

MATHEMATICS

Mathematics Program Learning Outcomes (<https://catalog.csudh.edu/program-learning-outcomes/natural-behavioral-sciences/bachelor-science-mathematics-learning-outcomes/>)

College of Natural and Behavioral Sciences

Department of Mathematics

Bachelor of Science

Degree Roadmaps

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Mathematics Education Option

Minor

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Faculty

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Center for Science and Mathematics Education

NSM A-115, (310) 243-2203

Emeritus Faculty

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Program Description

Mathematics is about number operations and algebra, motion and change (calculus and differential equations), logical analysis, scientific visualization, structure and geometry, the prediction of random events (probability), the extraction of useful information from large sets of data (statistics), the discovery of the best ways to do things (optimization). It is abstract and theoretical, and intensely down-to-earth and practical, all at the same time.

The mathematics major and minor prepare students for exciting and rewarding work in industry, for careers in teaching, and for advanced post-baccalaureate study. Our calculus, differential equations, analysis, and probability and statistics courses enable science students to analyze data and predict outcomes in static and dynamic situations.

Our foundations, discrete math, and algebra courses give students the tools they need for rigorous logical and structural analysis and a deep conceptual understanding of quantitative situations. Our mathematics education courses prepare students to be outstanding teacher leaders with a deep knowledge of mathematics and the best practices in teaching. Our general education courses give the general student the mathematical background she or he needs to function in life as an

educated and informed citizen in an increasingly quantitative and data-driven world.

The Mathematics Department makes every effort to offer its courses at times that are convenient for students.

For additional information, please visit our website <http://math.csudh.edu/> (<http://math.csudh.edu/>).

Academic Advising

Students are welcome to see a math advisor at any time when faculty are available. All full-time math faculty serve as advisors. To schedule an appointment with an advisor, please call the math department office (310) 243-3378 or drop by NSM A-124 during regular business hours. The math department requires majors to meet with an advisor at least once each semester.

Preparation

High School students should complete Algebra II, a year of geometry and trigonometry. A mathematics course should be taken in the senior year. Transfer students should complete three semesters of calculus and one additional course if possible.

Career Opportunities

A degree in mathematics is a key that opens the door to a world of opportunity. Students who major in mathematics are able to pursue a diverse range of careers. They are sought out by profit and non-profit institutions for their ability to use reasoning and logic and for their ability to solve problems. Many are interested in passing their learning on to future generations through teaching. Others seek advanced degrees in mathematics or other sciences and pursue cutting-edge research. Some will pursue degrees in business or economics, where the ability to work with numbers can be a great advantage. Those with mathematical training have gone on to careers as business executives at major software companies, as analysts for stock trading companies, as actuaries and risk management experts for insurance companies and the healthcare industry, as scientists and data analysts in engineering and biotech firms, as software designers and programmers, and a whole host of other careers.

Graduation With Honors

An undergraduate student may graduate with Honors in Mathematics provided that the following criteria are met:

1. A minimum of 36 units in residence at CSU Dominguez Hills;
2. A minimum grade point average of at least 3.5 in all courses used to satisfy the upper division requirements in the major;
3. Recommendation by the faculty of the Mathematics Department.

Bachelor of Science in Mathematics

Total Course Requirements for the Bachelor's Degree

See the "Requirements for the Bachelor's Degree (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/>)" in the University Catalog for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

Elective Requirements

Completion of elective courses (beyond the requirements listed below) to reach a total of 120 units.

General Education Requirements (49 units)

See the "General Education (<https://catalog.csudh.edu/general-information/double-counting-general-education-courses/general-education/>)" requirements in the University Catalog or the Class Schedule for the most current information on General Education requirements and course offerings.

Graduation Writing Assessment Requirement

See the "Graduation Writing Assessment Requirement (<https://catalog.csudh.edu/general-information/graduate-writing-examination/>)" in the University Catalog.

Minor Requirements

No minor is required.

Major Requirements (60-66 units)

Students must select one of the options listed below. The following courses, or their approved transfer equivalents, are required of all candidates for this degree. All courses used to satisfy this major must be passed with a grade of "C" or better.

Core Requirements (38 units)

1. Lower Division Required Courses (29 units)

MAT 191 Calculus I (5)
 MAT 193 Calculus II (5)
 MAT 211 Calculus III (5)
 MAT 247 Elements of Linear Algebra (3)
 MAT 271 Foundations Of Higher Math (3)
 MAT 281 Discrete Mathematics (3)
 PHY 130 General Physics I (5)

2. Upper Division Required Courses (9 units)

MAT 331 Linear Algebra (3)
 MAT 333 Abstract Algebra (3)
 MAT 401 Advanced Analysis I (3)

Mathematics Option - (22 units)

1. Lower Division Required Courses (4 units)

CSC 121 Introduction to Computer Science and Programming I (4)

2. Upper Division Required Courses (9 units)

MAT 321 Probability and Statistics (3)
 MAT 403 Advanced Analysis II (3)
 MAT 401 Advanced Analysis I (3)

3. Electives (9 units)

a. Select one of the following courses (3 units)

MAT 447 Number Theory (3)
 MAT 448 Cryptography (3)

b. Select two of the following courses (6 units)

MAT 311 Differential Equations (3)
 MAT 323 Statistical Inference (3)
 MAT 327 Introduction to Machine Learning with Software (3)
 MAT 411 Mathematical Modeling (3)
 MAT 460 Graph Theory and Algorithms (3)

Mathematics Education Option - (28 units)

This option will satisfy the subject matter preparation necessary for a secondary teaching credential in mathematics. Students do not

get Subject Matter Preparation on their diploma; the diploma says Mathematics Education option.

1. Lower Division Required Courses (9 units)

MAT 131 Elementary Statistics and Probability (3)
 MAT 143 Problem Solving in Mathematics (3)
 MAT 241 Programming and Technology for Teaching Secondary School Mathematics (3)

2. Upper Division Required Courses (13 units)

MAT 347 Modern Geometry (3)
 MAT 443 History Of Mathematics (3)
 MAT 489 Fundamental Mathematics and Teaching in Secondary Schools (4)
 MAT 490 Seminar in Mathematics Education (3)

3. Electives (3 units)

Select one of the following courses:

MAT 311 Differential Equations (3)
 MAT 327 Introduction to Machine Learning with Software (3)
 MAT 460 Graph Theory and Algorithms (3)

Minor in Mathematics (30 units)

All courses used to satisfy this minor must be passed with a grade of "C" or better.

Requirements

A. Required Courses (21 units)

MAT 191 Calculus I (5)
 MAT 193 Calculus II (5)
 MAT 211 Calculus III (5)

MAT 247 Elements of Linear Algebra (3)
 MAT 271 Foundations Of Higher Math (3)

B. Electives (6 units)

Select three upper division mathematics courses.

Introductory Mathematics Subject Matter Authorization (32 units)

Holders of a Single Subject or Multiple Subject credential issued by the California Commission on Teacher Credentialing may secure an Introductory Mathematics Subject Matter Authorization that allows the holder to teach the subject matter content typically included in curriculum guidelines and textbooks approved for study in grades 9 and below. This allows an employer to assign a teacher with an introductory mathematics authorization to teach a class in which the curriculum is for grades 9 and below but the students in the class may be in grades K-12.

For other requirements governing issuance of this authorization, consult the Teacher Education section of this catalog or contact the School of Education Student Services Center.

1. A minimum of 32 units is required but must include at least one course in the content areas of algebra, advanced algebra, geometry, probability or statistics, and development of the real number system or introduction to mathematics.
2. The following is an extensive list of courses, and their specific content area, that can be used to satisfy the 32-unit requirement. A Mathematics Department advisor can assist you in preparing your 32-unit coursework plan.

Requirements

1. Algebra

MAT 153 Pre-Calculus with Trigonometry (4)

MAT 307 Foundations of Middle School Mathematics I (3)

2. Advanced Algebra

MAT 191 Calculus I (5)

MAT 193 Calculus II (5)

MAT 309 Foundations of Middle School Mathematics III (3)

3. Geometry

MAT 207 Mathematics for Elementary School Teachers: Geometry & Statistics (4)

MAT 308 Foundations of Middle School Mathematics II (3)

4. Probability and Statistics

MAT 131 Elementary Statistics and Probability (3)

5. Development of the Real Number System or Introduction to Mathematics

MAT 107 Mathematics for Elementary School Teachers: Real Numbers (3)

or

MAT 105 Finite Mathematics (3)

MAT 143 Problem Solving in Mathematics (3)

and

MAT 141 Computers for Mathematics Teaching (3)

or

MAT 241 Programming and Technology for Teaching Secondary School Mathematics (3)

Can be used toward earning the required 32 units once each specific content area has been met.

Master of Arts in Teaching of Mathematics

The Department of Mathematics is currently not accepting students into the Master of Arts in Teaching of Mathematics program. For more information, please contact the Department of Mathematics.

Admission Procedures

Students must submit an application to the University for admission (or readmission) with graduate standing, and official transcripts of all previous college work in accordance with the procedures outlined in the Graduate Admissions section of the University Catalog. If the student is currently enrolled as a post-baccalaureate student, he/she must obtain a Request for Postbaccalaureate/Graduate Change of Objective form from the department office and submit it to the program's Graduate Coordinator.

Admission Requirements

The student will qualify for admission to the program if he/she:

1. has a baccalaureate degree from an accredited university. (See the University Catalog for requirements of graduates of non-accredited institutions.);
2. has completed two years of teaching and is currently teaching mathematics in a California school;
3. has a California Single Subject Credential in Mathematics or
4. is eligible for a California Single Subject Credential in Mathematics or
5. has completed a major in mathematics or

6. has completed, with an average grade of "B" or better, 20 semester units in college level mathematics and passed a department administered entrance examination;
7. has submitted three letters of recommendation, including one from the principal at the applicant's school;
8. has completed a successful interview with the program's Graduate Coordinator and representatives from the department's mathematics education faculty;
9. has achieved a TOEFL score of 550 (for those applicants who do not possess a bachelor's degree from a postsecondary institution where English is the principal language of instruction);
10. has a grade point average of at least 2.5 (on a 4.0 scale) in his/her last 60 semester units of upper division course work; lower division courses taken after obtaining the bachelor's degree and extension courses, (except CSU Dominguez Hills upper division resident extension courses or the equivalent on other campuses), will be excluded from the calculation; and
11. is in good standing at the last college attended.

Graduate Standing: Conditionally Classified

To qualify for admission with a graduate degree objective, students must meet the admission requirements for postbaccalaureate unclassified standing as well as any additional requirements of the particular program. Students who apply to a graduate degree program but who do not satisfy all program requirements may be admitted to conditionally classified status. Program coordinators will outline all conditions for attainment of classified status.

Graduate Standing: Classified

Students applying for master's degree programs will be admitted in classified status if they meet all program admission requirements.

Classified standing as a graduate student is granted by the academic unit to which the student is applying. Classified standing is normally granted when all prerequisites have been satisfactorily completed for admission to a master's degree program. Students must have classified standing to qualify for Advancement to Candidacy.

Graduation Writing Assessment Requirement

All graduate students entering the University in the Fall of 1983 or thereafter are required to satisfy the Graduation Writing Assessment requirement (GWAR) in accordance with the established policies of the university. Students must satisfy the requirements before being Advanced to Candidacy. (See "Graduation Writing Assessment Requirement (<https://catalog.csudh.edu/general-information/graduate-writing-examination/>)" section of the University Catalog.

Advancement to Candidacy

Advancement to candidacy recognizes that the student has demonstrated the ability to sustain a level of scholarly competency commensurate with successful completion of degree requirements. Upon advancement to candidacy, the student is cleared for the final stages of the graduate program which, in addition to any remaining course work, will include the thesis, project, or comprehensive examination.

Following are the requirements for Advancement to Candidacy:

1. A minimum of 15 resident units
2. Classified standing
3. An approved Program of Study
4. Successful completion of the GWAR

5. A cumulative GPA of 3.0 in all courses taken as a graduate student
6. No grade lower than a "C" in the degree program

Advancement to Candidacy must be certified on the appropriate form to the Graduate Dean by the department prior to the final semester, prior to the semester of the comprehensive exams, and prior to enrolling in thesis or project.

Acceptable Progress and Graduation Requirements

The following are specific graduation requirements which must be met to earn this graduate degree:

1. Completion of a minimum of 30 semester units of approved graduate work within five years. An extension of time may be granted if warranted by individual circumstances and if the outdated work is validated by such means as examination, independent study, continuing education, relevant additional course work, or by such other demonstration of competence and/or currency as deemed acceptable by the Graduate Coordinator and mathematics education faculty.

Distribution pattern of the 30 units:

1. at least 16 semester units will be completed in residence after admission to graduate standing in the program;
2. not more than 4 semester units of Graduate Seminar in Mathematics Education (MAT 590 Graduate Seminar in Mathematics Education (1-4)) can be used to meet graduation requirements;
3. not more than 9 semester units may have been earned from approved extension and/or transfer course credit; and
4. upon approval by the Graduate coordinator and representatives from the mathematics education faculty, courses taken previously may be used to meet the course content requirements if they have been completed within the five years immediately preceding the completion of the requirements of the degree. However, no courses (with the exception of GED 500 Research Methods in Education (3)) previously used to meet their requirements of another degree may apply toward the required number of 30 semester units of approved graduate work.
5. achievement of a grade point average of 3.0 or better in all courses taken to satisfy the requirements for the degree, except that an approved course in which no letter grade is assigned shall not be used in computing the grade point average;
6. satisfactory completion of the research project, or passing all parts of the comprehensive exam. The subject of the research project will depend upon that which is educationally most appropriate to the student and mathematics education. The research project is equivalent in rigor to the thesis, will be supervised by a committee of three faculty, and may include an oral defense or presentation as part of the culminating experience;
7. satisfactory completion of the Graduation Writing Assessment Requirement (GWAR); and
8. filing of an application for the award of the Master's degree.

Upon completion of the CSU Dominguez Hills' graduation requirements, award of the graduate degree must be approved by the program, the school dean, and the faculty of the University.

Degree Requirements (30 -36 units)

The Master of Arts Degree in Mathematics requires completion of 30 units of course work and one of the following:

1. Passing score on a comprehensive written examination. After completion of all course work or during the last semester of course work, the MAT degree candidate may apply to take the comprehensive examination. There is only one retake opportunity.
2. Completion of an approved thesis or creative project (MAT 599 Masters Project (6)). Students must have the approval of a faculty thesis advisor prior to enrolling for thesis credit.

A. Core Courses (21 units)

- MAT 500 Mathematics Education Research Design and Statistics (3)
- MAT 515 Topics in Advanced Finite Math (3)
- MAT 522 Foundations of Algebraic Thinking (3)
- MAT 543 Advanced Problem Solving (3)
- MAT 545 History of Math Education (3)
- MAT 557 Research in Math Education I (3)
- MAT 559 Research in Math Education II (3)

B. Each student must select one of the options below

1. Middle School Mathematics Option (9 units)

- MAT 501 Foundations of Geometric Thinking (3)
- MAT 505 Foundations of Mathematical Structures (3)
- MAT 506 Foundations of Rational Numbers (3)

2. High School Mathematics Option (9 units)

- MAT 521 Geometry For Teachers (3)
- MAT 523 Theory of Function (3)
- MAT 525 Algebraic Structures for Teachers (3)

C. Culminating Activity (0-6 units)

- MAT 599 Masters Project (6)

or

Comprehensive Exam