

Mathematics Course Descriptions

25-050. MATHEMATICAL CONCEPTS. 3:3:0

This course provides students with mathematical tools and problem-solving skills needed to move comfortably and confidently into Mathematics 075, 101 and 105. The concepts explored include Number Systems, Ratio, Proportion, Percent, Measurement, Algebra, Graphing and Geometry. This course does not carry credits toward graduation.

25-075. INTRODUCTION TO ALGEBRA. 3:3:0

The course provides students with a solid foundation in algebra and problem-solving skills needed to move comfortably and confidently into College Algebra, Survey of Mathematics, or Mathematics for Primary and Middle Grade Teachers. Topics include the applications of linear and quadratic equations and inequalities to real world problems, graphing, rational and radical expressions, and systems of linear equations. This course does not carry credits toward graduation.

25-101. SURVEY OF MATHEMATICS I. 3:3:0

A course designed to acquaint students with problem-solving strategies, sets and applications, logic, arithmetic in different bases, real number system, and algebra. Prerequisite: Two units of high school mathematics. Credit: three hours.

25-102. SURVEY OF MATHEMATICS II. 3:3:0

A course designed to acquaint students with consumer mathematics, geometry, mathematical systems, introduction to probability and statistics, and an introduction to computers. Prerequisite: Mathematics 101. Credit: three hours.

25-105. MATHEMATICS FOR TEACHERS I. 3:3:0

This course is designed to acquaint prospective PK-8, vocational and special education teachers with the structure of the real numbers system, its subsystems, properties, operations, and algorithms. Topics include problem solving, logic, number theory, and mathematical operations over the natural, integer and rational numbers. The course emphasizes heuristic instruction of students with different learning styles. Prerequisite: Two years of high school Mathematics, including Algebra and Trigonometry. Credit: three hours.

25-106. MATHEMATICS FOR TEACHERS II. 3:3:0

A course designed to introduce problem-solving skills and heuristic instruction to prospective PK-8, vocational and special education teachers. Topics include real numbers, percents and interest, radicals, rational exponents, probability, statistics, geometry and measurement. Prerequisite: Mathematics 105. Credit: three hours.

25-121. COLLEGE ALGEBRA. 3:4:0

A course designed to expose students to polynomials, factoring, rational expressions, complex numbers, rational exponents, radicals, solutions of equations, linear and quadratic inequalities, functions and graphs, and synthetic division. A graphing calculator is used for

learning and discovery in this course. Prerequisite: a minimum of three (3) units of college preparatory mathematics. Credit: three hours; four contact hours.

25-122. TRIGONOMETRY. 3:3:0

A course designed to prepare students for calculus. Topics include exponential and logarithmic functions, trigonometric functions and graphs, trigonometric identities, trigonometric equations, inverse trigonometric functions, laws of sines and cosines and applications, matrices and determinants, and systems of equations. Prerequisite: Mathematics 121. Credit: three hours.

25-125. FINITE MATHEMATICS. 3:3:0

The course is designed to prepare students for business calculus and quantitative business data analysis. Topics include counting techniques and series, systems of linear equations and inequalities, matrix algebra, linear programming, and exponential and logarithmic functions. Prerequisite: Mathematics 121. Credit: three hours.

25-203. COLLEGE GEOMETRY. 3:3:0

A course designed to prepare teachers in geometry. Topics include: axiomatic systems, methods of proof, formal synthetic Euclidean geometry, measurement, transformations, introduction to non-Euclidean geometries, and geometry within art and nature. Course emphasis will additionally be placed upon geometry education, problem-solving heuristic, and pedagogy. Prerequisite: Mathematics 122 or its equivalent. Credit: three hours.

25-204. NON-EUCLIDEAN GEOMETRY. 3:3:0

A treatment of Euclid's parallel postulate, nature of proof, characteristics of a mathematical system, Lobachevskian Geometry, and Riemannian Geometry. Prerequisite: Mathematics 203. Credit: three hours.

25-205. MATHEMATICS FOR TEACHERS III. 3:3:0

This course is designed to prepare prospective PK-8, vocational and special education teachers for solving mathematical problems originating from different disciplines. Topics include techniques and modes of operation in geometry, measurement, algebra, trigonometry and calculus. Prerequisite: Mathematics 106. Credit: three hours.

25-213. DISCRETE MATHEMATICS I. 3:3:0

An introduction to discrete mathematical structures for computer science with emphasis on logic, counting techniques, set theory, mathematical induction, relations, functions, and matrix algebra. Prerequisite: Mathematics 122. Credit: three hours.

25-214. DISCRETE MATHEMATICS II. 3:3:0

Principles and applications of discrete mathematical structures in computer science. Topics include Boolean algebra and switching functions, finite state machines, graph theory, trees and mathematical techniques for algorithmic analysis. Prerequisites: Mathematics 213 and 251. Credit: three hours.

25-225. CALCULUS FOR BUSINESS AND SOCIAL SCIENCES I. 3:3:0

An introduction to functions, limits and continuity, the derivative, marginal functions, maxima/minima, integrals and fundamental theorems of calculus, applications of differentiation and integration in Business and Economics. Prerequisite: Mathematics 125. Credit: three hours.

25-226. CALCULUS FOR BUSINESS AND SOCIAL SCIENCES II. 3:3:0

A continuation of Mathematics 225 covering a more general treatment and business applications of integration, partial derivatives, optimization problems and LaGrange multipliers, and multiple integration. Credit: three hours.

25-241. ELEMENTARY STATISTICS. 3:3:0

A course designed to introduce students to descriptive statistics, measures of central tendency and dispersion, probability, statistical inference, correlation, and regression analysis. Prerequisite: Mathematics 121. Credits: three hours.

25-251. CALCULUS I. 4:4:0

An introduction to limits, continuous functions, rate of change, derivatives, implicit differentiation, maximum and minimum points, and their applications, and development and application of the definite integral. Prerequisite: Mathematics 122. Credits: four hours.

25-252. CALCULUS II. 4:4:0

A continuation of Mathematics 251 covering logarithmic, exponential, trigonometric and hyperbolic functions, techniques of integration, indeterminate forms, improper integrals, Taylor's formula and infinite series. Prerequisite: Mathematics 251. Credit: four hours.

25-253. CALCULUS III. 4:4:0

A continuation of Mathematics 252 to include polar coordinates, vectors and parametric equations, solid analytic geometry and the calculus of several variables. Prerequisite: Mathematics 252. Credit: four hours.

25-313. LINEAR ALGEBRA. 3:3:0

A treatment of linear equations, matrices and determinants, vector spaces, inner product spaces, linear transformations, eigenvalues and eigenvectors. Prerequisite: Mathematics 252. Credit: three hours.

25-341. PROBABILITY. 3:3:0

This course is a treatment of probability theory with stochastic processes. Topics include sample spaces, probability measures, discrete and continuous random variables, sums of independent random variables, law of large numbers, and the Central Limit Theorem. Markov chain models and their applications in the social and natural sciences are included. Prerequisite: Mathematics 251, and 313. Credit: three hours.

25-351. ORDINARY DIFFERENTIAL EQUATIONS. 3:3:0

A treatment of the solutions and applications of first order linear, homogenous and non-homogenous linear nth order differential equations. A presentation of the power series solutions, Laplace transform, linear systems of ordinary differential equations, and methods of numerical solutions. Prerequisites: Mathematics 252, and 313. Credit: three hours.

25-403. METHODS OF TEACHING MATHEMATICS IN THE SECONDARY SCHOOLS. 3:3:0

A study of the methods and materials used in teaching high school mathematics. This course introduces current educational theory, reform organizations and research methodologies. Topics include NCTM standards, effective teaching models, lesson plans, classroom management, professionalism, technology in the classroom, and current issues and trend. Prerequisite: Mathematics 252. Credit: three hours.

25-411. ALGEBRAIC STRUCTURES I. 3:3:0

A study of set theory, functions, integers, groups, matrices, permutation and symmetric

groups, LaGrange theorem, normal and factor groups, and homomorphisms. Prerequisite: Mathematics 252 and 214 or its equivalent. Credit: three hours.

25-412. ALGEBRAIC STRUCTURES II. 3:3:0

A continuation of Mathematics 411 covering rings, integral domains, ideals, polynomial rings, principal ideal domains, and unique factorization domains. Prerequisite: Mathematics 411. Credit: three hours.

25-431. NUMERICAL ANALYSIS. 3:3:0

An introduction to the solutions of equations in one variable, direct methods and matrix techniques for solving systems of equations, interpolation and polynomial approximation, numerical differentiation and integration, and the initial value problems for ordinary differential equations. Prerequisite: Mathematics 252 and Computer Science 240 or 262 or other programming language. Credit: three hours.

25-451. ADVANCED CALCULUS I. 3:3:0

A treatment of vector spaces, differentiation of vector valued functions, and functions of several variables, partial derivatives, maximum and minimum of functions of several variables, Taylor's formula and applications, line and double integrals, Prerequisite: Mathematics 253. Credit: three hours.

25-452. ADVANCED CALCULUS II. 3:3:0

A continuation of Mathematics 451 covering curve and double integrals, Green's Theorem, triple and surface integrals, Divergence Theorem in 3-D space, Stoke's Theorem, Differentiability and the Change of Variable Theorem for functions from \mathbb{R}^n into \mathbb{R}^m , the Jacobian Matrix, the inverse mapping and implicit function theorem. Prerequisite: Mathematics 451. Credit: three hours.

25-461. INTRODUCTION TO REAL ANALYSIS. 3:3:0

An introduction to ordered and Archimedean fields, the theory of limits and continuity of functions, topological concepts, properties of continuous functions, the theory of differentiation and integration, and selected topics from power series and functions of several variables. Prerequisite: Mathematics 451. Credit: three hours.

25-471. COMPLEX ANALYSIS. 3:3:0

An introduction of complex numbers, Cauchy-Riemann equations, analytic and harmonic functions, elementary functions and their properties, branches of logarithmic functions, inverse trigonometric functions, the Cauchy-Goursat theorem, the Cauchy integral formula, Monera's theorem, Maximum Modula of functions, Taylor and Laurent series, residues and poles, linear fractional transformations. Prerequisite: Mathematics 452. Credit: three hours.

25-491. HISTORY OF MATHEMATICS. 3:3:0

A study of the evolution of mathematics. Topics include the scope and history of the Egyptian geometry, Greek and Arabic mathematics, the mechanical world, probability theory, number theory, non-Euclidean geometry, and set theory. Prerequisite: Mathematics 203 and 253. Credit: three hours.

25-498. TOPICS IN MATHEMATICS. 3:3:0

A treatment of selected topics in mathematics. (This is a senior capstone course.) Prerequisite: Approval of the Department of Mathematics. Credit: three hours.

25-499. SEMINAR IN MATHEMATICS. 3:3:0

A treatment of selected topics in mathematics augmented by invited guest speakers and student presentations. Prerequisite: Approval of the Department of Mathematics. Credit: three hours.

Department Homepage^[1]

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