Section 10: Course Descriptions—Mathematics (EX)

MTH 111 Mathematical Analysis I 3 credits
Prerequisite: MTH 101 or equivalent.
Equations and inequalities; graphs and functions; polynomials and rational functions; exponential and logarithmic; systems of equations and inequalities; matrices and determinants, conic sections.

MTH 112 Mathematical Analysis II 3 credits
Prerequisite: MTH 111 or equivalent
Pre-calculus topics; derivatives and integrals; applications; techniques of integration.

MTH 140 Elementary Functions 3 credits
Prerequisite: MTH 101 or equivalent
Study of functions, including polynomials; rational, algebraic, exponential, logarithmic and trigonometric functions. Computer laboratory included.

MTH 141 Analytic Geometry and Calculus I 3 credits
Prerequisite: MTH 140 or equivalent
Functions; limits and continuity; derivatives and integrals of polynomial, rational and trigonometric functions. Computer laboratory included.

MTH 142 Analytic Geometry and Calculus II 3 credits
Prerequisite: MTH 141 or equivalent
Topics in analytic geometry, differentiation and integration of exponential, logarithmic and inverse trigonometric functions; sequences and series. Computer laboratory included.

MTH 241 Analytic Geometry and Calculus III 4 credits
Prerequisite: MTH 142 or equivalent
Plane curves; polar coordinates; vectors in two and three dimensions; analytic geometry in the three dimensions; vector valued functions; partial derivatives and multiple integrals.

MTH 276 Discrete Structures 3 credits
Prerequisite: MTH 141.
Sets; functions and proof techniques; logic and logic circuits; relations; combinatorics; some graph theory; application to Computer Science.

MTH 372 Differential Equations with Linear Algebra 4 credits
Prerequisite: MTH 142.
Linear dependence; linear differential equations and applications; systems of linear differential equations; series solutions

MTH 402 Linear Algebra with Applications 3 credits
Prerequisite: MTH 142, or permission of instructor.
Vector spaces; matrices; systems of linear equations; determinants; inner products; linear transformations; similar matrices; eigenvalues and eigenvectors of a matrix.

MTH 405 Introduction to Modern Algebra I 3 credits
Prerequisite: MTH 276, 402, or 410, or permission of instructor.
Sets and mappings; an axiomatic approach to the number system; groups; rings; ideals; fields; isomorphism theorems; induction; permutations.

MTH 406 Introduction to Modern Algebra II 3 credits
Prerequisite: MTH 405.
Euclidean domains; polynomial rings; field extension; finite fields; finite groups; p-groups; the Sylow theorems; introduction to Galois theory.

MTH 415 Theory of Numbers 3 credits
Prerequisite: MTH 142 or permission of instructor.
Divisibility; congruences; quadratic reciprocity; number theoretic functions; Diophantine equations; prime number theorems; recent developments in number theory.

MTH 427 Applied Probability and Statistics 3 credits
Prerequisite: MTH 241.
Introductory probability theory; elements of sampling and descriptive statistics, sampling distributions; estimations and hypothesis testing; regression and correlation analysis; computer laboratory using a statistical software package.

MTH 451 Techniques of Advanced Calculus 3 credits
Prerequisite: MTH 241 and 372.
Real vector spaces; Laplace transforms; Fourier series; boundary value theorems; series solution and singular points; Bessel Functions; Legendre polynomials.

MTH 477 Concepts of Modern Elementary School Mathematics I 3 credits
Prerequisite: MTH 101 or equivalent.
Credit applies only in undergraduate or graduate programs in mathematics education. Sets, logic, mathematical systems, systems of numeration, natural numbers, whole numbers, integers, rational numbers, real numbers.

MTH 478 Concepts of Modern Elementary School Mathematics II 3 credits
Prerequisite: MTH 477.
Credit applies only in undergraduate or graduate programs in mathematics education. Foundations of algebra, metric and non-metric geometry, probability and statistics.

MTH 480 Analysis for Teachers 3 credits
Prerequisite: MTH 101 or equivalent.
Credit applies only in undergraduate or graduate programs in mathematics education. Real number system, polynomials, rational expressions, powers and radicals, relations, functions, with emphasis on linear, quadratic, exponential, logarithmic, and trigonometric functions. Computer laboratory included.

MTH 481 Modern Algebra for Teachers 3 credits
Prerequisite: MTH 480.
Credit only applies in mathematics education. Structure of mathematical system, groups, fields, ordered fields including important models (namely the real number system).

MTH 482 Linear Algebra for Teachers 3 credits
Prerequisite: MTH 480.
Credit only applies in mathematics education. Matrices, vectors, mathematical systems, determinants, inverse of a matrix system of linear equations, matrix solutions, linear inequalities, linear programming.

MTH 483 Fundamental Concepts of Geometry 3 credits
Prerequisite: Permission of Instructor.
Credit only applies in mathematics education. Intuitive geometry; axiomatic geometry including treatment of lines, planes, congruence, measures, parallelism and similarity; non-Euclidean geometries.

MTH 484 History of Mathematics 3 credits
Prerequisite: MTH 101 or equivalent.
Credit only applies in mathematics education. A historical development of mathematics from primitive origins to the Twentieth Century concentrating on numeration systems, arithmetic methods. Euclidean and non-Euclidean geometries, number theory, theory of equations, and the origins or Calculus.

MTH 485 Statistics for Teachers 3 credits

Prerequisite: MTH 101 or equivalent. Credit only applied in mathematics education.

Organization and presentation of data, frequency distributions, measures of centrality and dispersion, percentiles and standard scores, sampling theory and distributions, tests of hypotheses and confidence intervals, correlation.

MTH 486 Higher Arithmetic for Teachers 3 credits

Prerequisite: MTH 101 or equivalent.

Credit only applies in mathematics education. Divisibility, prime numbers, congruences, quadratic reciprocity law.

CSC 171 Intro to Computer Science 3 credits

Co-requisite: MTH 141 or permission of instructor.

Overview of Computer Organization, Algorithm Design, Introduction to Programming in C++, Input/Output Statements, Arithmetic Expressions, Assignment Statements, Logical Expressions, Conditional Statements, Control Statements, Functions and Function Calls, Math Library, I/O Library, Character Library, Introduction to Arrays and pointers, Program Testing and Debugging.