## MATH 4345: Numerical Methods for Differential Equations

***3 Credit Hours***

*Prerequisite: MATH 2306 and (CSE 1321 and CSE 1321L)*

This course introduces methods for numerically solving initial value problems and boundary value problems that arise in ordinary and partial differential equations. Numerical differentiation and integration will be considered. Computing and programming techniques will be used extensively.

Notes: Extensive use of computing will be incorporated.

## MATH 4361: Modern Algebra I

***3 Credit Hours***

*Prerequisite: MATH 2390 and MATH 3260*

An introduction to the fundamental structures of abstract algebra (groups, rings, and fields), the connections of these structures with the algebra studied at the elementary level, and the historical development of modern algebra. The emphasis in this course is on groups.

## MATH 4362: Modern Algebra II

***3 Credit Hours***

*Prerequisite: MATH 4361*

A continuation of Modern Algebra I with an emphasis on rings and fields.

## MATH 4381: Real Analysis I

***3 Credit Hours***

*Prerequisite: MATH 2390*

This course provides a rigorous introduction to the calculus of a single real variable and a deeper awareness of the theory of calculus than can be achieved in the elementary calculus courses. Among the topics covered in the course are completeness of the number system, elementary topology of the real line, limits of sequences, and limits and continuity of functions. The aim of this course is two-fold, to provide an understanding of the nature of the real number system and its role in the theory of calculus, and to provide a training in the discovery and writing of rigorous mathematical proofs.