

# Mathematics

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and cosine functions, tables and graphs, other trigonometric functions, identities and equations. Trigonometric functions of angles, solution of triangles. (See *Duplication of Courses*.) (CAN MATH 8)

## 6. Precalculus (4)

Prerequisite: students must meet the ELM requirement. Basic algebraic properties of real numbers; linear and quadratic equations and inequalities; functions and graphs; polynomials; exponential and logarithmic functions; analytic trigonometry and functions; conics; sequences, and series. (CAN MATH 16)

### 10A. Structure and Concepts in Mathematics I (3)

Prerequisite: students must meet the ELM requirement. Designed for prospective elementary school teachers. Development of real numbers including integers, rational and irrational numbers, computation, prime numbers and factorizations, and problem-solving strategies. Meets Area B4 G.E. requirement for liberal studies majors.

### 10B. Structure and Concepts in Mathematics II (3)

Prerequisite: MATH 10A. Designed for prospective elementary school teachers. Counting methods, elementary probability and statistics. Topics in geometry to include polygons, congruence and similarity, measurement, geometric transformations, coordinate geometry, and connections between numbers and geometry with selected applications.

## 11. Elementary Statistics (3)

Prerequisite: students must meet the ELM requirement. Illustration of statistical concepts: elementary probability models, sampling, descriptive measures, confidence intervals, testing hypotheses, chi-square, nonparametric methods, regression. It is recommended that students with credit in MATH 72 or 75 take MATH 101. (CAN STAT 2)

## 14. Introduction to Discrete Mathematics (3)

No credit if taken after MATH 75. Prerequisite: students must meet the ELM requirement. Set theory, relations and functions, logic, proof techniques, number systems.

## 25. Mathematica (1)

Prerequisites: MATH 70, 71, 75 (may be taken concurrently) or permission of instructor. In addition, students must meet the ELM requirement. Use of Mathematica™ software as an exploratory

tool in Mathematics. Examples drawn from a broad range of Mathematics. CR/NC grading only.

## 41. Number Systems (3)

Not open to mathematics majors. Prerequisite: students must meet the ELM requirement. Designed for elementary credential students. Development of the rational number system and its subsystems from the informal point of view; sets, relations and operations, equivalence classes; definitions of number systems and operations; algorithms for operations; prime numbers, divisibility tests; ratios. (CAN MATH 4)

## 43. Elementary Problem Solving (3)

Prerequisite: students must meet the ELM requirement. The purpose of this course is to develop problem-solving skills using elementary mathematics.

## 45. What is Mathematics? (3)

Prerequisite: students must meet the ELM requirement. Covers topics from the following areas: (I) The Mathematics of Social Choice; (II) Management Science and Optimization; (III) The Mathematics of Growth and Symmetry; and (IV) Statistics and Probability. G.E. Foundation B4.

## 61. Geometry and the Imagination (3)

Prerequisite: students must meet the ELM requirement. Topics in Geometry. May include, but is not restricted to, tilings and tessellations, regular polyhedra in 3 and 4 dimensions, ruler and compass constructions, map coloring.

## 70. Mathematical Analysis for Life Sciences (4)

No credit if taken after MATH 72 or 75; one unit of credit if taken after MATH 71. Prerequisite: students must meet the ELM requirement. Functions and graphs, limits, derivatives, antiderivatives, differential equations, and partial derivatives with applications in the Life Sciences.

## 71. Elementary Mathematical Analysis I (3)

No credit if taken after MATH 70, 72, or 75. Prerequisite: students must meet the ELM requirement. Review of algebra, real numbers, inequalities, functions, graphs, finite induction, limits, differentiation of algebraic functions and applications to extrema, mean value theorem, l'Hôpital's rule.

## 72. Elementary Mathematical Analysis II (3)

No credit if taken after MATH 75; 2 units of credit if taken after MATH 70. Prereq-

uisites: MATH 71 and trigonometry. Analytic geometry and calculus of polynomials, rational functions, transcendental functions; polar coordinates, conic sections, integration and applications.

## 75. Mathematical Analysis I (4)

Two units of credit if taken after MATH 70; 3 units of credit if taken after MATH 71; 2 units of credit if taken after MATH 72. Prerequisite: elementary geometry, intermediate algebra, trigonometry, or MATH 6. In addition, students must meet the ELM requirement. Inequalities, functions, graphs, limits, continuity, derivatives, antiderivatives, the definite integral, and applications. Using Mathematica™ software as an exploratory tool. G.E. Foundation B4. (CAN MATH 18)

## 76. Mathematical Analysis II (4)

Prerequisite: MATH 75. Transcendental functions, techniques of integration, improper integrals, conic sections, polar coordinates, infinite series. Using Mathematica™ software as an exploratory tool. (CAN MATH 20)

## 77. Mathematical Analysis III (4)

Prerequisite: MATH 76. Vectors, three dimensional calculus, partial derivatives, multiple integrals, Green's Theorem, Stokes' Theorem. Using Mathematica™ software as an exploratory tool. (CAN MATH 22)

## 81. Applied Analysis (4)

Prerequisite: MATH 77. Introduction to ordinary linear differential equations; solutions by power series and Laplace transforms. Solution of systems of equations. Introduction to Fourier series. Using Mathematica™ software as an exploratory tool.

## 90. Directed Study (1-3; max total 3)

Independently arranged course of study in some limited area of mathematics either to remove a deficiency or to investigate a topic in more depth. (1-3 hours, to be arranged)

## 100. Exploring Mathematics (3)

Prerequisite: MATH 10B. A problem-solving approach to topics from game theory, combinatorics, mathematical modeling, and finite geometries.

## 101. Statistical Methods (4)

Prerequisite: MATH 70, 71, or 75; no credit if taken after MATH 108. Application of statistical procedures to examples from biology, engineering, and social science; one- and two-sample normal theory methods; chi-square, analysis of variance, and regression; nonparametric methods. Computerized statistical packages are used.