MATHEMATICS

The study of mathematics develops analytic and quantitative skills which are valuable in today’s data-driven economy. A bachelor’s degree with a major in math is great preparation for graduate school (such as schools of law, medicine, education, or business) as well as direct employment in industry, government, research, and business. In addition, math courses serve as the foundation for many related STEM programs.

COCO Math Department Webpage (https://www.cocc.edu/departments/math/default.aspx)

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Programs

Transfer
- Mathematics - Associate of Arts Oregon Transfer (AAOT) (https://catalog.cocc.edu/programs/mathematics/mathematics-aaot/)

Courses

MTH 001 Adjust My Placement (AMP) (1 Credit)
Provides a structured setting to refresh and review math skills. Participate in problem-solving activities designed to strengthen critical thinking skills. Provides an opportunity for students to be successful in a higher-level math class than they originally placed. Math advising is also part of this course. Intended for students to strengthen previously-learned mathematical skills and problem-solving abilities. To receive the maximum benefit of this course, it is important to enroll in a math course the term immediately following. Meets twice a week for 7 weeks, beginning the second week of the term.

MTH 010 Developmental Mathematics (4 Credits)
Introduces mathematics and its application; explains language and symbols used in math; develops concepts in whole number, fraction, and decimal operations and applications; and develops analytical thinking while emphasizing study and learning skills necessary for success in math courses and overcoming anxiety toward math.

MTH 020 Pre-Algebra (4 Credits)
Recommended preparation: MTH 010.
Emphasizes applications of basic arithmetic skills. Equips students to handle everyday arithmetic problems and lays a foundation for algebra. Topics include ratio, proportion, percent, measurement, perimeter, area, volume and integers.

MTH 029 Fraction Review Workshop (2 Credits)
Provides a concentrated experience for students needing a review of fractions and associated number theory skills. This course is not a replacement for students who place into or need to take MTH 10. May be taken concurrently with another math class. P/NP grading.

MTH 031 Health Care Math (3 Credits)
Recommended preparation: MTH 010.
This is a three-credit course designed for students majoring in Addiction Studies, Massage Therapy, Health Information Technology, among others. Includes topics from pre-algebra and descriptive statistics. MTH 031 is not designed to serve as a prerequisite to MTH 060.

MTH 058 Math Literacy I (4 Credits)
Recommended preparation: MTH 010 or minimum placement into MTH 020.
Designed for non-math and non-science majors: integrating numeracy, proportional reasoning, algebraic reasoning and beginning data presentation and analysis. Develop conceptual and procedural tools that support the use of key mathematical concepts in a variety of contexts. Introduces pattern recognition, estimation and number sense, working with units, and making accurate inferences and conclusions based upon data presented in graphical or tabular format. Explores how to clearly communicate arguments supported by quantitative evidence using words, tables, graphs, and mathematical equations.

MTH 060 Beginning Algebra I (4 Credits)
Recommended preparation: Math 020 or higher or minimum placement into MTH 060.
Introduction to algebra, integers, rational and real numbers, algebraic expressions, linear equations in one and two variables, and graphical representations with a focus on modeling and applications.

MTH 065 Beginning Algebra II (4 Credits)
Recommended preparation: MTH 060 or higher or minimum placement into MTH 065.
Continues development of manipulative algebra skills from MTH 060. Includes algebraic expressions and polynomials, factoring algebraic expressions, rational expressions, roots and radicals, and quadratic equations.

MTH 085 Technical Mathematics I (4 Credits)
Recommended preparation: MTH 020 and/or MTH 060. First in a two-term sequence designed for majors in forest technology, fire science, CADD and GIS, among others. Includes introduction to algebra and geometry with a focus on units of measurement, formula manipulation, solving linear and literal equations, exponents, three-dimensional geometry and preparation for trigonometry. Real-world applications are emphasized.

MTH 086 Technical Mathematics II (4 Credits)
Recommended preparation: MTH 085. Second in a two-term sequence designed for majors in forest technology, fire science, CADD and GIS, among others. Includes a review of geometry and a thorough discussion of trigonometry with an introduction to vectors and their applications. The second half of the term includes an introduction to functions and their applications including graphing equations, developing equations from graphs, analysis of linear and non-linear functions and functions as models. Students will work in teams to develop and analyze a complex, real-world application and submit a technical report detailing the results. A graphing calculator is required. TI-83 or TI-84 recommended.
MTH 095 Intermediate Algebra (4 Credits)
Recommended preparation: MTH 065.
Continues the algebra foundation necessary to study college-level mathematics and statistics. Includes systems of equations and inequalities, linear and quadratic regressions, functions and function notation, equation solving through manual and graphical means, inequalities and complex numbers. Graphing calculator required. TI-83 or TI-84 recommended.

MTH 098 Math Literacy II (4 Credits)
Recommended preparation: MTH 058.
Covers modeling, graphing and solving linear equations in context. Explores how to clearly communicate sophisticated arguments supported by quantitative evidence using words, tables, graphs, and mathematical equations as appropriate. Covers dimensional analysis as it arises contextually in applications.

MTH 099 Selected Topics: Mathematics (1-4 Credits)
Offers selected topics in mathematics for courses generally available only once. Topics and credits to be arranged. P/NP grading.

MTH 105 Math in Society (4 Credits)
Prerequisites: MTH 095 or higher or minimum placement into MTH 105.
Math in Society is a rigorous mathematics course designed for students in Liberal Arts and Humanities majors. The course provides a solid foundation in quantitative reasoning, symbolic reasoning, and problem solving techniques needed to be a productive, contributing citizen in the 21st century.

MTH 111 College Algebra (4 Credits)
Recommended preparation: MTH 095.
Introduces graphs and functions (linear, quadratic, polynomial, rational, exponential and logarithmic) using a graphing calculator. First term of a precalculus sequence for science students. Graphing calculator required. TI-83 or TI-84 recommended.

MTH 112 Trigonometry (4 Credits)
Recommended preparation: MTH 111.
Examines the applied, real-world and theoretical mathematical implications of the trigonometric functions. The symbolic, numerical, and graphical representations of these functions and their applications form the core of the course. Emphasizes solving problems symbolically, numerically and graphically and understanding the connections among these methods in interpreting and analyzing results. Graphing calculator required. TI-83 or TI-84 recommended.

MTH 113 Topics in Precalculus (4 Credits)
Recommended preparation: MTH 112.
Examines topics chosen from the applied, real-world and theoretical mathematical implications of analytic geometry, nonrectangular coordinate systems, vectors, matrices and sequences. The symbolic, numerical, and graphical representations of these functions and their applications form the core of the course. Emphasizes solving problems symbolically, numerically and graphically and understanding the connections among these methods in interpreting and analyzing results. The primary focus is preparation for Calculus. Graphing calculator required. TI-83 or TI-84 recommended.

MTH 188 Special Studies: Mathematics (1-4 Credits)
Explores topics of current interest in the discipline.

MTH 198 Practicum in Mathematics (2 Credits)
Allows students to gain exposure to an elementary classroom setting, gain experience in teaching/tutoring math to elementary-school-age children and gain an understanding of learning theory and processes as they apply to mathematics education.

MTH 199 Selected Topics: Mathematics (1-4 Credits)
This course is in development.

MTH 211 Fundamentals of Elementary Mathematics I (4 Credits)
Recommended preparation: MTH 095.
Introduces problem-solving, sets, natural and whole numbers, number theory and fractions. First term of a sequence for students planning to become elementary teachers but open to any students wanting to study the foundations of mathematics.

MTH 212 Fundamentals of Elementary Mathematics II (4 Credits)
Recommended preparation: MTH 211.
Covers decimals, percents, ratio and proportion, integers, rational and real numbers, and statistics and probability. Second term of a sequence for students planning to become elementary teachers but open to any student wanting to study the foundations of mathematics.

MTH 213 Fundamentals of Elementary Mathematics III (4 Credits)
Recommended preparation: MTH 211.
Covers geometric shapes, measurement, congruence and similarity, and coordinate and transformational geometry. Third term of a sequence for students planning to become elementary teachers but open to any student wanting to study the foundations of mathematics.

MTH 231 Discrete Mathematics (4 Credits)
Recommended preparation: MTH 112.
Topics in the course will examine in detail the applied, real-world and theoretical mathematical implications of the mathematical concepts elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees. The symbolic, numerical and graphical representations of the mathematical concepts will be expanded and explored. Emphasis will be on solving problems symbolically, numerically and graphically and understanding the connections among these methods in interpreting and analyzing results.

MTH 241 Calculus for Management/Social Science (4 Credits)
Recommended preparation: MTH 111.
Introduces basic concepts of differential and integral calculus for students majoring in management and social science. Includes elementary differential and integral calculus of polynomial, logarithmic and exponential functions, and their applications to business, management and social sciences. A graphing calculator is required. TI-83 or TI-84 recommended.

MTH 243 Introduction to Probability and Statistics I (4 Credits)
Recommended preparation: MTH 111 (for those needing MTH 241 or MTH 251), MTH 105.
Introduces probability and descriptive statistics. Includes critical readings of graphs and data, basic probability theory, random variables, and binomial and normal probability distributions. Culminates with the Central Limit Theorem. A graphing calculator is required. TI-83 or TI-84 recommended.

MTH 244 Introduction to Probability and Statistics 2 (4 Credits)
Prerequisites: MTH 243.
Introduces methods of inferential statistical analysis. Includes sampling techniques, confidence intervals, hypothesis testing, tests of association, linear regression and categorical analysis. Basic computer skills (especially spreadsheet knowledge) are desirable. A graphing calculator is required. TI-83 or TI-84 recommended.
MTH 245 Mathematics for Management, Life, and Social Sciences (4 Credits)
**Recommended preparation:** MTH 111.
This is a Finite Math course that covers techniques of counting, probability and elements of statistics including binomial and normal distributions, introductory matrix algebra, and elements of linear programming.

MTH 251 Calculus I (4 Credits)
**Recommended preparation:** MTH 112 or MTH 113.
Introduces concepts of differential calculus for science, mathematics and engineering students. Includes limits and continuity; the derivative; rates of change; derivatives of polynomial, rational and trigonometric, log, and exponential functions; applications including related rates and optimization; and antiderivatives. Graphing calculator required.

MTH 252 Calculus II (4 Credits)
**Recommended preparation:** MTH 251.
Introduces concepts of integral calculus to science, mathematics and engineering students. Includes antidifferentiation, the Fundamental Theorem of Calculus, integration techniques, numerical methods, improper integrals and mathematical modeling with applications to geometry, physics, economics and population dynamics. Graphing calculator required.

MTH 253 Calculus III (4 Credits)
**Recommended preparation:** MTH 252.
Introduces additional calculus concepts to science, mathematics, and engineering students. Includes selected topics in linear algebra, parametric and polar functions, applications of calculus to parametric and polar functions, infinite series, and Taylor series and polynomials.

MTH 254 Vector Calculus I (4 Credits)
**Recommended preparation:** MTH 253.
Introduces concepts of vector calculus to science and engineering students. Includes vectors and vector functions, parametric curves, functions of several variables, partial derivatives, gradients, directional derivatives and optimization problems. A graphing calculator is required. TI-83 or TI-84 is recommended. Computer skills required.

MTH 255 Vector Calculus II (4 Credits)
**Recommended preparation:** MTH 254.
Continuation of the study of vector analysis for science and engineering students. Includes double and triple integrals with applications to area, volume and center of mass; introduction to vector analysis including divergence, curl, line integrals and work, surface integrals; conservative fields and the theorems of Green and Stokes. A graphing calculator is required. TI-83 or TI-84 recommended. Basic computer skills required.

MTH 256 Applied Differential Equations (4 Credits)
**Recommended preparation:** MTH 253.
Introduction to the application of differential equations for science and engineering students. Includes first- and second-order linear and nonlinear equations, systems of linear first-order differential equations and applications appropriate for science and engineering; numerical, graphical, series and analytical solutions are covered. Computer skills are recommended and a graphing calculator is required. TI-83 or TI-84 is recommended.

MTH 261A Introduction to Linear Algebra (2 Credits)
**Recommended preparation:** MTH 252.
Provides an introduction to linear algebra concepts for science, math, and engineering majors. Topics include vectors, matrices, systematic solution to linear systems, determinants, linear dependence and independence, linear transformations, and eigenvalues and eigenvectors.

MTH 280 Co-op Work Experience Mathematics (1-4 Credits)
**Prerequisites:** Instructor approval.
Provides experience in which students apply previous classroom learning in an occupational setting. Credits depend on the number of hours worked. P/NP grading.

MTH 298 Independent Study: Mathematics (1-4 Credits)
**Prerequisites:** Instructor approval.
**Recommended preparation:** prior coursework in the discipline.
Individualized, advanced study to focus on outcomes not addressed in existing courses or of special interest to a student. P/NP grading.