SUSSEX COUNTY COMMUNITY COLLEGE

Master College Syllabus

MATH113	CALCULUS I	
COURSE #	COURSE TITLE	CLASSIFICATION

4	4	0
CREDITS	CLASS HOURS	LAB HOURS

RECOMMENDED TEXT:

Text: <u>Calculus of a Single Variable: Early Transcendental Functions, 6th ed.</u>
Author: Larson/Edwards
Publisher: Cengage, 2015
ISBN: 9781285774794
Graphing Calculator: TI-83, TI-83 Plus, or TI-84

CATALOG DESCRIPTION:

This course includes the study of the concepts of limits and continuity; the derivative and its applications; integration and the Fundamental Theorem of Calculus. Algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions will be studied.

PREREQUISITE: Prerequisite: MATH110 and MATH112 (grades of C) or appropriate pre-calculus placement score.

TOPICS TO BE INCLUDED:

A.   Limits and Their Properties
      1.   Finding Limits Graphically and Numerically
      2.   Evaluating Limits Analytically
      3.   Continuity and One-Sided Limits
      4.   Infinite Limits
B.   Differentiation
      1.   The Derivative and the Tangent Line
      2.   Basic Differentiation Rules and Rates of Change
      3.   Product and Quotient Rules and Higher Order Derivatives
      4.   The Chain Rule
      5.   Implicit Differentiation
      6.   Derivatives of Inverse Functions
      7.   Related Rates
      8.   Newton's Method
C.   Applications of Differentiation
      1.   Extrema on an Interval
      2.   Rolle's Theorem and the Mean Value Theorem
      3.   Increasing and Decreasing Functions and the First Derivative Test
      4.   Concavity and the Second Derivative Test
      5.   Limits at Infinity
      6.   A Summary of Curve Sketching
      7.   Optimization Problems
      8.   Differentials
D.   Integration
      1.   Antiderivatives and Indefinite Integration

2. Area
3. Reimann Sums and Definite Integrals
4. The Fundamental Theorem of Calculus
5. Integration by Substitution
6. Numerical Integration
7. The Natural Logarithmic Function: Integration
8. Inverse Trigonometric Functions: Integration
9. Hyperbolic Functions

COURSE COMPETENCIES/LEARNING OUTCOMES:

In a manner deemed appropriate by the instructor and approved by the department, students will be able to:

1. Utilize the concept of instantaneous rate of change to solve problems in physics, biology, economics, and other real-world phenomena. (GE2)
2. Differentiate polynomial, rational, exponential, logarithmic, and trigonometric functions algebraically. (GE2)
3. Demonstrate the relationship between the algebraic and geometric properties of the derivative. (GE2)
4. Apply the derivative procedure to optimization problems. (GE2)
5. Use the concept of antiderivative to algebraically evaluate integrals involving simple substitutions. (GE2)
6. Demonstrate the relationship between differentiation and integration using the Fundamental Theorem of Calculus. (GE2)

MATH113
Rev. 6/10/2014 Books
4/24/2014 Descr & Topics