The A.S. degree program in mathematics gives students the opportunity to complete lower-division coursework, in preparation for transfer to a four-year program in mathematics.

### Mathematics

#### Requirements for Degree Major

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>MATH 400</td>
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<td>MATH 410</td>
<td>3</td>
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<tr>
<td>MATH 420</td>
<td>4</td>
</tr>
</tbody>
</table>

and one course selected from:

| STAT 301, MATH 320/PHIL 325 | 3     |

#### Recommended Electives

| PHYS 410; One course selected from: CISP 340, 360, or 365. |  |

**General Education Graduation Requirements:** In addition to completing the degree requirements, students must also complete the general education graduation requirements for an A.A./A.S. degree. See ARC graduation requirements.

### Mathematics Courses

**MATH 10**  
**Overcoming Math Anxiety**  
Formerly: MATH 202  
Prerequisite: None  
Advisory: Concurrent enrollment in a math course.  
Hours: 18 hours LEC  
The course will help students to recognize their fear of mathematics and overcome their math anxiety and avoidance. The students will learn strategies to achieve success in mathematical situations. This course is also useful for tutors, counselors and teachers interested in helping others overcome their math anxiety. Credit/No Credit.

**MATH 12**  
**Mathematics for the Home and Workplace**  
Formerly: MATH 203  
Prerequisite: None  
Hours: 36 hours LEC  
This course will use a variety of realistic consumer-oriented applications to refresh, reinforce, and extend students' mastery of basic mathematics concepts. The applications will include earned wages, buying and maintaining a car, working with food, budgeting, banking, and other consumer and job related activities. Calculator use will be an integral part of the course.

**MATH 25**  
**Computational Arithmetic**  
Formerly: MATH 204  
Prerequisite: None  
Hours: 54 hours LEC  
This course covers instruction in the fundamentals of arithmetic with an emphasis on computational skills. Topics to be studied will include whole numbers, fractions and decimals, problem solving, and applications.

**MATH 32**  
**Pre-Algebra**  
Formerly: MATH 215  
Prerequisite: MATH 25 with a grade of "C" or better, or placement through assessment.  
Hours: 54 hours LEC  
This course will briefly review the fundamentals of arithmetic, including whole numbers, fractions, and decimals. Course content will include order of operations, signed numbers, concepts of variables, exponents, ratios and proportions, area/perimeter/volume of geometric figures, and solving equations.
MATH 100 Elementary Algebra 5 Units
Formerly: MATH 51
Prerequisite: MATH 32 with a grade of “C” or better or placement through assessment process.
Hours: 90 hours LEC
This course includes the fundamental concepts and operations of algebra with problem solving skills emphasized throughout. Topics include properties of real numbers, linear equations and inequalities, integer exponents, polynomials, factoring polynomials, rational expressions and equations, radical expressions and equations, rational exponents, systems of linear equations and inequalities, the rectangular coordinate system, graphs and equations of lines, and solving quadratic equations. AA/AS area 4C.

MATH 110 Elementary Geometry 5 Units
Formerly: MATH 52
Prerequisite: MATH 100 or one year of high school algebra with a grade of “C” or better or placement through assessment process.
Hours: 90 hours LEC
This course covers elementary geometry with emphasis on plane geometry but with some work in space geometry. Problem solving techniques and logical thinking will be emphasized. AA/AS area 4C.

MATH 120 Intermediate Algebra 5 Units
Formerly: MATH 53
Prerequisite: MATH 100 with a grade of “C” or better, or placement through assessment.
Hours: 90 hours LEC
This course reviews and extends the concepts of elementary algebra with problem solving skills emphasized throughout. Topics which are reviewed and extended include linear and quadratic equations, factoring polynomials, rational expressions, exponents, radicals, equations of lines, and system of equations. New topics include graphs and their translations and reflections, functions, exponential and logarithmic functions, graphs of quadratic and polynomial functions, nonlinear systems of equations, polynomial and rational inequalities, and an introduction to conic sections. AA/AS area D2 and 4C.

MATH 300 Introduction to Mathematical Ideas 3 Units
Formerly: MATH 1
Prerequisite: Mathematics 120 with a grade of “C” or better. Course Transferable to UC/CSU
Hours: 54 hours LEC
This course focuses on elements of mathematical systems. It is designed to make fundamental concepts and processes more meaningful to the general student. Its content may include systems, logic, geometry, combinatorics, probability, statistics, sets, matrices, and number theory. Not recommended for students entering elementary school teaching or business administration majors. (CAN MATH 2) AA/AS area D2 and 4C; CSU area B3

MATH 310 Mathematical Discovery 3 Units
Formerly: MATH 2
Prerequisite: Mathematics 110 and 120 with a grade of “C” or better. Course Transferable to UC/CSU
Hours: 54 hours LEC
In this course students will explore mathematical patterns and relations, and formulate and prove conjectures. Topics from number theory, probability and statistics, and geometry will be investigated. Recommended for students interested in education. (CAN MATH 4) AA/AS area D2 & 4C; CSU area B3.

MATH 320 Symbolic Logic (Same as Philosophy 325) 3 Units
Formerly: MATH 12
Prerequisite: PHIL 320 or MATH 110, and MATH 120 with a grade of “C” or better
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course covers an introduction to symbolic logic including the logic of sentences (the statement calculus) and the logic of classes and relations (the predicate calculus), together with an introduction to the nature and development of deductive systems. Applications include examples of logic used in elementary mathematics and the analysis of verbal arguments. Not open to students who have completed PHIL 325. AA/AS area D2 and 4C; CSU area B3.

MATH 325 Problem-Solving 3 Units
Formerly: MATH 3
Prerequisite: MATH 120 with a grade of “C” or better, or placement through assessment process.
Course Transferable to CSU
Hours: 54 hours LEC
This course focuses on the problem-solving skills necessary to solve both real-life and nontraditional mathematics problems. Problem-solving strategies presented in this course include: drawing a diagram, eliminating possibilities, making a systematic list, looking for a pattern, guessing and checking, solving an easier related problem, working backward, algebraic representation, finite differences, and other related techniques. Divergent thinking, group work, and the clear presentation of mathematical work will be emphasized throughout the course. AA/AS area D2 and 4C; CSU area B3.

MATH 330 Trigonometry 3 Units
Formerly: MATH 15
Prerequisite: MATH 110 and 120 with a grade of “C” or better or placement through assessment process.
Course Transferable to CSU
Hours: 54 hours LEC
This course focuses on the fundamental concepts of trigonometry and the relationships between them. Applications involve right and oblique triangles, circular motion, graphing, vectors and complex numbers. (CAN MATH 8) AA/AS area D2 and 4C; CSU area B3.

MATH 340 Calculus for Business and Economics 3 Units
Formerly: MATH 43
Prerequisite: MATH 120 with a grade of “C” or better, or placement through assessment process.
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course includes analytic geometry, differential and integral calculus with applications in the fields of business, economics, social science and biological science. Not recommended for mathematics and physical science majors. (CAN MATH 34) AA/AS area D2 and 4C; CSU area B3; IGETC area 2.

MATH 342 Modern Business Mathematics 3 Units
Formerly: MATH 44
Prerequisite: MATH 120 with a grade of “C” or better, or placement through assessment.
Course Transferable to CSU
Hours: 54 hours LEC
This course is designed around applications of mathematics in economic and business contexts. Specific topics will include functions and related business formulas, tables and graphs, finance (interest and exponential models in economics), rates of change including applications and optimization, and linear programming. AA/AS area D2 & 4C; CSU area B3.

MATH 344 Finite Mathematics 3 Units
Formerly: MATH 42
Prerequisite: MATH 120 with a grade of “C” or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course covers sets, probability and combinatorics, expected value, matrix theory, systems of equations and inequalities, linear programming, and mathematics of finance with emphasis on applications in business administration, biological sciences, and social science. It also includes computer applications. (CAN MATH 12) AA/AS area D2 and 4C; CSU area B3; IGETC area 2
Mathematics Courses

Math 25
Computational Arithmetic
(formerly Math 204)
3 units

Math 10
Overcoming Math Anxiety
(formerly Math 202)
1 unit

Math 32
Pre-Algebra
(formerly Math 215)
3 units

Math 100
Beginning Algebra
(formerly Math 51)
5 units

Math 110
Elementary Geometry
(formerly Math 52)
5 units

Math 120
Intermediate Algebra
(formerly Math 53)
5 units

Math 300
Introduction to Mathematical Ideas
(formerly Math 1)
3 units

Math 325
Problem Solving
(formerly Math 3)
3 units

Math 340
Calculus for Business and Economics
(formerly Math 43)
3 units

Math 342
Modern Business Mathematics
(formerly Math 44)
3 units

Statistics 301
Intro to Probability & Statistics
(formerly Math 1)
3 units

Math 350
Calculus for Social & Life Sciences I
(formerly Math 16A)
3 units

Math 351
Calculus for Social & Life Sciences II
(formerly Math 16B)
3 units

Math 400
Calculus I
(formerly Math 9A)
5 units

Math 401
Calculus II
(formerly Math 9B)
5 units

Math 402
Calculus III
(formerly Math 9C)
5 units

Math 410
Introduction to Linear Algebra
(formerly Math 35)
3 units

Math 420
Differential Equations
(formerly Math 90)
4 units

Boxes with dashed lines indicate courses available as Math 1000 in the Math Learning Center.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 350</td>
<td>Calculus for the Life and Social Sciences I</td>
<td>3</td>
<td>This course covers the concepts and techniques of functions, limits, analytic geometry and differential calculus. Applications from business, social and biological sciences will be emphasized. (CAN MATH SEQ D-MATH 350+351; CAN MATH 30) AA/AS area D2 and 4C; CSU area B3; IGETC area 2.</td>
<td>Formerly: MATH 16A. Prerequisite: MATH 330 with a grade of &quot;C&quot; or better or placement through assessment process. Course Transferable to UC/CSU. Hours: 54 hours LEC.</td>
</tr>
<tr>
<td>MATH 351</td>
<td>Calculus for the Life and Social Sciences II</td>
<td>3</td>
<td>This course is the continuation of MATH 350. It covers integration and differentiation of commonly used functions, and applications of analytic geometry and calculus. (CAN MATH 32) AA/AS area 4C; CSU area B3; IGETC area 2; (MATH SEQ D Math 350 and 351).</td>
<td>Formerly: MATH 16B. Prerequisite: MATH 350 with a grade of &quot;C&quot; or better. Course Transferable to UC/CSU. Hours: 54 hours LEC.</td>
</tr>
<tr>
<td>MATH 360</td>
<td>Introduction to Scientific Graphing Calculators</td>
<td>1</td>
<td>This course introduces the basic functions and applications of scientific graphic calculators. It covers plotting, evaluating, and solving functions. It also discusses calculator-based problems of solutions from algebra and trigonometry. and introduces techniques that will be useful in subsequent courses like precalculus and calculus. A calculator of a model and type that will be specified by instructor is required.</td>
<td>Formerly: MATH 28. Prerequisite: MATH 330 with a grade of &quot;C&quot; or better or placement through assessment. Course Transferable to CSU. Hours: 18 hours LEC.</td>
</tr>
<tr>
<td>MATH 370</td>
<td>Pre-Calculus Mathematics</td>
<td>5</td>
<td>This course includes application and graphing of polynomial, logarithmic, exponential and trigonometric functions, systems of linear and non-linear equation and inequalities, and analytic geometry including straight lines, conic sections, graphing and curve sketching. (CAN MATH 16a) AA/AS area D2 and 4C; CSU area B3; IGETC area 2.</td>
<td>Formerly: MATH 29. Prerequisite: MATH 330 with a grade of &quot;C&quot; or better or placement through assessment process. Course Transferable to UC/CSU. Hours: 90 hours LEC.</td>
</tr>
<tr>
<td>MATH 400</td>
<td>Calculus I</td>
<td>5</td>
<td>This course is an introduction to differential and integral calculus. Its content includes limits, continuity, differentiation, and integration of algebraic and trigonometric, logarithmic, exponential and other transcendental functions. Some applications are also included. (CAN MATH 18) AA/AS area 4C and D2; CSU area B3; IGETC area 2; (MATH SEQ C MATH 400, 401 and 402). (MATH SEQ B Sum Math17,19,21 or Math 18,20)</td>
<td>Prerequisite: MATH 370 with a grade of &quot;C&quot; or better, or placement through assessment process. Advisory: MATH 405. Course Transferable to UC/CSU. Hours: 90 hours LEC.</td>
</tr>
<tr>
<td>MATH 401</td>
<td>Calculus II</td>
<td>5</td>
<td>This course is a continuation of MATH 400. Its content will include techniques of integration, improper integrals, indeterminate forms, applications of integration, infinite series, parametric equations and polar coordinates. (CAN MATH 20) AA/AS area 4C; CSU area B3; IGETC area 2; (MATH SEQ C MATH 400, 401 and 402).</td>
<td>Prerequisite: MATH 400 with a grade of &quot;C&quot; or better. Course Transferable to UC/CSU. Hours: 90 hours LEC.</td>
</tr>
<tr>
<td>MATH 402</td>
<td>Calculus III</td>
<td>5</td>
<td>This course is a continuation of MATH 401. It includes calculus of functions of more than one variable, partial derivatives, extreme functions of more than one variable, multiple integration, development of the vector calculus, line integrals, three dimensional analytic geometry and the theorems of Green, Gauss (Divergence), and Stokes. (CAN MATH 22) AA/AS area 4C; CSU area B3; IGETC area 2; (MATH SEQ C MATH 400, 401 and 402).</td>
<td>Prerequisite: MATH 401 with a grade of &quot;C&quot; or better. Course Transferable to UC/CSU. Hours: 90 hours LEC.</td>
</tr>
<tr>
<td>MATH 410</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
<td>This course provides an introduction to linear algebra including matrices, determinants, vector spaces, linear transformations, eigenvectors. It is intended for majors in mathematics, engineering, economics, science and related fields. (CAN MATH 26) AA/AS area 4C; CSU area B3; IGETC area 2.</td>
<td>Formerly: MATH 35. Prerequisite: MATH 400 with a grade of &quot;C&quot; or better. Course Transferable to UC/CSU. Hours: 54 hours LEC.</td>
</tr>
<tr>
<td>MATH 420</td>
<td>Differential Equations</td>
<td>4</td>
<td>This course is a study of ordinary differential equations with emphasis on linear equations and systems of linear equations. It includes infinite series and, Laplace transform and matrix methods of solution. It stresses applications to engineering problems. It is recommended for electrical, mechanical, industrial, ceramic, and petroleum engineers, and for mathematics and physical science majors. (CAN MATH 24) AA/AS area 4C; CSU area B2; IGETC area 2.</td>
<td>Formerly: MATH 9D. Prerequisite: Mathematics 401 with a grade of &quot;C&quot; or better. Advisory: MATH 402. Course Transferable to UC/CSU. Hours: 72 hours LEC.</td>
</tr>
<tr>
<td>MATH 481</td>
<td>Honors Applications of Calculus</td>
<td>1</td>
<td>This course focuses on professional applications of mathematics in such fields as biomathematics, economics, political science, computer science, earth science, social sciences and psychology. AA/AS area 4C</td>
<td>Formerly: MATH 8H. Prerequisite: Cumulative GPA of 3.0 or better; MATH 402 with a grade of &quot;C&quot; or better; and ENGR 300 or 480 with a grade of &quot;C&quot; or better. Course Transferable to UC/CSU. Hours: 18 hours LEC.</td>
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<tr>
<td>MATH 496</td>
<td>Teaching Assistant in Mathematics</td>
<td>1-4</td>
<td>This course is intended for students who want to develop an in-depth understanding of the fundamentals of mathematics and to learn to work with individual students and small groups of students. Open entry and exit. May be taken twice for credit.</td>
<td>Formerly: MATH 46. Prerequisite: MATH 120 with a grade of &quot;C&quot; or better. Course Transferable to CSU. Hours: 9-36 hours LEC; 27-108 hours LAB.</td>
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</tbody>
</table>
MATH 1000  Individualized Mathematics  3-5 Units
Formerly: MATH 200
Prerequisite: None
Hours: 90 hours LEC
Students wishing to take Mathematics 32 (Prealgebra) for 3.0 units, Mathematics 100 (Elementary Algebra) for 5 units, or Math 120 (Intermediate Algebra) for 5 units may enroll in “Individualized Mathematics”. Students enroll in a specific hour, during the first class meeting and the student will designate the specific course. Course placement can be determined by either an assessment test through the assessment center before the semester or completion of prerequisites. Immediate advancement from one course to the next is allowed upon successful completion of prescribed work. Credit will only be given for the number of units assigned to a course and if the course is completed during the semester. Students who do not complete the course within the semester enrolled and who receive a notation of “In Progress” must reregister in the same individualized course the following semester in order to complete the course and receive full unit credit.

Statistics

STAT 301  Introduction to Probability and Statistics  3 Units
Formerly: STAT 1
Prerequisite: MATH 120 with a grade of “C” or better.
Advisory: ENGRD 116.
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course will introduce basic concepts of probability and statistics. It will include analysis of data, probability, distributions, tests of hypothesis, estimation, regression and correlation, and analysis of variance. Related application to psychology, social science, natural science, business and engineering will be explored. A scientific calculator that has a stat package (2-variable) is used throughout the course. (CAN STAT 2) AA/AS area D2 and 4C; CSU area B3; IGETC area 2.

STAT 481  Introduction to Probability and Statistics - Honors  3 Units
Formerly: STAT 1H
Prerequisite: Cumulative GPA of 3.0 or better; MATH 120 with a grade of “C” or better, and ENGWR 300 or 480 with a grade of “C” or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course is an introduction to the concepts of statistics with a strong emphasis on the understanding and appreciation of the role of statistics in real life situations including computer analysis of real data. In addition to the topics presented in STAT 301, this honors course will include either additional topics of non-parametric statistics, design-of-experiment issues ensuring validity, analysis of variance and multiple regression or an applied research term paper using statistical methods and data collected from a work environment. AA/AS area D2; CSU area B3; IGETC area 2.