Physics-related Undergraduate Mathematics Courses in Semesters

MATH 1200 College Algebra Credit Hours: 4.0; Content: LECTURE (4.0); Prerequisites: C OR T OR BETTER IN MATH 0005 Intermediate Algebra OR MATH PLACEMENT LEVEL 1 OR HIGHER; Course Description: Topics in algebra including functions, linear equations and systems, polynomials, rational and radical expressions, quadratic equations, exponential and logarithmic functions, and inequalities. This course is primarily intended to prepare students for Business Calculus. Students needing Tier I Math credit only should consider Intro Game Theory instead. Those whose program requires MATH 2301 Calculus I should start with PreCalculus.

MATH 1300 Pre-Calculus Credit Hours: 4.0; Content: LECTURE (4.0); Prerequisites: Placement Level 2 or (C or T or better) in 1200 College Algebra; Course Description: Graphs, inverses, and operations of functions. Study of polynomial, rational, exponential, logarithmic, and trigonometric functions. Additional topics from trigonometry and analytic geometry. Recommended only for students intending to enroll in MATH 2301 Calculus I.

MATH 2301 Calculus I Credit Hours: 4.0; Content: LECTURE (3.0), RECITATION (1.0); Prerequisites: (Placement Level 3) or (C or T or better in MATH 1300 or MATH 1322) or (B or better in MATH 1350); Course Description: First course in calculus and analytic geometry with applications in the sciences and engineering. Includes basic techniques of differentiation and integration with applications including rates of change, optimization problems, and curve sketching; includes exponential, logarithmic and trigonometric functions. No credit for both MATH 2301 and 1350.

MATH 2302 Calculus II Credit Hours: 4.0; Content: LECTURE (3.0), RECITATION (1.0); Prerequisites: C or T or better in 2301 Calculus I; Course Description: Second course in calculus and analytic geometry with applications in the sciences and engineering. Includes techniques of integration, conic sections, polar coordinates, infinite series, vectors and vector operations.

MATH 2500 Introduction to Statistics Credit Hours: 4.0; Content: LECTURE (4.0); Prerequisites: MATH 1200 or MATH 1321 or PLACEMENT LEVEL 2 OR HIGHER and (NOT PSY 1100 OR 2110 OR ISE 3040); Course Description: An introductory course in applied statistics. Organization of data, central tendency and dispersion, probability, concept of random variables, probability distributions, estimation, testing hypotheses, linear regression and correlation, analysis of variance, and use of Excel in statistical analysis.

MATH 3200 Applied Linear Algebra Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: 2301 or 1350; Course Description: A course on linear algebra with an emphasis on applications and computations. Solutions to linear systems, matrices and matrix algebra, determinants, n-dimensional real vector spaces and subspaces, bases and dimension, eigenvalues and eigenvectors, diagonalization, norms, inner product spaces, orthogonality and least squares problems.

MATH 3300 Calculus III Credit Hours: 4.0; Content: LECTURE (3.0), RECITATION (1.0); Prerequisites: C OR T OR BETTER in MATH 2302; Course Description: Third course in calculus and analytic geometry with applications in the sciences and engineering. Includes partial differentiation, multiple integrals, line and surface integrals, and the integral theorems of vector calculus.

MATH 3320 Vector Analysis Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: MATH 3300 Calculus III; Course Description: Vector algebra and its applications. Vector calculus and space curves. Scalar and vector fields, gradient, divergence, curl, and Laplacian. Line and surface integrals. Divergence theorem. Stoke's theorem, and Green's theorem.
MATH 3400 Elementary Differential Equations Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: C OR T OR BETTER in MATH 2302 Calculus II; Course Description: Introduction to ordinary differential equations and their use as models for applications with an emphasis on exact solution methods for linear equations and systems including Laplace transform methods.

MATH 3500 Probability Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: 2302 and (3050 or CS 3000); Course Description: A mathematical introduction to univariate probability theory with some applications, particularly to statistics. Topics will include the basic rules of probability, conditional probability, independent events, the Law of total probability, Bayes' Theorem, univariate random variables, discrete and continuous distributions and the density function, expectation, variance, higher moments, and special discrete and continuous distributions such as Bernoulli, binomial, Poisson, uniform, exponential, gamma and normal.

MATH 3600 Applied Numerical Methods Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: MATH 3400 Differential Equations; Course Description: A survey of numerical methods for engineering, science and mathematics students. Topics include: solutions of systems of linear and nonlinear equations, eigenvalues, numerical differentiation and integration, and numerical solution of ordinary and partial differential equations. The topics will be posed in a setting of problems intended for engineering students using MATLAB. The course will simultaneously introduce numerical methods, programming techniques, problem solving skills and the Matlab language, in a lecture-lab format.

MATH 4310 Complex Variables Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: 3300; Course Description: A first course in complex variables focused on developing analytic techniques that are useful in applications. The course is also essential for further study in mathematics and students will be expected to do some proofs. Topics will include: Analytic and harmonic functions, Cauchy integration and residue theorems, contour integration, Taylor and Laurent expansions, conformality and linear fractional transformations with applications.

MATH 4330 Hilbert Spaces and Applications Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: 3400, (3200 or 3210); Course Description: A course in applied linear analysis, especially Hilbert spaces, for advanced undergraduate and graduate students in mathematics, the sciences or engineering. The course will introduce both the practical and theoretical aspects of linear analysis and students will be expected to complete both computational and proof-oriented exercises. Topic covered will include: Normed Vector Spaces, the spaces L1 and L2, Hilbert Spaces, orthonormal systems, linear operators on Hilbert space and applications to differential equations.

MATH 4400 Advanced Differential Equations Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: 3400, (3200 or 3210); Course Description: An introduction to the qualitative theory of differential equations, with emphasis on linear systems.

MATH 4410 Fourier Analysis and Partial Differential Equations Credit Hours: 3.0; Content: LECTURE (3.0); Prerequisites: MATH 3300 Calc III & 3400 Differential Equations; Course Description: Representation of functions as sums of infinite series of trigonometric functions and complex exponentials, Bessel functions, Legendre polynomials, or other sets of orthogonal functions. Use of such representations for solution of partial differential equations dealing with vibrations, heat flow, and other physical problems.