MATHEMATICS (MATH)

During 2024-2025, Southwestern College will not offer pre-transfer-level math courses, such as MATH 35, MATH 45, MATH 60, and MATH 62 in compliance with recent legislation (AB 1705).

MATH 35
PRE-ALGEBRA
4 UNITS

Pass/No Pass Only
Recommended Preparation: RDG 56 or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 4 hours
Offered: FALL, SPRING
Provides students with the strategies needed to make the transition from arithmetic to elementary algebra. Includes a review of basic mathematics, operations on real numbers and algebraic expressions, introduction to elementary topics in algebra, topics in geometry, English and metric measurements, and conversions. [ND]

MATH 45
ELEMENTARY ALGEBRA
4 UNITS

Pass/No Pass or Grade is Allowed
Recommended Preparation: RDG 56 or equivalent or through the Southwestern College multiple measures placement processes.
Prerequisite: MATH 35 or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 4 hours
Offered: ALL
Emphasizes elementary concepts of algebra, including real numbers, linear equations and inequalities in one variable, graphs of lines and inequalities in two variables, Pythagorean theorem, 2x2 systems, exponents, polynomials, factoring techniques, rational expressions, and applications. (Not open to students with credit in MATH 48). [ND]

MATH 48
DEVELOPMENTAL MATHEMATICS
3 UNITS

Pass/No Pass Only
Recommended Preparation: RDG 56 or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 3 hours
Offered: FALL, SPRING
Provides students who have an algebra background with the strategies needed to make the transition from pre-algebra to intermediate algebra. Reviews pre-algebra and emphasizes topics in elementary algebra. (Not open to students with credit in MATH 45). [ND]

MATH 60
INTERMEDIATE ALGEBRA I (FOR LIBERAL ARTS MAJORS)
4 UNITS

Pass/No Pass or Grade is Allowed
Recommended Preparation: MATH 45 or equivalent or through the Southwestern College multiple measures placement processes; RDG 56 or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 4 hours
Offered: ALL
Delivers Intermediate Algebra for Liberal Arts and Allied Health Majors. Investigates rational expressions and equations, systems of equations in two variables, absolute value equations and inequalities, radical expressions and equations, rational exponents, quadratic equations, and graphs of linear and quadratic functions. [D]

MATH 62
INTERMEDIATE ALGEBRA II (STEM/BUS)
2 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: MATH 60 or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 2 hours
Offered: FALL, SPRING
Bridges Intermediate Algebra for STEM and Business Majors. Investigates systems of nonlinear equations, absolute value inequalities, graphs of conic sections, functions including exponential, logarithmic, and piecewise functions. Requires graphing calculator. (Not open to students with credit in MATH 70, MATH 72, or equivalent.) [D]

MATH 72
INTERMEDIATE ALGEBRA I AND II (STEM/BUS)
6 UNITS

Pass/No Pass or Grade is Allowed
Lecture 6 hours
Offered: ALL
Delivers Intermediate Algebra for STEM and Business Majors. Investigates rational expressions and equations, systems of equations in two and three variables, absolute value equations and inequalities, radical expressions and equations, rational exponents, complex numbers, quadratic equations, graphs of linear and radical functions, parabolas, and circles. Requires graphing calculator. [D]

MATH 81
SUPPORT FOR INTERMEDIATE ALGEBRA
2 UNITS

Pass/No Pass Only
Corequisite: MATH 60 or MATH 72.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students enrolled in Intermediate Algebra whose assessment results indicate a need for additional instruction on topics from Elementary Algebra, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed in Intermediate Algebra. Focuses on numeracy, algebraic expressions, linear equations and functions, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 281)

MATH 82
SUPPORT FOR MATHEMATICS (GENERAL EDUCATION)
2 UNITS

Pass/No Pass Only
Corequisite: MATH 100, MATH 110, or MATH 118.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for liberal arts majors whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed with introductory college-level mathematics. Focuses on numeracy, algebraic expressions, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 282)

MATH 83
SUPPORT FOR COLLEGE ALGEBRA
2 UNITS

Pass/No Pass Only
Corequisite: MATH 101.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students enrolled in College Algebra whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed in College Algebra. Focuses on linear equations and functions, manipulation of algebraic expressions, polynomial operations, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 283)

MATH 84
SUPPORT FOR ELEMENTARY STATISTICS
2 UNITS

Pass/No Pass Only
Corequisite: STAT C1000.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students enrolled in Elementary Statistics whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed in introductory college-level statistics. Focuses on numeracy, algebraic expressions, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 284;STAT 84)

MATH 85
SUPPORT FOR APPLIED CALCULUS
2 UNITS

Pass/No Pass Only
Corequisite: MATH 120 or MATH 121.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students enrolled in an Applied Calculus course whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed in Applied Calculus. Focuses on linear equations and functions, quadratic equations and functions, manipulation of algebraic expressions, polynomial operations, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 285)

MATH 86
SUPPORT FOR TRIGONOMETRY
2 UNITS

Pass/No Pass Only
Corequisite: MATH 104.
Lecture 2 hours
Offered: FALL, SPRING
Reviews and reinforces the skills necessary to succeed in Trigonometry. Focuses on right triangle relationships, ratio and proportion, graphing, solutions to linear and quadratic equations, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. (Serves as corequisite support for students enrolled in Trigonometry whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, and for those students who would like additional support). [ND] (Same as: NC 286)

MATH 87
SUPPORT FOR CALCULUS
2 UNITS

Pass/No Pass Only
Corequisite: MATH 250.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students enrolled in a Calculus course whose assessment results indicate a need for additional instruction on topics from Elementary and Intermediate Algebra, College Algebra, and Trigonometry, and for those students who would like additional support. Reviews and reinforces the skills necessary to succeed in Calculus. Focuses on linear equations and functions, quadratic equations and functions, manipulation of algebraic expressions, polynomial operations, trigonometric functions, support for the core content, and study skills. Provides frequent and intensive instructor feedback and practice. [ND] (Same as: NC 287)

MATH 88
SUPPORT FOR CALCULUS 2 (MATH 251)
2 UNITS

Pass/No Pass Only
Corequisite: MATH 251.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students in Calculus 2. Focuses on polynomial and rational equations/functions, conic sections, polynomial and rational expression operations, sequences and series, inverse trigonometric functions, trigonometric identities, polar coordinates, support for the core content, and study skills. Provides frequent instructor feedback and practice. [ND] (Same as: NC 288)

MATH 89
SUPPORT FOR CALCULUS 3 (MATH 252)
2 UNITS

Pass/No Pass Only
Corequisite: MATH 252.
Lecture 2 hours
Offered: FALL, SPRING
Serves as corequisite support for students third semester Calculus. Focuses on vectors, matrices, conic sections, polynomial operations, trigonometric functions and identities, polar curves, support for the core content, and study skills. Provides frequent instructor feedback and practice. [ND] (Same as: NC 289)

MATH 100
MATHEMATICS FOR GENERAL EDUCATION
3 UNITS

Grade Only
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 82 or NC 282, Support for Mathematics (General Education).
Lecture 3 hours
Offered: ALL
Focuses on mathematical reasoning, quantitative arguments, and quantitative analysis. Covers standards presented through the study of set theory, logic, counting methods, probability, statistics, and finance. [D; CSU; UC]

MATH 101
COLLEGE ALGEBRA
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 83 or NC 283, Support for College Algebra.
Lecture 3 hours
Offered: ALL
Emphasizes functions (algebraic and transcendental), relations, theory of equations and inequalities, matrices, binomial theorem, sequences and series, and curve fitting using the graphing calculator. Requires graphing calculator. A student can earn a maximum of six units for successfully completing MATH 244 or both MATH 101 and 104. (Not open to students with credit in MATH 250 or the equivalent.) [D; CSU; UC]

MATH 104
TRIGONOMETRY
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 86 or NC 286, Support for Trigonometry.
Lecture 3 hours
Offered: ALL
Emphasizes graphic and numerical applications of trigonometry, circular and inverse trigonometric functions, proving and applying identities, solutions and practical applications of right and oblique triangles, and applications of De Moivre's Theorem. Requires graphing calculator. A student can earn a maximum of six units by successfully completing MATH 244 or both MATH 101 and 104. [D; CSU]

MATH 110
STRUCTURES AND CONCEPTS IN MATHEMATICS I
4 UNITS

Grade Only
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process.
Lecture 4 hours
Offered: ALL
Focuses on development of quantitative reasoning skills through in-depth explorations of mathematical topics, including real number systems and subsystems, number theory, and numeration systems. Emphasis is on problem solving strategies, comprehension and analysis of mathematical concepts and applications of logical reasoning. [D; CSU; UC]

MATH 111
STRUCTURES AND CONCEPTS IN MATHEMATICS II
4 UNITS

Grade Only
Prerequisite: MATH 110 or equivalent.
Lecture 4 hours
Offered: FALL, SPRING
Covers topics that include probability, statistics, geometry, Includes two and three dimensional shapes and interrelationships, congruence, similarity and proportional reasoning, measurement of length, angle size, area, volume, metric system, problem solving, and appropriate use of technology in the classroom. [D; CSU; UC]

MATH 112
CHILDREN'S MATHEMATICAL THINKING
1 UNIT

Pass/No Pass Only
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process.
Corequisite: MATH 110 (may be taken previously).
Lecture 1 hour
Offered: FALL, SPRING
Assists students in undertaking an in-depth analysis of children's understanding of operations, place values, and fractions. Helps students understand how children approach mathematics and how children best learn mathematics. Designed for elementary education majors. [D; CSU]

MATH 118
FINITE MATHEMATICS
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 82 or NC 282, Support for Mathematics (General Education).
Lecture 3 hours
Offered: ALL
Provides a survey of topics in mathematics, emphasizing the deductive process and practical applications. Includes linear functions, systems of linear equations and inequalities, matrices, linear programming, mathematics of finance, sets and Venn diagrams, combinatorial techniques, and an introduction to probability. Applications in business, economics, and social sciences. [D; CSU; UC]

MATH 119
ELEMENTARY STATISTICS
4 UNITS

Grade Only
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 84 or NC 284, Support for Statistics.
Lecture 4 hours
Offered: ALL
Emphasizes probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Addresses descriptive statistics, probability, sampling distributions, statistical inference, correlation, linear regression, ANOVA, chi-square tests, t-tests, and use of technology for statistical analysis including interpretation of the relevance of statistical findings. Includes applications from various disciplines. [D; CSU; UC; C-ID MATH 110] (Same as: STAT C1000)

MATH 120
CALCULUS FOR BUSINESS ANALYSIS
4 UNITS

Grade Only
Recommended Preparation: ACCT 101 or equivalent.
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 85 or NC 285, Support for Applied Calculus.
Lecture 4 hours
Offered: ALL
Emphasizes matrix algebra, differential and integral calculus, graphing and optimization, and exponential and logarithmic functions. Includes applications to business. Requires graphing calculator. (Not open to students with credit in MATH 122, 250, or equivalent.) [D; CSU; UC; C-ID MATH 140]

MATH 121
APPLIED CALCULUS I
3 UNITS

Grade Only
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process; Placement may require concurrent enrollment in MATH 85 or NC 285, Support for Applied Calculus.
Lecture 3 hours
Offered: ALL
Presents a study of the techniques of differential calculus with emphasis placed on the application of these concepts to the physical, biological, and social sciences. Provides applications of derivatives of functions including polynomials, rational, exponential, and logarithmic functions. Requires graphing calculator. (Not open to students with credit in MATH 250 or equivalent.) [D; CSU; UC]

MATH 122
APPLIED CALCULUS II
3 UNITS

Grade Only
Recommended Preparation: RDG 158 or equivalent or through the Southwestern College multiple measures placement processes.
Prerequisite: MATH 121 or equivalent.
Lecture 3 hours
Offered: ALL
Continues the study of differential and integral calculus, with emphasis on polynomial, rational, radical, logarithmic, exponential, and trigonometric functions, techniques of integration, multi-variable calculus, and applications. Graphing calculator is required. (Not open to students with credit in MATH 251 or equivalent.) [D; CSU; UC]

MATH 130
INTRODUCTION TO COMPUTER PROGRAMMING
4 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process.
Lecture 3 hours, laboratory 3 hours
Offered: ALL
Uses Java to introduce object-oriented programming and software engineering with an emphasis on applications in science, engineering and mathematics. Introduces classes, methods, parameters, control structures, and basic inheritance. Emphasizes use of modularity, abstraction, documentation, testing, and verification techniques. [D; CSU; UC; C-ID COMP 122]

MATH 140
DATA STRUCTURES AND ALGORITHMS
4 UNITS

Pass/No Pass or Grade is Allowed
Fee: $2
Recommended Preparation: RDG 158 or equivalent or through the Southwestern College multiple measures placement processes.
Prerequisite: MATH 130 or equivalent.
Lecture 3 hours, laboratory 3 hours
Offered: ALL
Introduces the fundamental concepts of computational data structures and algorithms. Includes recursion, builds on object-oriented programming ideas, introduces fundamental data structures (including stacks, queues, linked-lists, heaps, priority queues, hash tables, trees, and an introduction to graphs), and the basics of algorithm analysis. Examines implementation and analysis of sorting and searching algorithms. [D; CSU; UC; C-ID COMP 132]

MATH 230
COMPUTER ORGANIZATION AND ARCHITECTURE
4 UNITS

Pass/No Pass or Grade is Allowed
Fee: $2
Prerequisite: MATH 130 or equivalent.
Lecture 3 hours, laboratory 3 hours
Offered: ALL
Provides basic concepts of computer organization and architecture, machine language principles, computer memory organization, Input and Output (I/O) fundamentals, and elements of computer logic design. Emphasizes tradeoffs involved in fundamental architectural design decisions. [D; CSU; UC; C-ID COMP 142]

MATH 244
PRE-CALCULUS WITH TRIGONOMETRY
6 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: Intermediate algebra proficiency, as determined through the Southwestern College Multiple Measures Process.
Lecture 6 hours
Offered: ALL
Covers functions, equations, inequalities, matrices, binomial theorem, sequences, series, and curve fitting. Emphasizes functions and graphing. Includes graphic and numerical applications of trigonometry, circular and inverse functions, proving and applying identities, solutions and practical applications of right and oblique triangles, and application of De Moivre's Theorem. Requires a graphing calculator. Students can earn at most 6 units for successfully completing MATH 244 or both MATH 101 and MATH 104. (Not open to students with credit in MATH 250 or the equivalent.) [D; CSU; UC]

MATH 250
ANALYTIC GEOMETRY AND CALCULUS I
5 UNITS

Grade Only
Prerequisite: MATH 244, MATH 101 and MATH 104, or equivalent or through the Southwestern College multiple measures placement processes.
Lecture 5 hours
Offered: ALL
Covers analytic geometry, functions, limits, derivatives of algebraic and trigonometric functions, applications of the derivative, integration, applications of the definite integral, and transcendental functions. Graphing calculator is required. [D; CSU; UC; C-ID MATH 211]

MATH 251
ANALYTIC GEOMETRY AND CALCULUS II
4 UNITS

Grade Only
Prerequisite: MATH 250 or equivalent.
Lecture 4 hours
Offered: ALL
Covers techniques and applications of integration. Includes inverse trigonometric and hyperbolic functions, curves in parametric form, polar coordinates, and infinite sequences and series. Includes separable differential equations, L'Hopital's Rule, and indeterminate forms. Graphing calculator is required. [D; CSU; UC; C-ID MATH 221]

MATH 252
ANALYTIC GEOMETRY AND CALCULUS III
4 UNITS

Grade Only
Recommended Preparation: RDG 158 or equivalent or through the Southwestern College multiple measures placement processes.
Prerequisite: MATH 251 or equivalent.
Lecture 4 hours
Offered: ALL
Covers analytic geometry, vectors, and vector-valued functions. Includes functions of several variables; vector calculus; surfaces and surface integrals; partial derivatives; multiple integrals; line integrals; and Green's, Stokes', and divergence theorems. Requires graphing calculator. [D; CSU; UC; C-ID MATH 230]

MATH 253
INTRODUCTION TO DIFFERENTIAL EQUATIONS
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: MATH 251 or equivalent.
Lecture 3 hours
Offered: ALL
Introduces the theory, techniques and applications of ordinary differential equations. Includes first and second order ODEs, reduction of order, variation of parameters, undetermined coefficients, series solutions, linear systems of first-order equations and eigenvalues, linear independence, and Laplace transforms. Requires graphing calculator. [D; CSU; UC; C-ID MATH 240]

MATH 254
INTRODUCTION TO LINEAR ALGEBRA
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: MATH 251 or equivalent.
Lecture 3 hours
Offered: FALL, SPRING
Introduces linear algebra including solving of linear systems, matrix algebra, Gaussian elimination, determinants and their properties, vector spaces, inner product spaces, linear transformations, orthogonality, eigenvalues and eigenvectors. Requires a scientific calculator with graphing capacity. [D; CSU; UC; C-ID MATH 250]

MATH 260
DISCRETE MATHEMATICS
3 UNITS

Pass/No Pass or Grade is Allowed
Prerequisite: MATH 122 or 251 or equivalent.
Lecture 3 hours
Offered: ALL
Emphasizes logic, methods of proof, set theory, number theory, equivalence and order relations, counting (combinations and permutations), and solving recurrence relations. Provides topics for proofs coming from discrete math concepts that predominate throughout many areas of mathematics and computer science. [D; CSU; UC]

MATH 265
DISCRETE STRUCTURES
3 UNITS

Grade Only
Prerequisite: MATH 122 or MATH 251 or equivalent; MATH 130 or equivalent.
Lecture 3 hours
Offered: ALL
Introduces discrete structures used in Computer Science with an emphasis on their applications, including programming. Covers topics such as Functions; Relations and Sets; Basic Logic; Proof Techniques; Basics of Counting; Graphs and Trees; and Discrete Probability. [D; CSU; UC; C-ID COMP 152]

MATH 299
INDEPENDENT STUDY
1-3 UNITS

Pass/No Pass or Grade is Allowed
Limitation on Enrollment: Eligibility for independent study.
Lecture 3 hours
Offered: ALL
Independent study or research in some area of the mathematical sciences of particular interest to the student and not included in regular courses of the college. [D; CSU]