

Mathematics

MATH 100 Bridge Math (4 credit, 4 lecture, 0 lab)

This course provides an intensive review of intermediate algebra concepts and skills. Topics include review of real numbers, first degree equations and inequalities, polynomials and factoring, algebraic fractions and equations, integer and rational exponents, radicals, complex numbers, second degree equations, and graphing.

MATH 101 Math Improvement (4 credit, 4 lecture, 0 lab)

This developmental studies course is designed to promote and improve basic math skills such as whole number operations, estimation and rounding, order of operations, fractions, decimals, percents, basic algebraic functions, and problem solving. This course may be offered as variable credit and repeatable three times. **Pre-Requisite:** Placement test.

MATH 106 Beginning Algebra (4 credit, 4 lecture, 0 lab)

Properties of linear equations and inequalities, exponents, polynomials and factoring, algebraic fractions, graphing, systems of equations in two variables, roots and radicals, and quadratic equations. **Pre-Requisite:** MATH 101

MATH 108 Geometry (4 credit, 4 lecture, 0 lab)

Undefined geometric terms, postulates, and theorems, properties of parallel lines; properties of triangles, congruent triangles, and similar triangles; quadrilaterals; circles; perimeter and area of two-dimensional figures; surface area and volume of three-dimensional figures; and proof. **Pre-Requisite:** MATH 106.

MATH 109 Intermediate Algebra (4 credit, 4 lecture, 0 lab)

Review of real numbers, first degree equations and inequalities, absolute value equations, polynomials and factoring, algebraic fractions and equations, integer and rational exponents, radicals, complex numbers, second degree equations and inequalities, graphing, and functions. **Pre-Requisite:** MATH 106.

MATH 125 General Education Statistics (4 credit, 4 lecture, 0 lab)

IAI M1 902

Focuses on mathematical reasoning and the solving of real-life problems, rather than on routine skills and appreciation. Descriptive methods (frequency distributions, graphing and measures of location and variation), basic probability theory (sample spaces, counting, factorials, combinations, permutations and probability laws), probability distributions (normal distributions and normal curve, binomial distribution, and random samples and sampling techniques), statistical inference (estimation, hypothesis testing, t-test and chi-square test, and errors), correlation and regression, and f-test and analysis of variance. **Pre-Requisite:** MATH 109.

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MATH 126 Trigonometry (3 credit, 3 lecture, 0 lab)

Review of geometric concepts, trigonometric functions, and the inverse functions, radian measure, identities and equations, solutions of oblique and right triangles, and power and roots of complex numbers. **Pre-Requisite:** MATH 109.

MATH 128 College Algebra (4 credit, 4 lecture, 0 lab)

The algebra of functions-linear, polynomial, rational, exponential, and logarithmic; solving equations and inequalities based upon these functions; systems of equations and matrix operations; conic sections; and sequences and series. **Pre-Requisite:** MATH 108 and MATH 109.

MATH 141 Statistics (4 credit, 4 lecture, 0 lab)

IAI M1 902, BUS 901

Descriptive statistics, basic probability theory, probability distributions, statistical inference, correlation and regression, and the analysis of variance. An emphasis will be placed on applications in business, education, nursing, social sciences, and STEM fields. **Pre-Requisite:** MATH 128.

MATH 142 Finite Mathematics (4 credit, 4 lecture, 0 lab)

IAI M1 906

Counting techniques, set theory, probability theory, equations of lines, systems of linear equations, linear applications, matrices and matrix applications, linear programming, and the Simplex method. **Pre-Requisite:** MATH 128

MATH 143 Applied Calculus (4 credit, 4 lecture, 0 lab)

IAI M1 900

Linear, quadratic, and higher order polynomial functions; exponential and logarithmic functions and their applications; mathematical modeling; concepts and techniques of differentiation; curve sketching; finding maxima and minima of functions; concept and techniques of definite and indefinite integrals; the fundamental theorem of calculus; and applications of differentiation and integration in business and social science. **Pre-Requisite:** MATH 128.

MATH 144 Heart of Mathematics (4 credit, 4 lecture, 0 lab)

IAI M1 904

Focuses on mathematical reasoning and the solving of real-life problems, rather than on routine skills and appreciation. Explores some of the most profound ideas in mathematics. Topics include number theory, geometry, graph theory, and counting techniques and probability. **Pre-Requisite:** MATH 109.

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MATH 151 Occupational Math (4 credit, 4 lecture, 0 lab)

Review of the concepts of whole number arithmetic, fractions, decimals, percents, and ratios and proportions. Practical applications of arithmetic and geometry, measurement systems, and basic algebra concepts. **Pre-Requisite:** MATH 101

MATH 155 Technical Math (4 credit, 4 lecture, 0 lab)

The necessary algebra, geometry, trigonometry, and statistics needed to succeed in a variety of vocational/technical areas. Provides the necessary prerequisite skills for technical calculus for a four-year degree. **Pre-Requisite:** MATH 106

MATH 161 Pre-Calculus (4 credit, 4 lecture, 0 lab)

Topics include: rational, real, and complex number systems, elementary functions including polynomial, rational, exponential, logarithmic and trigonometric, and analytic geometry. Preparation for calculus. **Pre-Requisite:** MATH 108 and MATH 128.

MATH 162 Calculus & Analytic Geometry I (5 credit, 5 lecture, 0 lab)

IAI M1 900-1, MTH 901

Treatment of the major concepts and techniques of single variable calculus, with careful statements but few proofs. Differential and integral calculus of the elementary functions with associated analytic geometry. **Pre-Requisite:** "C" or better in MATH 161.

MATH 165 Scientific Programming (3 credit, 2 lecture, 2 lab)

Study of a structured higher-level programming language to analyze and solve scientific and mathematical problems using a computer. Topics include: introduction to computers; basic elements of the language; control and repetition structures; user defined functions; arrays and strings; input-output streams; numerical methods. **Pre-Requisite:** MATH 162.

MATH 204 Algebraic and Arithmetic Systems (4 credit, 4 lecture, 0 lab)

General problem solving techniques; functions; whole numbers, integer, rational numbers, irrational numbers, and real numbers; number theory; probability; and statistics. For elementary education majors only. **Pre-Requisite:** MATH 108 (Geometry) or one year of high school Geometry and MATH 109 (Intermediate Algebra) or equivalent. You may not enroll in this course unless you have passed on year of high school Geometry or have previously completed with a passing grade MATH 108 (Geometry) here at SIC. This is mandated and reviewed regularly by the state and is strictly enforced.

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MATH 205 Geometry for Elementary Teachers (4 credit, 4 lecture, 0 lab)

IAI M1 903

Parallel and perpendicular lines; measurement of angles, line segments, time, and temperature; ratio and proportions; congruence and similarity; area, surface area, and volume; Greek constructions, proofs, and the Cartesian coordinate system. For elementary education majors only. **Pre-Requisite:** MATH 204 with a grade of "C" or better.

MATH 221 Calculus & Analytic Geometry II (5 credit, 5 lecture, 0 lab)

IAI M1 902-2, MTH 902

Develops the techniques of single-variable calculus begun in Calculus I and extends the concepts of function, limit, derivative and integral to functions of more than one variable. The treatment is intuitive, as in Calculus I. Techniques of integration, introduction to multivariate calculus, elements of infinite series. **Pre-Requisite:** MATH 162 with a grade of "C" or better.

MATH 222 Calculus & Analytic Geometry III (5 credit, 5 lecture, 0 lab)

IAI M1 900-3, MTH 903

Further topics in calculus. Definite integrals over solid regions, applications of partial derivatives, vectors and vector operations, derivatives of vector functions, line integrals. Green's theorem. **Pre-Requisite:** MATH 221 Calculus & Analytic Geometry II with a grade of "C" or better.

MATH 224 Linear Algebra (3 credit, 3 lecture, 0 lab)

IAI MTH 911

A first course in vectors, matrices, vector spaces, and linear transformations. Covers the following topics: vectors; operations on matrices; matrices; inverse of a matrix; solution of systems of linear equations; rank of a matrix; vector spaces and subspaces; linear dependence and independence; basis and dimension; linear transformations; sums, composites, inverses of linear transformations; range and kernel of a linear transformation, determinants; eigenvalues and eigenvectors; orthogonality and inner product spaces; and quadratic forms. Emphasis is placed on theory and formal proofs integrated throughout the course. Examples, applications, and geometric intuition are also included. **Pre-Requisite:** MATH 221 Calculus & Analytic Geometry II.

MATH 225 Differential Equations (3 credit, 3 lecture, 0 lab)

IAI MTH 912

Course in ordinary differential equations for engineering students. Topics include first order equations, linear differential equations, systems of linear differential equations, series solutions, the Laplace transform, numerical solutions, and applications. **Pre-Requisite:** MATH 222 or concurrent enrollment.