



*Courses in the College of Letters and Sciences*

***MATHEMATICS AND COMPUTER SCIENCE COURSES (760, 765)***

**MATHEMATICS (760)**

**760-542 Applied Statistics -- 3 cr**

This course will cover the basics of statistical testing, regression analysis, experimental design, analysis of variance, the use of computers to analyze statistical problems.

Prereq: 760-253 or 760-250 or consent of instructor.

Unreq: 230-245.

**760-555 Matrices And Linear Algebra -- 3 cr**

Systems of linear equations, vector spaces, linear dependence, bases, dimension, linear mappings, matrices, determinants, quadratic forms, orthogonal reduction to diagonal form, eigenvalues, geometric applications.

Prereq: 760-254 or concurrent registration.

**760-565 Linear Programming -- 3 cr**

A study of the vector-matrix theory and computational techniques of the simplex method, duality theorem, degeneracy problem, transportation problems and their applications to engineering and economics. Programming and machine solution of linear programming problems.

Prereq: 760-171 and 760-355/555, or consent of instructor.

**760-575 Development Of Mathematics -- 3 cr**

A study of the development of mathematical notation and ideas from prehistoric times to the present, with special emphasis being placed on elementary mathematics through the calculus. The development and historic background of the new math will be included.

Prereq: Consent of instructor.

**760-580 Patterns Of Problem Solving -- 3 cr**

This course will expose students to a variety of techniques useful in solving mathematics problems. The experiences gained from this course can be applied to problems arising in all fields of mathematics. The student will have the chance to see how some general techniques can be used as tools in many areas. Homework for this course will consist mostly of solving a large number of mathematics problems.

Prereq: 760-280 or consent of instructor. (Consent will be given to students with substantial interest in problem solving, and adequate preparation.)

**760-615 Modern Algebra And Number Theory For The Elementary Teacher -- 3 cr**

An introduction to modern algebra with special emphasis on the number systems and algorithms which underlie the mathematics curriculum of the elementary school. Topics include sets, rings, integral domains, rational numbers, real numbers, complex numbers and polynomials. Students may not receive credit for both 760-615 and 760-652.

Prereq: Consent of instructor.

**760-616 Geometry For The Elementary Teacher -- 3 cr**

A study of the intuitive, informal geometry of sets of points in space. Topics include elementary constructions, coordinates and graphs, tessellations, transformations, problem solving, and symmetries of polygons and polyhedra.

Prereq: 760-112 and 760-152.

**760-617 Theory Of Numbers -- 3 cr**

A study of the properties of integers, representation of integers in a given base, properties of primes, arithmetic functions, modulo arithmetic. Diophantine equations and quadratic residues. Consideration is also given to some famous problems in number theory.

Prereq: 760-415/615, or 760-452/652, or consent of instructor.

**760-631 Topology -- 3 cr**

An introduction to point-set topology, including such topics as topological spaces, mappings, connectedness, compactness, separation axioms, metric spaces, complete spaces, product spaces and function spaces.

Prereq: 760-255 and either 760-280 or consent of instructor.

**760-641 Probability Theory -- 3 cr**

Probability spaces, discrete and continuous random variables, mathematical expectation, discrete and continuous distributions.

Prereq: 760-255 or consent of instructor.

**760-642 Mathematical Statistics -- 3 cr**

This course will cover moment generating functions, moment of linear combinations of random variables, conditional expectation, functions of random variables, sampling distributions, the theory of estimation, Bayesian estimation, hypothesis testing, nonparametric tests, and linear models.

Prereq: 760-441/641 and either 760-355/555 or consent of instructor.

**760-646 Actuarial Mathematics -- 3 cr**

This course will discuss the actuarial profession and the insurance industry, provide direction to students wishing to take the first few actuarial examinations, thoroughly cover the theory of interest, and introduce the basic concepts of actuarial mathematics.

Prereq: 760-441 or concurrent registration.

**760-652 Introduction to Abstract Algebra -- 3 cr**

An introductory survey of abstract algebra and number theory with emphasis on the development and study of the number system of integers, integers mod  $n$ , rationals, reals, and complex numbers. These offer examples of and motivation for the study of the classical algebraic structures of groups, rings integral domains and fields. Application to algebraic coding theory and crystallography will be developed as time allows.

Prereq: 760-280

Unreq: 760-415/615.

**760-653 Abstract Algebra -- 3 cr**

This course is a continuation of 760-452/652 with emphasis on ring and field theory.

Topics include a review of group theory, polynomial rings, divisibility in integral domains, vector spaces, extension fields, algebraic extension fields, etc.

Prereq: 760-355/555 and 760-452/652.

**760-658 Applied Mathematical Analysis I -- 3 cr**

A course in numerical and series solutions for ordinary differential equations, the Laplace transform, boundary value problems, Fourier series, vector analysis and its physical applications.

Prereq: 760-361.

**760-659 Partial Differential Equations -- 3 cr**

Fourier analysis, partial differential equations and boundary value problems, complex variables, and its potential theory.

Prereq: 760-361.

**760-664 Advanced Calculus I -- 3 cr**

This course presents a rigorous treatment of the differential and integral calculus of single variable functions, convergence theory of numerical sequences and series, uniform convergence theory of sequences and series of functions, metric spaces, function of several real variables, and the inverse function theorem. This course contains a written component.

Prereq: 760-301.

**760-671 Numerical Analysis I -- 3 cr**

Emphasis on numerical algebra. The problems of linear systems, matrix inversion, the complete and special eigenvalue problems, solutions by exact and iterative methods, orthogonalization, gradient methods. Consideration of stability and elementary error analysis. Extensive use of microcomputers and programs using a high level language such as PASCAL.

Prereq: 760-171 and 760-355/555

**760-690 Workshop -- 1-3 cr****760-694 Seminar -- 2 cr**

**760-696 Special Studies -- 1-3 cr**

Prereq: Consent of instructor.

**760-790 Workshop -- 1-6 cr**

**760-794 Seminar -- 1-3 cr**

**760-798 Individual Studies -- 1-3 cr**

**760-799 Thesis Research -- 1-6 cr**

Students must complete a Thesis Proposal Form in the Graduate Studies Office before registering for this course.

**COMPUTER SCIENCE (765)**

**765-502 Computer Logic And Microprocessors -- 3 cr**

Structure of microprocessors and microprocessor systems, programming in machine language, computer logic and logic circuits, interfacing.

Prereq: 765-171.

**765-507 Microcomputer Applications -- 3 cr**

This course will treat a variety of applications of microcomputers, as well as their architecture, design and social impact.

Prereq: 765-171 or consent of instructor.

**765-572 Intermediate Programming -- 3 cr**

Sequel to 765-171. Advanced programming language features, techniques, and data structures, learned through the implementation of larger programs; an introduction to algorithm analysis, program verification, recursion and data abstraction.

Prereq: 765-171

Unreq: 950-231

**765-612 Computer Organization And System Programming -- 3 cr**

A study of general computer system organization and architecture. Comparison of CPU and memory structure, instruction formats, addressing, flow of control and operating systems on different type of computers. Assembly language is used extensively to write systems programs.

Prereq: 760-271 or consent of instructor.

**765-690 Workshop -- 1-3 cr**

Repeatable.

Prereq: Consent of instructor.

**765-694 Seminar -- 2 cr**

**765-696 Special Studies -- 1-3 cr**

Repeatable.

Prereq: Consent of instructor.

**765-790 Workshop -- 1-3 cr**

**765-794 Seminar -- 1-3 cr**

**765-798 Individual Studies -- 1-3 cr**