MATHEMATICS

DIVISION: Math & Computer Science

The Mathematics & Computer Science Division offers coursework at the freshman and sophomore levels in Mathematics, Computer Science, and Statistics. Computer Science course offerings include programming in languages such as C++, Java, and Python; Computer Data Structures; and Unix Scripting with BASH. The coursework prepares students for transfer to a 4-year university, where they can earn a degree in Computer Science or Computer Engineering.

The Mathematics Department offers a variety of classes for students earning either an Associate Degree, an Associate Degree for Transfer, or to transfer to a 4-year university. Courses offered include College Algebra up through Calculus and Differential Equations for Science, Technology, Engineering, & Mathematics (STEM) majors; students focusing on non-STEM fields, can enroll in Statistics or Quantitative Reasoning, both of which are applicable to students' real lives. Students can also earn an Associate Degree for Transfer in Mathematics, to prepare them for Transfer to a CSU or UC.

The Math Success Center is also a vital support to students' success in Mathematics courses, providing tutoring, workshops, and activities to enhance their conceptual understanding.

The Mathematics, Engineering, Science Achievement (MESA) program provides support for 1st generation students who wish to transfer to a 4-year university in a STEM field of study. MESA students benefit from webinar, workshop, and conference attendance, nominations for a variety of internships and career opportunities, including numerous NASA projects, transfer preparation, and one-on-one support navigating college.

There are numerous clubs related to the Mathematics & Computer Science Division, which include:

- Math Success Club, which helps students succeed in Mathematics
- Pi Club holds workshops and events to enhance student math learning, encourage mathematical discovery and research, and to provide connections between mathematics and the real-world.
- She.Codes supports women in Computer Science and promotes women in technology fields.

- Mathematics – Associate in Science Degree for Transfer to CSU (https://curriculum.pasadena.edu/academic-programs/mathematics/mathematics-ast/)

Courses

MATH 003 COLLEGE ALGEBRA FOR STEM
5 unit
Transfer Credit: CSU; UC limitations. See counselor.
Prerequisite(s): *MATH 131 or placement based on the Math assessment process*

Algebra, graphing, and applications of functions; polynomial, rational, logarithmic and exponential functions, equations and inequalities; linear and nonlinear systems of equations; conic sections; sequences and series; the binomial theorem. Intended for STEM majors but open to all qualified students. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 005A SINGLE VARIABLE CALCULUS I
5 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
C-ID: MATH 211; MATH SEQ 900S (WITH MATH 005B)
Prerequisite(s): *MATH 008 or MATH 009, or placement based on the Math assessment process*

Limits, differentiation, and integration of functions of a single variable including the Mean Value Theorem and the Fundamental Theorem of Calculus. No credit if taken after MATH 005AH. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 005AH HONORS SINGLE VARIABLE CALCULUS I
5 unit
Transfer Credit: CSU; UC
Prerequisite(s): *MATH 008 or MATH 009, or placement based on the Math assessment process*

Enrollment Limitation: *Acceptance into the Honors Program*

Limits, differentiation, and integration of functions of a single variable including the Mean Value Theorem and the Fundamental Theorem of Calculus. As an honors course, students will be expected to complete additional assignments involving more extensive proofs and problem solving to gain deeper insight into single variable calculus theory and applications. No credit if taken after MATH 005A. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 005B SINGLE VARIABLE CALCULUS II
5 unit
Transfer Credit: CSU; UC.
C-ID: MATH 221; MATH SEQ 900S (WITH MATH 005A)
Prerequisite(s): *MATH 005A or MATH 005AH*

Differentiation and integration of trigonometric, exponential, logarithmic, hyperbolic functions, polar, and parametric equations; applications and techniques of integration; indeterminate forms and infinite sequences and series. No credit given if taken after MATH 005BH. Total of 90 hours lecture.
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 005BH HONORS SINGLE VARIABLE CALCULUS II
5 unit
Transfer Credit: CSU; UC.
C-ID: MATH 221.
Prerequisite(s): *MATH 005A or 005AH*

Enrollment Limitation: *Acceptance to the PCC Honors Program*

Differentiation and integration of trigonometric, exponential, logarithmic, hyperbolic functions; polar, and parametric equations; applications and techniques of integration; indeterminate forms and infinite sequences and series. As an honors course, students will be expected to complete additional assignments involving more extensive proofs and problem solving to gain deeper insight of single variable calculus theory and applications. No credit if taken after MATH 005B. Total of 90 hours lecture.
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 005C MULTIVARIABLE CALCULUS
5 unit
Transfer Credit: CSU; UC.
C-ID: MATH 230
Prerequisite(s): *MATH 005B or MATH 005BH*

Parametric equations, polar coordinates, vectors and vector calculus, partial differentiation, multiple integration, Green's theorem, divergence theorem of Gauss, Stokes' theorem. No credit given if taken after MATH 005CH. Total of 90 hours lecture
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 005CH HONORS MULTIVARIABLE CALCULUS
5 unit
Transfer Credit: CSU; UC
Prerequisite(s): *MATH 005B or 005BH*

Enrollment Limitation: *Acceptance to the PCC Honors Program*

Parametric equations, polar coordinates, vectors and vector calculus, partial differentiation, multiple integration, Green's theorem, divergence theorem of Gauss, Stokes' theorem. As an honors course, students will be expected to complete additional assignments involving more extensive proofs and problem solving to gain deeper insight of multivariable calculus theory and applications. No credit if taken after MATH 005C. Total of 90 hours lecture
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 006A CALCULUS FOR LIFE SCIENCES I
3 unit
Transfer Credit: CSU; UC credit under review.
Prerequisite(s): *MATH 003 or MATH 009 or placement by the Math Placement process*

Standard topics in differential calculus with an emphasis on life science applications used throughout the course. Topics include algebraic, trigonometric, exponential growth and decay functions; limits; continuity; derivatives and applications of derivatives; brief introduction to integrals. Total of 54 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 008 PRECALCULUS TRIGONOMETRY
4 unit
Transfer Credit: CSU
Prerequisite(s): *MATH 003 or placement based on the assessment process*

Trigonometric functions and their graphs; inverse trigonometric functions; unit circle and special right triangles; trigonometric identities and equations; polar and parametric equations; polar and rectangular forms of complex numbers and vectors; matrix algebra and Cramer's Rule; mathematical induction. Intended for STEM majors but open to all qualified students. No credit if taken after MATH 007B. Total of 72 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 009 PRECALCULUS MATHEMATICS
5 unit
Transfer Credit: CSU; UC credit limitations. See counselor.
Prerequisite(s): *MATH 008 or placement based on the Math assessment process*

Algebraic, exponential, logarithmic and trigonometric functions; inverse functions; zeros and graphs of functions; inequalities; matrices; determinants; sequences and series; binomial theorem; mathematical induction; topics in analytic geometry including curve sketching and conic sections. No credit if taken after MATH 007A or 007B. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 010 LINEAR ALGEBRA AND APPLICATIONS
5 unit
Transfer Credit: CSU; UC
C-ID: MATH 250
Prerequisite(s): *MATH 005B*

Vector spaces, linear transformations, determinants, solutions of systems of equations, algebra of matrices. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 015 EXPLORATIONS IN QUANTITATIVE REASONING
4 unit
Transfer Credit: CSU; UC
Prerequisite(s): *Intermediate Algebra or placement into any MATH course numbered 001 - 099*

Skills and techniques for problem solving using mathematical methods and quantitative reasoning. Topics include: elementary logic; combinatorics and probability; statistics; set theory; and finance math. For students with non-STEM majors. Total of 72 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 020 INDEPENDENT STUDY
2 unit
Transfer Credit: CSU
Prerequisite(s): *Enrollment in or completion of any college level math course and permission of division dean*

Faculty-guided survey of contemporary mathematical topics and student research. Total of 108 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 022 DISCRETE MATHEMATICS
4 unit
Transfer Credit: CSU, UC
Prerequisite(s): *MATH 005A or CS 002 or placement based on the Math assessment process*

Study of finite mathematical systems. Includes set theory, logic, modular arithmetic, combinatorics, relations and functions, matrix algebra, Boolean algebra, recursion, graph theory. For mathematics and computer science majors, but open to all qualified students. Total of 72 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 038 FOUNDATIONS OF ELEMENTARY SCHOOL MATHEMATICS: BASIC NUMBER CONCEPTS
3 unit
Transfer Credit: CSU; UC
Prerequisite(s): *Intermediate Algebra or placement into any MATH course numbered 001 ndash; 099*

Introduces problem-solving strategies and quantitative reasoning to develop skills and explore topics in numeration systems and the real number system. Designed for prospective elementary and middle school teachers. Total of 54 hours lecture and 18 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 055 DIFFERENTIAL EQUATIONS
4 unit
Transfer Credit: CSU; UC.
C-ID: MATH 240
Prerequisite(s): *MATH 005B or MATH 005BH*

Ordinary first-and higher-order differential equations and modeling with applications to biological and physical sciences. Linear and nonlinear equations, initial-value problems, series solutions, Laplace transforms, systems of linear equations, and numerical solutions. No credit if taken after Math 055H. Total of 72 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 055H HONORS DIFFERENTIAL EQUATIONS
4 unit
Transfer Credit: CSU; UC.
Prerequisite(s): *MATH 005B or MATH 005BH*

Enrollment Limitation: *Acceptance to the Honors Program*

Ordinary first- and higher-order differential equations and modeling with applications to biological and physical sciences. Linear and nonlinear equations, initial-value problems, series solutions, Laplace transforms, systems of linear equations, and numerical solutions. As an honors course, students will be expected to complete additional assignments involving more extensive proofs and problem solving to gain deeper insight into differential equations theory and applications. No credit if taken after MATH 055. Total of 72 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 065 SCIENTIFIC COMPUTING FOR MATHEMATICS
1 unit
Transfer Credit: CSU: UC credit under review.
Exploration of the potential of applied programming methods for mathematics. Fundamentals of scripting including generative plots, graphs, animations, computations, and simulations in a variety of projects with an emphasis on using the open-sourced libraries and packages specifically for mathematics. For students who would like to explore applied coding in the context of mathematics but open to all students. Total of 54 hours laboratory.
Grade Mode: *Letter Grade, Pass/No-Pass*

MATH 103 SUPPORT FOR COLLEGE ALGEBRA
0.5 unit
Corequisite(s): *MATH 003*

Review of core prerequisite skills, competencies, and concepts for college algebra with an emphasis on critical thinking and problem solving. Intended for students who are concurrently enrolled in MATH 003: College Algebra for STEM. Topics include learning strategies and mathematical knowledge necessary for successful completion of College Algebra for STEM. Total of 45 hours laboratory.
Grade Mode: *Audit, Pass/No-Pass*

MATH 115 SUPPORT FOR EXPLORATIONS IN QUANTITATIVE REASONING
0.5 unit
Corequisite(s): *MATH 015*

Review of core prerequisite skills, competencies, and concepts for quantitative reasoning with an emphasis on critical thinking and problem solving. Intended for students who are concurrently enrolled in MATH 015: Explorations in Quantitative Reasoning. Topics include learning strategies and mathematical knowledge necessary for successful completion of Explorations in Quantitative Reasoning. Total of 36 hours laboratory.
Grade Mode: *Audit, Pass/No-Pass*

MATH 125 BEGINNING ALGEBRA
4 unit
Prerequisite(s): *MATH 402 or 400B or 250, or placement based on the Math assessment process*

Simplifying linear, polynomial, rational, and radical expressions. Using properties of exponents. Factoring polynomials. Applications and solving of linear, rational, radical, and quadratic equations. Graphing linear equations and solving systems of linear equations. Maximum credit for MATH 125, 127AB, and 128AB is 4 units. No credit if taken after MATH 127B or MATH 128B. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 131 INTERMEDIATE ALGEBRA FOR STEM
5.5 unit
Prerequisite(s): *MATH 125; or MATH 250 and concurrent enrollment in or completion of MATH 331; or placement based on the Math assessment process*

Topics include algebra, graphing, and applications of functions: polynomial, rational, radical, exponential, and logarithmic. Designed for STEM majors and some Business majors. Total of 90 hours lecture and 45 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 139 PLANE GEOMETRY
3 unit
Prerequisite(s): *MATH 125 or MATH 126C or MATH 127B or MATH 128B*

Geometric facts necessary for advanced work in mathematics. Deductive process emphasized. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 141 SURVEY OF MATHEMATICAL IDEAS
4 unit
Prerequisite(s): *MATH 125 or MATH 127B or MATH 128B or placement based on the Math assessment process*

Study of practical applications of mathematics, including topics in finance, probability and statistics, and geometry. Additional topics may include graph theory, health and nutrition, voting, history of mathematics, and logic. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 150 QUANTITATIVE LITERACY II
5.5 unit
Prerequisite(s): *MATH 250 or MATH 402 or MATH 400B or placement based on the Math assessment process*

Study of practical applications of mathematics including finance, probability, statistics, geometry, measurement & dimensional analysis, and functions: linear, exponential & logarithmic. For non-STEM majors, but open to all qualified students. Total of 90 hours lecture and 45 hours of laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 171A EXPLORING TOPICS IN MATHEMATICS
3 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Pass/no pass grading. Total of 90 hours lecture.
Grade Mode: *Audit, Pass/No-Pass*

MATH 171B EXPLORING TOPICS IN MATHEMATICS
2 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Pass/no pass grading. Total of 45 hours of lecture.
Grade Mode: *Audit, Pass/No-Pass*

MATH 171C EXPLORING TOPICS IN MATHEMATICS
1 unit
Exploratory course: Specific topic identified in Schedule of Classes. Lecture focusing on topics of current and general interest. Pass/no pass grading. Total of 18 hours lecture and 18 hours laboratory.
Grade Mode: *Audit, Pass/No-Pass*

MATH 250 QUANTITATIVE LITERACY I
5.5 unit
Prerequisite(s): *MATH 450 or placement based on the Math assessment process*

Number sense and basic algebraic skills involving integers, fractions, decimals, and percents. Simplifying algebraic expressions, solving linear equations and graphing. With an emphasis on how and where mathematics is used. No credit if taken after MATH 402, 400B, 125, 127B, or 128B. Total of 90 hours lecture and 45 hours laboratory.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 330 SKILLS FOR COLLEGE SUCCESS IN ELEMENTARY ALGEBRA
2 unit
Corequisite(s): *MATH 125*

Development and rigorous practice of essential study techniques and course material for success in Elementary Algebra. Integration of web-based supplemental instruction, life management skills, strategies for successful classroom experience, and critical thinking/problem solving strategies. No credit if taken after MATH 110. For students admitted to the Math Path program but open to all qualified students. Pass/no pass grading. Total of 45 hours lecture.
Grade Mode: *Audit, Pass/No-Pass*

MATH 331 SKILLS FOR COLLEGE SUCCESS IN INTERMEDIATE ALGEBRA FOR STEM
0.5 unit
Prerequisite(s): *MATH 250 or placement based on the Math assessment process Corequisite: MATH 131*

Critical thinking and problem solving. Intended for STEM majors to develop study skills and mathematical knowledge necessary for successful completion of Intermediate Algebra for STEM. Total of 45 hours of laboratory.
Grade Mode: *Audit, Pass/No-Pass*

MATH 402 PREALGEBRA
4 unit
Prerequisite(s): *MATH 450, or placement based on the Math assessment process*

Basic algebraic skills involving fundamental mathematical operations with integers, fractions, decimals, and percents. Simplifying algebraic expressions and solving equations. Maximum credit for MATH 402 and 400AB is 4 units. No credit if taken after MATH 400B or 250. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*

MATH 429 SKILLS FOR SUCCESS IN PREALGEBRA
2 unit
Corequisite(s): *MATH 402*

Development and rigorous practice of essential study techniques and course material for success in Prealgebra; web-based supplemental instruction; life management skills; strategies for successful classroom experience, and critical thinking/problem solving strategies. No credit if taken after MATH 110. Pass/no pass grading. Total of 45 hours lecture.
Grade Mode: *Audit, Pass/No-Pass*

MATH 450 NUMERICAL FOUNDATIONS
4 unit
Building whole number arithmetic skills. Includes a brief introduction to fractions, decimals and percents and incorporates study skills for success in mathematics courses. Total of 90 hours lecture.
Grade Mode: *Audit, Letter Grade, Pass/No-Pass*