



## COURSE DESCRIPTION:

Functions and relations; polynomial and rational functions; exponential and logarithmic functions; matrices; sequences and series. The course is the first half of a one year course that is intended to provide students with the necessary background and skills that will subsequently enable them to successfully undertake the study of Calculus.

Prerequisites: A grade of C or better in Math 27 (or its equivalent), or placement in Math 135 (by assessment test).

## COURSE OBJECTIVES:

To review the fundamental concepts of Real Numbers and algebra.

To achieve an understanding of functions & relations, and to acquire proficiency in sketching their graphs.

To achieve an understanding of polynomial & rational functions, and to acquire (a basic level of) proficiency in sketching their graphs.

To achieve an understanding of exponential & logarithmic functions, and to acquire proficiency in sketching their graphs.

To review the methods for solving linear systems of equations & inequalities.

To review the methods for solving nonlinear systems of equations & inequalities.

To develop an initial understanding of matrices, and matrix algebra.

To develop a basic understanding of sequences and series.

In addition, as in most mathematical courses, *students will be presented with the challenge of utilizing critical thinking along with development of communicating their analyses in an orderly and neat fashion.*

## INSTRUCTIONAL MATERIALS:

Textbook: PreCalculus – Functions and Graphs (Third Edition)  
by Mark Dugopolski

Calculators: A scientific calculator is required.

Recommended: Graph paper or engineering pad;  
Graphing calculator;  
A loose-leaf notebook for storing HomeWork, exams, quizzes, and notes.

# MATHEMATICS 135F / PreCalculus (Elementary Functions)

## Course Outline

### **UNIT I. EQUATIONS, INEQUALITIES & MODELING**

Real Numbers and Their Properties; Integral Exponents; Rational Exponents and Radicals; Polynomials; Factoring Polynomials; Rational Expressions. Linear Equations; Applications; Complex Numbers; Quadratic Equations; More Equations; Inequalities; More Inequalities.

### **UNIT II. FUNCTIONS & GRAPHS**

The Cartesian Coordinate System; Functions; Graphs of Relations and Functions; Transformations and Symmetry of Graphs; Operations with Functions; Inverse Functions; Variation.

### **UNIT III. POLYNOMIAL & RATIONAL FUNCTIONS**

Linear Functions; Quadratic Functions; Zeros of Polynomial Functions; The Theory of Equations; Graphs of Polynomial Functions; Graphs of Rational Functions.

### **UNIT IV. EXPONENTIAL & LOGARITHMIC FUNCTIONS**

Exponential Functions; Logarithmic Functions; Properties of Logarithms; More Equations and Applications.

### **UNIT V. SYSTEMS of EQUATIONS & Inequalities**

Systems of Linear Equations in Two Variables; Systems of Linear Equations in Three Variables; Nonlinear Systems of Equations; Partial Fractions; Inequalities and Systems of Inequalities in Two Variables.

### **UNIT VIII: MATRICES & DETERMINANTS**

Solving Linear Systems Using Matrices; Gaussian Elimination; Inconsistent and Dependent Systems in Two Variables; Systems in Three Variables; Inconsistent and Dependent Systems in Three Variables; Applications

### **UNIT VIII: SEQUENCES & SERIES**

Sequences; Series; Arithmetic Sequences and Series; Geometric Sequences and Series; Mathematical Induction.