107. Introduction to Probability and Statistics (3)
Prerequisite: MATH 77 (may be taken concurrently). Basic concepts required for applications of probability theory; standard discrete and continuous models; random variables; conditional distributions; limit theorems.

108. Statistics (3)
Prerequisite: MATH 107. Criteria used for selecting particular procedures of data analysis; derivation of commonly used procedures; topics from sampling, normal theory, nonparametrics, elementary decision theory.

109. Applied Probability (3)
Prerequisite: MATH 107. Introduction to stochastic processes and their applications in science and industry. Markov chains, queues, stationary time series.

110. Symbolic Logic (3)
(Similar to PHIL 145; consult department.) Prerequisite: MATH 75. An informal treatment of the theory of logical inference, statement calculus, truth-tables, predicate calculus, interpretations applications.

114. Discrete Structures (3)
Prerequisite: MATH 76. Counting techniques, matrix algebra, graphs, trees and networks, recurrence relations and generating functions, applied modern algebra.

116. Theory of Numbers (4)
Prerequisite: MATH 75. Divisibility theory in the integers, primes and their distribution, congruence theory, Diophantine equations, number theoretic functions, primitive roots, indices, the quadratic reciprocity law.

118. Graph Theory (3)
Prerequisite: MATH 77. Trees, connectivity, Euler and Hamilton paths, matchings, chromatic problems, planar graphs, independence, directed graphs, networks.

121. Numerical Analysis I (3)
Prerequisites: MATH 77 and C SCI 40. Zeros of nonlinear equations, interpolation, quadrature, systems of equations, numerical ordinary differential equations, and eigenvalues. Use of numerical software libraries.

123. Topics in Applied Mathematics (3)
Prerequisite: MATH 77. Vector spaces and linear transformations, eigenvalues and eigen functions. Special types of linear and nonlinear differential equations; solution by series. Fourier transforms. Special functions, including gamma, hypergeometric, Legendre, Bessel, Laguerre, and Hermite functions. Introduction to partial differential equations.

128. Applied Complex Analysis (3)
Prerequisite: MATH 77. Analytic functions of a complex variable, contour integration, series, singularities of analytic functions, the residue theorems, conformal mappings; emphasis on engineering and physics applications.

133. Number Theory for Liberal Studies (3)
Prerequisite: MATH 10B or permission of instructor. The historical development of the concept of number and arithmetic algorithms. The magnitude of numbers. Basic number theory. Special numbers and sequences. Number patterns. Modular arithmetic. (Formerly N SCI 140T section)

134. Geometry for Liberal Studies (3)
Prerequisite: MATH 10B or permission of instructor. The use of computer technology to study and explore concepts in Euclidean geometry. Topics include, but are not restricted to, properties of polygons, tilings, and polyhedra.

137. Exploring Statistics (3)
Prerequisite: MATH 10B or permission of instructor. Descriptive and inferential statistics with a focus on applications to mathematics education. Use of technology and activities for student discovery and understanding of data organization, collection, analysis, and inference.

138. Exploring Algebra (3)
Prerequisite: MATH 10B or permission of instructor. Designed for prospective school teachers who wish to develop a deeper conceptual understanding of algebraic themes and ideas needed to become competent and effective mathematics teachers.

143. History of Mathematics (4)
Prerequisite: MATH 72 or 75. History of the development of mathematical concepts in algebra, geometry, number theory, analytical geometry, and calculus from ancient times through modern times. Theorems with historical significance will be studied as they relate to the development of modern mathematics.

145. Problem Solving (3)
Prerequisite: MATH 76. A study of formulation of problems into mathematical form; analysis of methods of attack such as specialization, generalization, analogy, induction, recursion, etc. applied to a variety of non-routine problems. Topics will be handled through student presentation.

151. Principles of Algebra (4)
Prerequisite: MATH 76. Equivalence relations; groups, cyclic groups, normal subgroups, and factor groups; rings, ideals, and factor rings; integral domains and polynomial rings; fields and field extensions.

152. Linear Algebra (4)
Prerequisite: MATH 77. Vector spaces, linear transformations, matrices, determinants, eigenvalues and eigenvectors, linear functions, inner-product spaces, bilinear forms, quadratic forms, orthogonal and unitary transformations, selected applications.

161. Principles of Geometry (3)
Prerequisite: MATH 77. The classical elliptic, parabolic, and hyperbolic geometries developed on a framework of incidence, order and separation, congruence; coordinatization. Theory of parallels for parabolic and hyperbolic geometries. Selected topics of modern Euclidean geometry.

165. Differential Geometry (3)
Prerequisite: MATH 77. Study of geometry in Euclidean space by means of calculus, including theory of curves and surfaces, curvature, theory of surfaces, and intrinsic geometry on a surface.

171. Intermediate Mathematical Analysis I (4)
Prerequisite: MATH 77. Sets, real numbers as a complete ordered field, its usual topology, functions of a real variable, limits, continuity, uniform continuity, differentiability, generalized mean value theorem, Riemann integrals, series of functions, uniform convergence, and Fourier series of integrable functions. (Formerly MATH 171A)

172. Intermediate Mathematical Analysis II (4)
Prerequisite: MATH 171. Differentiation of functions of several variables, applications of partial differentiation, functions of bounded variation, rectifiable curves, theory of Riemann-Stieltjes integration, multiple integrals and line integrals, improper Riemann-Stieltjes integrals. Inverse and implicit function theorems.

181. Differential Equations (3)
Prerequisite: MATH 81 or 123. Definition and classification of differential equations; general, particular, and singular solutions; existence theorems; theory and technique of solving certain differential equations: phase plane analysis, elementary stability theory; applications.

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