent work in your major. It requires 6 units of honors course work completed over two semesters.

The Honors in the Major program allows you to work closely with a faculty mentor in your area of interest on an original performance or research project. This year-long collaboration allows you to work in your field at a professional level and culminates in a public presentation of your work. Students sometimes take their projects beyond the University for submission in professional journals, presentation at conferences, or academic competition. Such experience is valuable for graduate school and professional life. Your honors work will be recognized at your graduation, on your permanent transcripts, and on your diploma. It is often accompanied by letters of commendation from your mentor in the department or the department chair.

Some common features of Honors in the Major program are:

- You must take 6 units of Honors in the Major course work. All 6 units are honors classes (marked by a suffix of H), and at least 3 of these units are independent study (399H, 499H, 599H) as specified by your department. You must complete each class with a minimum grade of B.
- You must have completed 9 units of upper-division course work or 21 overall units in your major before you can be admitted to Honors in the Major. Check the requirements for your major carefully, as there may be specific courses that must be included in these units.
- Yourcumulative#GPA should be at least 3.5 or within the top 5% of majors in your department.
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- Most students apply for or are invited to participate in Honors in the Major during the second semester of their junior year. Then they complete the 6 units of course work over the two semesters of their senior year.
- Your honors work culminates with a public presentation of your honors project.

While Honors in the Major is part of the Honors Program, each department administers its own program. Please contact your major department or major advisor to apply.

Well-qualified Mathematics majors are encouraged to apply for Honors in Mathematics. The program is open to junior and senior Mathematics majors who have completed 9 upper-division units (or a total of 24 units) in mathematics, including MATH 420W with a grade of B or higher, and have a grade point average among the top 5% of junior-senior mathematics majors. Please visit the department office in HOLT 101 for further information.

See Bachelor's Degree Requirements (https://catalog.csuchico.edu/undergraduate-requirements/bachelors-degree-requirements/) for complete details on general degree requirements. A minimum of 39 units, including those required for the major, must be upper division.

General Education Requirements: 48 units

See General Education (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/) and the Class Schedule (http://www.csuchico.edu/schedule/) for the most current information on General Education Requirements and course offerings.

This major has approved GE modification(s). See below for information on how to apply these modification(s).

- MATH 217 is an approved major course substitution for Critical Thinking (A3).

- MATH 330W is an approved major course substitution for Upper-Division Scientific Inquiry and Quantitative Reasoning (UD-B).

These modifications apply to The Option in Mathematics Education - Credential Path only

- EDTE 451 fulfills Lifelong Learning and Self-Development (E).
- EDTE 302, ENGL 471, and MATH 333 fulfill the Upper-Division Pathway requirement.

Diversity Course Requirements: 6 units

You must complete a minimum of two courses that focus primarily on cultural diversity. At least one course must be in U.S. Diversity (USD) and at least one in Global Cultures (GC). See Diversity Requirements (https://catalog.csuchico.edu/undergraduate-requirements/diversity-requirements/) for a full list of courses. Most courses taken to satisfy these requirements may also apply to General Education (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/).

Upper-Division Writing Requirement

Writing Across the Curriculum (EM 17-009 (http://www.csuchico.edu/prs/EMs/2017/17-009.shtml/)) is a graduation requirement and may be demonstrated through satisfactory completion of four Writing (W) courses, two of which are designated by the major department. See Mathematics/Quantitative Reasoning and Writing Requirements (https://catalog.csuchico.edu/undergraduate-requirements/mathematicsquantitative-reasoning-writing-requirements/) for more details on the four courses. The first of the major designated Writing (W) courses is listed below.

- MATH 330W Methods of Proof (W)

The second major-designated Writing course is the Graduation Writing Assessment Requirement (GW) (EO 665 (https://calstate.policystat.com/policy/9585618/latest/)). Students must earn a C- or higher to receive GW credit. The GE Written Communication (A2) (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/#A2) requirement must be completed before a student is permitted to register for a GW course.