



**MATH 1140 (3)****Pre-Calculus II**

This course is a continuation of MATH 1130 and covers further mathematical topics that prepare students for higher level mathematics courses. Course topics include: a complete development of trigonometry including trigonometric functions and their identities; solving trigonometric equations, applications of trigonometry to vectors; polar coordinates, and polar form of complex numbers; rectangular form and polar form of conic sections; matrices and matrix formulation of series; and the binomial theorem.

*Prerequisite: A grade of C- or better in MATH 1130 or advisor approval.*

**MATH 1150 (3)****Pre-Calculus I and II Accelerated**

A course for well-qualified students who are prepared to complete the pre-calculus sequence in one term. The course includes all the topics covered in Pre-Calculus I, MATH 1130, and Pre-Calculus II, MATH 1140, but is presented in one term.

*Prerequisite: A grade of A in MATH 1105, a grade of C or better in MATH 1130, an ACT Math score of at least 24, an SAT Quantitative score of at least 570, or an appropriate score on a placement test.*

**MATH 1234 (3)****Introduction to Cryptology**

This course gives an historical introduction to cryptology, the science of making and breaking secret codes. It begins with the oldest recorded codes, taken from hieroglyphic engravings, and ends with the encryption schemes used to maintain privacy during internet credit card transactions. Since secret codes are based on mathematical ideas, each new encryption method discussed in this course leads to the study of new mathematical ideas and results. Topics covered include basic modular arithmetic, primes and divisors, permutations, and elementary statistics.

This course will also cover the social and historical aspects of cryptography.

**MATH 2214 (3)****Calculus I**

A course in single variable calculus which emphasizes limit, continuity, derivative, and integral. Primary focus is on the derivative with an introduction to the integral and elementary applications of the integral. Differentiation topics include: chain rule, implicit differentiation, curve sketching, and maxima and minima problems. Integration topics include: fundamental theorem of calculus, method of substitution, area between curves, and volumes of revolution. *Prerequisite: An ACT Math score of at least 26, an SAT Quantitative score of at least 620, a grade of C- or better in MATH 1140 or 1150, or an appropriate score on the math placement test.*

**MATH 2215 (3)****Calculus II**

A continuation of Calculus I, completing the development of the integral. Integration topics include: integration by parts, trigonometric substitution, method of partial fractions, length of curves, surfaces, and volumes of revolutions. Other topics include: infinite series, tests of

**MATH 3110 (3)**  
**Foundations of Mathematical Logic and Applications**

**MATH 3302 (3)****Elementary Number Theory**

Topics covered include prime and composite integers; factorization; divisibility; number theoretic functions; Diophantine equations; congruence of integers; quadratic reciprocity; mathematical inductions; cryptography; Pythagorean triples; and real, complex and p-adic numbers. *Prerequisite: MATH 2215; or MATH 2214 and 3301. Undergraduate standing.*

**MATH 3305 (3)****Linear Algebra**

Elementary linear algebra with applications in the sciences and to computers and economics. Topics include: systems of linear equations; matrix theory, determinants and eigenvalues; geometry of Euclidean n-



**MATH 4301 (3)****Combinatorics and Graph Theory**

This course explains how to reason and model using enumerative combinatorics and applied graph theory. It also stresses the systematic analysis of different possibilities, exploration of the logical structure of a problem, and ingenuity. Combinatorial reasoning underlies all analysis of computer systems. It plays a similar role in discrete operations research problems and infinite probability. Topics covered include generating functions, set partitions, recurrence relations, inclusion-exclusion, trees, graph connectivity, independence, and graph colorings. Additional

and Hamiltonian and Eulerian graphs.

*Prerequisite: MATH 3301.*

**MATH 4450 (3)****Complex Analysis**

Complex Analysis is the theory and applications of analytic functions of a single complex

and formula, residue calculus, harmonic functions, zeros and poles, counting theorem, conformal mappings, linear functional transformations, Schwartz-

*Prerequisite: MATH 2216, or consent of instructor.*

**MATH 4470 (3)****Methods of Applied Mathematics I**

Applied Mathematics I is the first course in a course sequence exploring analytical methods of solution in various mathematical and scientific areas. The course may review a variety of topics: solution of ordinary differential equations, solution of systems of ordinary differential equations, Laplace transform method, methods of applied linear algebra, and vector calculus. New topics presented in this class include: complex variables, Fourier transform, partial differential

*Prerequisite: MATH 3307\*, PHYS 2052, or consent of instructor. (\*may be taken concurrently). MATH 3216 is recommended.*

**MATH 4471 (3)****Methods of Applied Mathematics II**

Applied Mathematics II is the second course in a course sequence exploring numerical solutions in various mathematical and scientific areas. Topics for this course include: elements of error analysis, real roots of an equation, polynomial approximation by finite difference and least square methods, interpolation, quadrature, numerical solution of ordinary differential equations, and numerical solutions of systems of linear equations. Additional topics explore partial differential equations and finite-element analysis.

*Prerequisite: CSCI 2911; MATH 3305, 4470; or consent of instructor.*

**MATH 4475 (3)****Modeling and Simulation**

Material includes the advanced study of mathematical techniques, algorithms, and applications applicable to assist and improve decision-making in the management and behavioral sciences. The course focuses on both the techniques and the use of the computer in facilitating application of these techniques.

*Prerequisite: CSCI 2912; MATH 1123 and 2214.*

**MATH 4920 (3)****Math Education Practicum**

This course combines the study of mathematics problem-solving with practical classroom experience. Students will investigate the issues of teaching mathematics while gaining practical experience as tutors. Students will follow the progress of their own students in mathematics labs.

*Prerequisite: MATH 3316, or any other MATH 3000-level class, or consent of instructor.*

**MATH 3990 Nonpaid Internship** See Internship Section.

**MATH 4210 (3)****Topology**

An introduction to the basic concepts of topology in the setting of metric spaces and more general topological spaces. Topics include completeness, compactness, connectedness, continuous functions and continuity in terms of nets, Hausdorff spaces, product spaces, metric spaces, Tychonoff theorem, Bolzano-Weierstrass theorem, Stone-Weierstrass theorem, and the Baire category theorem.

*Prerequisite: MATH 2215; and MATH 3310 or higher; or consent of instructor.*

This course combines the study of mathematics problem-solving with practical classroom experience. Students will investigate the issues of teaching mathematics while gaining practical experience as tutors. Students will follow the progress of their own students in mathematics labs.

*Prerequisite: MATH 3316, or any other MATH 3000-level class, or consent of instructor.*

**Math 4940 (3)****Research in Logic or Pure Mathematics**

Math 4940 is a class where seniors who have excelled in mathematics can be mentored by individual faculty members. Exceptional students will work closely with a faculty member who will guide them in advanced topics and mathematical research. The class utilizes the best aspects

strength. Math 4940 has one to three hours of instruction per week and extra office hours. The class is flexible to meet student needs and help prepare them for independent research in advanced logic or pure mathematics.



**MATH 4950 (3)****Research in Applied Mathematics**

MATH 4950 Research in Applied Mathematics is an upper- division course for senior students from any major in CNCS. Students work closely with a faculty member in the Department of Mathematics who will guide them in learning advanced topics and doing research in applied mathematics. The topics broadly encompass mathematical modeling, data analysis, numerical

is no prerequisite but MATH 3307 Differential Equation is highly recommended.