



Course Name: Calculus I

Course Number: MAT*E254

Credits: 4

Catalog description: A study of differential calculus, the definition of limits, limit theorems, the tangent and velocity problems, the definition of derivatives, differentiation formulae, implicit differentiation, applications of the derivatives, differentials, maxima and minima problems, concavity, antiderivatives, The Fundamental Theorem of Calculus

Prerequisite: Satisfactory score on placement exam, or MAT*186 with a grade of C or higher

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):

QUAX Quantitative Reasoning

Discipline-Specific Attribute Code(s):

MATH Mathematics elective

Course objectives:

General Education Goals and Outcomes:

Quantitative Reasoning: Students will learn to recognize, understand, and use the quantitative elements they encounter in various aspects of their lives. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.

Course Specific Objectives:

1. To be able to perform limit calculations
2. Use of limits to determine continuity.
3. To be able to calculate the derivative of polynomial functions, trigonometric functions, and exponential and logarithmic functions.
4. To be able to use derivatives to determine the graph of a function.
5. To be able to use derivatives in optimization problems.
6. To understand finite sum notation and its relation to the definite integral.
7. To be able to calculate the antiderivative of polynomial functions, trigonometric functions, and exponential and logarithmic functions.
8. To understand the Fundamental Theorem of Calculus

Course Content:

MAT*E254



- Unit 1: Limits and continuity
 - Intro to limits
 - Techniques of evaluating limits
 - Continuity
- Unit 2: Differentiation
 - The derivative, tangent line
 - Velocity, acceleration, rates of change
 - Differentiation Rules
 - The Chain Rule
 - Implicit differentiation
 - Related Rates
- Unit 3: Applications of the derivative
 - The Mean Value Theorem
 - 1st, 2nd derivative tests
 - Limits at infinity
 - Optimization problems
 - Differentials
- Unit 4: Antiderivatives
 - Definite integral
 - Area
 - The Fundamental Theorem of Calculus
 - Integration by substitution

REV:5/22/2006

REV: 11/28/06

REV: 1/2015

REV:02/27/2017