MAT 272 Calculus II

COURSE DESCRIPTION:

Prerequisite(s): MAT 271; minimum grade of "C"
Corequisite(s): None

This course is designed to develop advanced topics of differential and integral calculus. Emphasis is placed on the applications of definite integrals, techniques of integration, indeterminate forms, improper integrals, infinite series, conic sections, parametric equations, polar coordinates, and differential equations. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to integral-related problems with and without technology.
This is a Universal General Education Transfer Component (UGETC) course

Course Hours Per Week: Class, 3. Lab, 2. Semester Hours Credit, 4.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to

1. Select and apply appropriate models and integration techniques to solve problems involving algebraic and transcendental functions; these problems will include but are not limited to applications involving volume, arc length, surface area, centroids, force and work.
2. Evaluate proper and improper integrals using various integration techniques.
3. Analyze the convergence and divergence of infinite sequences and series and find the Taylor and MacLaurin representations for transcendental functions.
4. Use differentiation and integration to analyze the graphs of polar form equations and parametric form equations.
5. Solve separable and first-order linear differential equations.
6. Analyze and graph conic sections using calculus techniques.

OUTLINE OF INSTRUCTION:

B. Trigonometric integrals
C. Trigonometric substitution
D. Partial fractions
E. Integration by tables and computer algebra systems
F. Indeterminate forms and L'Hôpital's Rule
G. Improper integrals

III. Infinite Series
A. Sequences
B. Series and convergence; the Divergence Test
C. Geometric and telescoping series
D. The Integral Test
E. The Comparison and Limit Comparison Tests
F. Alternating series
G. Absolute convergence; the Ratio and Root tests
H. Power series
I. Representation of functions as power series
J. Maclaurin and Taylor series
K. Approximation using Maclaurin and Taylor polynomials

IV. Parametric equations, polar coordinates, and conic sections
A. Parametric equations and conic sections
B. Calculus with parametric curves
C. Polar coordinates
D. Area in polar coordinates

V. Differential equations
A. Separable differential equations, exponential growth, and applications
B. First-order linear differential equations and applications
C. Direction fields
D. Euler's Method

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the chair/instructor.