

COURSE OUTLINE
MATH 135
Precalculus
5 Semester Hours

HOWARD COMMUNITY COLLEGE

Description

Students will develop skills in the analysis of functions and solving of equations and inequalities. Polynomial, rational, exponential, logarithmic and trigonometric functions will be studied in detail. Additional topics include complex numbers and parametric and polar equations. Modeling using data analysis will be an integral part of this course. A graphical approach will be utilized throughout, with an emphasis on solving application problems. Not open to students who have completed MATH 131 or MATH 133. MATH 135 is equivalent to MATH 131 and 133. Prerequisite: Appropriate score on math placement test or equivalent.

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Solve linear equations and inequalities.
2. Evaluate and graph functions, some of which are altered by shifts, reflections, and/or transformations.
3. Perform the basic operations on or find the composite of two or more functions.
4. Find and graph the inverse of a function.
5. Solve absolute value and non-linear inequalities.
6. Apply classic theorems to find the zeros of polynomial equations and graph its corresponding function.
7. Operate with complex numbers in standard (rectangular) form and in trigonometric form
8. Graph rational functions and identify their major features.
9. Use exponents and logarithms to solve equations and application problems.
10. Define and graph the trigonometric functions and their inverses.
11. Prove or disprove trigonometric identities and solve trigonometric equations.
12. Apply sum and difference, double angle, half-angle trigonometric formulas and the standard trigonometric identities.
13. Use the Law of Sines and Cosines.
14. Find polynomial, exponential, and trigonometric models that best fit a set of data.
15. Model with parametric equations.
16. Apply and graph parametric and polar equations.
17. Solve application problems related to real world issues including topics on global awareness, sustainability and financial literacy.

Major Topics

- I. Graphs, Functions, and Models
 - A. Analysis of Functions and Graphs
 - B. Slope (Rate of Change)
 - C. Curve Fitting, and Linear Regression
 - D. Symmetry and Transformations
 - E. Circles
- II. Functions and Equations: Zeros and Solutions
 - A. The Complex Numbers
 - B. Quadratic Functions and Quadratic Like Functions, Quadratic Regression
 - C. Radical and Absolute Value Equations and Inequalities
- III. Polynomial and Rational Functions
 - A. Polynomial Functions and Modeling
 - B. Polynomial Division; The Remainder and Factor Theorems
 - C. Theorems about Zeros of Polynomial Functions
 - D. Rational Functions
 - E. Polynomial and Rational Inequalities
- IV. Exponential and Logarithmic Functions
 - A. Composite and Inverse Functions
 - B. Exponential & Logarithmic Functions and Graphs
 - C. Solving Exponential and Logarithmic Equations
 - D. Applications and Models: Growth and Decay
- V. Trigonometry
 - A. Right Triangle Trigonometry
 - B. Trigonometric Functions, Their Inverses, and Graphs
 - C. Solving Equations and Verifying Identities
 - D. Law of Sines and Cosines, Sum and Difference, Double Angle, and Half-Angle Formulas
 - G. Trigonometric Form of a Complex Number
 - H. DeMoivre's Theorem and Nth Roots
- VI. Analytic Geometry
 - A. Parametric Equations
 - B. Polar Equations
- VII. Sequences and Series
 - A. Basic and Recursive Definitions
 - B. Arithmetic and Geometric Sequences
 - C. Finite and Infinite Series

Course Requirements

Grading/Exams: Grading procedures will be determined by the individual faculty member within the guidelines of the Mathematics Division and will include several unit exams, projects and a comprehensive departmental final exam.

Other Course Information

MATH 135 is a prerequisite course for the main calculus sequence, MATH 181/182, intended primarily for mathematics, science and engineering majors. If you are a business, social science or humanities major, your interests may be better served by taking MATH 145 (Business Calculus) or MATH 138 (Statistics). Contact your transfer institution for more specific information. This course is a Mathematics core course and an Arts and Science elective.