CUMBERLAND COUNTY COLLEGE

Course: MA 140 Calculus II

Credits: 4

Prerequisites
MA 130

Description
A rigorous continuation of MA130. Topics include a further development of exponential and logarithmic functions, inverse trigonometric functions, hyperbolic and inverse hyperbolic functions; integration techniques for a variety of integrals; indeterminant limits, L'Hopital's rule and improper integrals; infinite sequence and series, alternate representations of functions using polar and parametric coordinates, calculus using polar and parametric coordinates, conic sections. Theory is augmented by applications from a variety of disciplines.

Learning Outcomes
At the completion of this course, students will be able to:
- Find a wide variety of anti-derivatives analytically
- Use integration in spatial applications and a variety of physics applications
- Apply numeric methods to approximate integrals which are not analytic
- Develop, analyze, and apply series approximations for various functions
- Rewrite and analyze functions in polar and parametric coordinate systems

Related General Education Outcomes
- Students will translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations.
- Students will construct graphs and charts, interpret them, and draw appropriate conclusions.

Topical Outline
- Applications of Definite Integrals
  - Volumes using Cross-Sections
  - Volumes Using Cylindrical Shells
  - Arc Length
  - Areas of Surfaces of Revolution
  - Work and Fluid Forces
  - Moments and Centers of Mass
- Integrals and Transcendental Functions
  - The Logarithm Defined as an Integral
  - Exponential Change and Separable Differential Equations
  - Hyperbolic Functions
- Techniques of Integrations
  - Using Basic Integration Formulas
  - Integrations by Parts

- o Trigonometric Integrals
- o Trigonometric Substitutions
- o Integrations of Rational Functions by Partial Fractions
- o Numerical Integration
- o Improper Integrals
- Infinite Sequences and Series
  - o Sequences
  - o Infinite Series
  - o The Integral Test
  - o Comparison Tests
  - o Absolute Convergence
  - o Alternating Series and Conditional Convergence
  - o Power Series
  - o Taylor and MacLaurin Series
  - o Convergence of Taylor Series
  - o Binomial Series and Convergence of Taylor Series
- Parametric Equations and Polar Coordinates
  - o Parameterizations of Plane Curves
  - o Calculus with Parametric Curves
  - o Polar Coordinates
  - o Graphing Polar Coordinate Equations
  - o Areas and Lengths in Polar Coordinates
  - o Conic Sections
  - o Conic Sections in Polar Coordinates

Required Texts and Other Materials
Thomas' Calculus Early Transcendentals, 13th ed: Pearson.

Student Assessment
Assessment may be accomplished through projects, portfolios, online assignments, exams, presentations and/or papers.

Academic Integrity
Plagiarism is cheating. Plagiarism is presenting in written work, in public speaking, and in oral reports the ideas or exact words of someone else without proper documentation. Whether the act of plagiarism is deliberate or accidental [ignorance of the proper rules for handling material is no excuse], plagiarism is, indeed, a "criminal" offense. As such, a plagiarized paper or report automatically receives a grade of **ZERO** and the student may receive a grade of **F** for the semester at the discretion of the instructor.

Available Resources
If you are having difficulty with work in this class, tutoring is available through the Success Center. If you think that you might have a learning disability, contact Project Assist at 856.691.8600, x1282 for information on assistance that can be provided to eligible students.

(List availability of open labs and/or writing center)

<u>Before Withdrawing From This Course</u>
If a student experiences adverse circumstances while enrolled in this course and considers withdrawing, s/he should see an advisor (division or advisement center) BEFORE withdrawing from the class. A withdrawal may cause harmful repercussions to completion rate standards and overall GPA which can limit or eliminate future financial aid in addition to causing academic suspension.