

Area: Mathematics  
 Dean: TBA  
 Phone: (916) 484-8215  
 Counseling: (916) 484-8572

Degree: A.S. - Mathematics  
 A.S. - Physical Science/Mathematics

## Mathematics Degree

The A.S. degree in mathematics provides a foundation of mathematics for students in preparation for transfer to a four-year program in mathematics or statistics. Course work includes a three-semester calculus series, differential equations, linear algebra, and statistics and/or symbolic logic.

Requirements for Degree	25 Units	
MATH 400	Calculus I	5
MATH 401	Calculus II	5
MATH 402	Calculus III	5
MATH 410	Introduction to Linear Algebra	3
MATH 420	Differential Equations	4
<i>And a minimum of 3 units from the following:</i>		3
PHIL 325	Symbolic Logic (3)	
or MATH 320	Symbolic Logic (3)	
STAT 481	Introduction to Probability and Statistics - Honors (3)	
or STAT 301	Introduction to Probability and Statistics (3)	

**Associate Degree Requirements:** The Mathematics Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

## Physical Science/Mathematics Degree

This program provides a broad study in fields of physical science and mathematics. It provides a good foundation for transfer to a four-year program in science.

### Career Opportunities

This program is intended to provide a broad foundation of skills and knowledge to help students succeed in the completion of a bachelor's degree in a variety of science, math or engineering-related areas.

Requirements for Degree	18 Units
<i>A minimum of 18 units from the following:</i>	

Transferable courses must be selected from the following areas: astronomy, chemistry, engineering, geology, mathematics, physical geography, physical science, physics, and statistics.

**Associate Degree Requirements:** The Physical Science/Mathematics Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

## Mathematics

### MATH 10 Developing Confidence in Math 1 Unit

*Advisory: Concurrent enrollment in another math course.*

*Hours: 18 hours LEC*

This course helps students to recognize common fears and misconceptions of mathematics, and to overcome math anxiety and avoidance. Strategies to achieve success in mathematical situations are discussed. This course is also useful for tutors, counselors, and teachers interested in helping others overcome their math anxiety. Credit/No Credit only.

### MATH 12 Mathematics for the Home and Workplace 2 Units

*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 3 Units

*Advisory: Confirm placement using ARC's Math Self-Assessment System.*

*Hours: 54 hours LEC*

This course covers fundamentals of arithmetic with an emphasis on computational skills. Topics include whole numbers, fractions, decimals, problem solving, and applications.

### MATH 32 Pre-Algebra 3 Units

*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

*Prerequisite: MATH 32 with a grade of "C" or better or placement through the assessment process.*

*Hours: 90 hours LEC*

This course includes the fundamental concepts and operations of algebra with problem solving skills emphasized. Topics include properties of real numbers, linear equations and inequalities, integer exponents, polynomials, and factoring polynomials. Other topics include rational exponents and rational/radical expressions with associated equations. Additional topics introducing the rectangular coordinate system, focus on graphs and equations of lines, systems of linear equations/inequalities, and solving quadratic equations.

**MATH 110 Elementary Geometry 5 Units**

*Prerequisite: MATH 100 with a grade of "C" or better or placement through the assessment process.*

*Hours: 90 hours LEC*

This course covers aspects of elementary geometry. Topics include terms and definitions, properties of parallel lines and parallelograms, congruent and similar triangles, properties of triangles, right triangles, and basic trigonometry. Later topics include properties of circles, construction of loci, areas, and volumes. The course also emphasizes problem solving strategies, elementary logic, and reading and writing proofs.

**MATH 120 Intermediate Algebra 5 Units**

*Prerequisite: MATH 100 with a grade of "C" or better; or placement through the assessment process.*

*General Education: AA/AS Area II(b)*

*Hours: 90 hours LEC*

This course reviews and extends the concepts of elementary algebra with an emphasis on problem solving. Topics which are reviewed and extended include linear and quadratic equations, factoring polynomials, rational expressions, exponents, radicals, graphing, 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.

**MATH 294 Topics in Mathematics .5-4 Units**

*Hours: 9-72 hours LEC*

This course is designed to give students an opportunity to study topics in mathematics not included in current course offerings. Individualized topics are developed to foster, complement and build upon arithmetic, geometric and algebraic skills with an emphasis on critical thinking. The course may be taken four times for a maximum of 6 credits with no duplication of topics.

**MATH 300 Introduction to Mathematical Ideas 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*

*General Education: AA/AS Area II(b); CSU Area B4*

*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.

**MATH 310 Mathematical Discovery 3 Units**

*Prerequisite: MATH 110 and 120 with grades of "C" or better*

*General Education: AA/AS Area II(b); CSU Area B4*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC*

This course explores mathematical patterns and relations, and formulation and proof of conjectures. Topics from number theory, probability and statistics, and geometry will be investigated. Recommended for students interested in education.

**MATH 315 Exploratory Field Experience in Mathematics 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*

*General Education: AA/AS Area III(b)*

*Enrollment Limitation: Current TB clearance is required prior to work in schools. Fingerprinting may also be required.*

*Course Transferable to CSU*

*Hours: 36 hours LEC; 54 hours LAB*

This course is an education-based field experience in mathematics allowing students to explore teaching as a career choice. Students are assigned to area schools to observe and/or assist in a mathematics classroom. Students have the opportunity to learn and practice essential skills to assist younger students with their progress through the mathematics sequence, and to learn about social, cultural, and educational issues related to mathematics and the school environment. Weekly seminars allow students to share experiences and compare observations. This course is recommended for those who may wish to pursue a single-subject credential in mathematics.

**MATH 320 Symbolic Logic 3 Units**

*Same As: PHIL 325*

*Prerequisite: PHIL 320 or MATH 110, and MATH 120 with a grade of "C" or better.*

*General Education: AA/AS Area II(b); CSU Area B4*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC*

This course covers an introduction to symbolic logic including the logic of sentences (the statement of 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.

**MATH 325 Problem-Solving 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better; or placement through the assessment process.*

*General Education: AA/AS Area II(b); CSU Area B4*

*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.

**MATH 330 Trigonometry 3 Units**

*Prerequisite: MATH 110 and 120 with grades of "C" or better*

*General Education: AA/AS Area II(b); CSU Area B4*

*Course Transferable to CSU*

*Hours: 54 hours LEC*

This course presents the fundamentals of trigonometry. Topics include definitions of trigonometric and circular functions, graphs, identities and applications. Other material covered includes solving trigonometric equations, solving triangles using the Laws of Sines and Cosines, vectors, polar coordinates and polar representations of complex numbers.

**MATH 340 Calculus for Business and Economics 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*

*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC*

This course is an introduction to differential and integral calculus with applications in the fields of business, economics, social science and biological science. It is not recommended for mathematics and physical science majors.

**MATH 342 Modern Business Mathematics 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*  
*General Education: AA/AS Area II(b); CSU Area B4*  
*Course Transferable to CSU*  
*Hours: 54 hours LEC*

This course is designed around applications of mathematics in economic and business contexts. Specific topics 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.

**MATH 344 Finite Mathematics 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*  
*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 54 hours LEC; 18 hours LAB*

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.

**MATH 350 Calculus for the Life and Social Sciences I 3 Units**

*Prerequisite: MATH 330 with a grade of "C" or better*  
*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 54 hours LEC*

This course covers functions, limits, and derivatives, and introduces antiderivatives. Algebraic and computational techniques are emphasized in applications from business, and social and biological sciences. It is not recommended for math or engineering majors.

**MATH 351 Calculus for the Life and Social Sciences II 3 Units**

*Prerequisite: MATH 350 with a grade of "C" or better*  
*General Education: CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 54 hours LEC*

This course is the continuation of MATH 350. It covers integration and differentiation of commonly used functions and applications of analytic geometry and calculus.

**MATH 360 Introduction to Scientific Graphing Calculators 1 Unit**

*Prerequisite: MATH 330 with a grade of "C" or better or placement through assessment.*  
*Course Transferable to CSU*  
*Hours: 18 hours LEC*

This course introduces the basic functions and applications of scientific graphic calculators. It covers plotting, evaluating, and solving functions. It also discusses calculator-based solutions of problems 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.

**MATH 370 Pre-Calculus Mathematics 5 Units**

*Prerequisite: MATH 330 with a grade of "C" or better*  
*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 90 hours LEC*

This course includes application and graphing of polynomial, logarithmic, exponential and trigonometric functions, as well as systems of linear and non-linear equations and inequalities. It also covers analytic geometry including straight lines, conic sections, graphing and curve sketching.

**MATH 400 Calculus I 5 Units**

*Prerequisite: MATH 370 with a grade of "C" or better*  
*Advisory: Students who took Precalculus in a non-college setting should confirm adequate preparation for Math 400 using ARC's Math Self-Assessment System*  
*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2; TCSU MATH 210, MATH Sequence A*  
*Course Transferable to UC/CSU*  
*Hours: 90 hours LEC*

This course is an introduction to differential and integral calculus. It includes limits, continuity, differentiation and integration of algebraic, trigonometric, logarithmic, exponential and other transcendental functions. Some applications are also included.

**MATH 401 Calculus II 5 Units**

*Prerequisite: MATH 400 with a grade of "C" or better*  
*General Education: CSU Area B4; IGETC Area 2; TCSU MATH 220, MATH Sequence A*  
*Course Transferable to UC/CSU*  
*Hours: 90 hours LEC*

This course is a continuation of MATH 400. It includes techniques of integration, improper integrals, indeterminate forms, applications of integration, infinite series, parametric equations and polar coordinates.

**MATH 402 Calculus III 5 Units**

*Prerequisite: MATH 401 with a grade of "C" or better*  
*General Education: CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 90 hours LEC*

This course is a continuation of MATH 401. It includes calculus of functions of more than one variable, partial derivatives, extrema of functions of more than one variable, multiple integration, development of vector calculus, line integrals, three dimensional analytic geometry and the theorems of Green, Gauss (Divergence), and Stokes.

**MATH 410 Introduction to Linear Algebra 3 Units**

*Prerequisite: MATH 400 with a grade of "C" or better*  
*Advisory: MATH 402*  
*General Education: CSU Area B4; IGETC Area 2; TCSU MATH 250*  
*Course Transferable to UC/CSU*  
*Hours: 54 hours LEC*

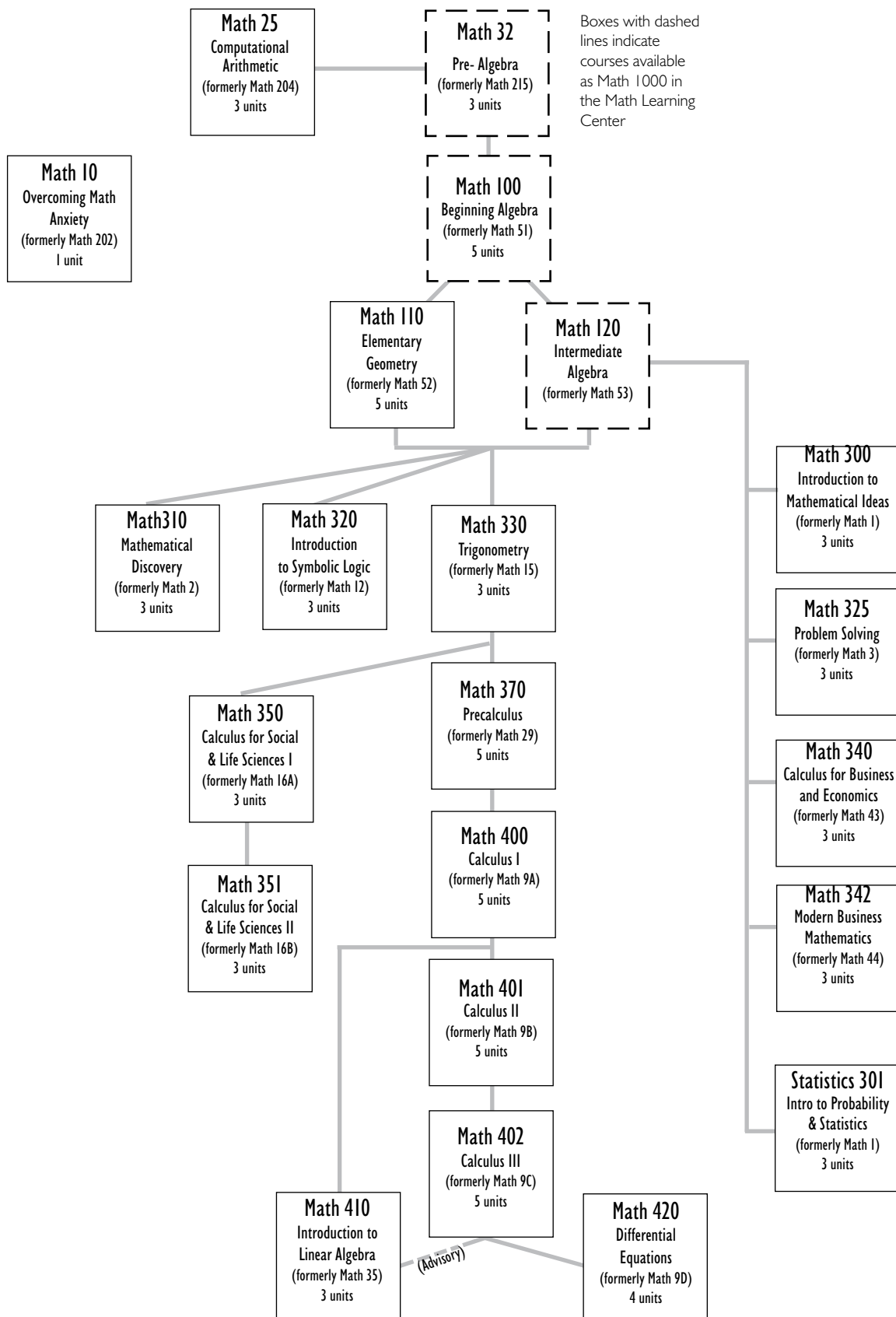
This course provides an introduction to linear algebra including matrices, determinants, vector spaces, linear transformations, and eigenvectors. It is intended for majors in mathematics, engineering, economics, science, and related fields.

**MATH 420 Differential Equations 4 Units**

*Prerequisite: MATH 401 with a grade of "C" or better*  
*Advisory: MATH 402*  
*General Education: CSU Area B4; IGETC Area 2*  
*Course Transferable to UC/CSU*  
*Hours: 72 hours LEC*

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.

# mathematics courses



**MATH 481 Honors Applications of Calculus 1 Unit**

*Prerequisite: Cumulative GPA of 3.0 or better; MATH 402 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: 18 hours LEC*

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

**MATH 100 Individualized Mathematics 3-5 Units**

*Advisory: Determine or confirm placement using ARC's Math Self-Assessment System.*

*Hours: 90 hours LEC*

This program is an open-entry/open-exit, independent study approach for students wishing to take MATH 25 (Computational Arithmetic, 3 units), MATH 32 (Prealgebra, 3 units), MATH 100 (Elementary Algebra, 5 units), or MATH 120 (Intermediate Algebra, 5 units). During the first class meeting, students choose the specific course in which to enroll. For students who do not have a prerequisite, course placement should be determined by ARC's on-line self-assessment system. Students who complete one course may advance immediately to the next one. Students may choose to complete a course in one semester (or less), or take up to two semesters. Unit credit is only awarded for the semester in which the course is completed. Students who receive a notation of "In Progress" must register in the same individualized course the following semester in order to complete the course and receive full unit credit. Computer-based instruction is an integral component. Work may be done on campus (computers available) or off campus (software runs on PC Windows or Macintosh w/virtual PC software).

**Statistics**

**STAT 301 Introduction to Probability and Statistics 3 Units**

*Prerequisite: MATH 120 with a grade of "C" or better*

*Advisory: ENGRD 116*

*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*

*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, test of hypothesis, estimation, regression and correlation, and analysis of variance. Related applications 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.

**STAT 481 Introduction to Probability and Statistics - Honors 3 Units**

*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*

*General Education: AA/AS Area II(b); CSU Area B4; IGETC Area 2*

*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.