CALCULUS II

MATH 1960

Course Description:

This course introduces applications of integration, techniques of integration, infinite sequences and series, vectors in the plane, and polar functions. A mathematical software package is introduced, with required assignments. **5 credits**

Prerequisites:

MATH 1950 with a grade of C- or better, or MATH 1960 with a grade of F or better, or permission of instructor.

Overview of Content and Purpose of the Course:

This is the second course in a three course Calculus sequence. The concepts introduced have applications to every area of the physical sciences and represent an important foundation for higher level Math courses. MATH 1960 provides a transition from studying Calculus in two dimensions to three dimensions in MATH 1970.

Major Topics:

1) Applications of Integration
    a. Area of a Region Between Two Curves
    b. Volume: The Disk Method
    c. Volume: The Shell Method
    d. Arc Length and Surfaces of Revolution
    e. Work
    f. Moments, Centers of Mass, and Centroids
    g. Fluid Pressure and Fluid Force

2) Integration Techniques, L′Hopital's Rule, and Improper Integrals
    a. Basic Integration Rules
    b. Integration by Parts
    c. Trigonometric Integrals
    d. Trigonometric Substitution
    e. Partial Fractions
    f. Integration by Tables and Other Integration Techniques
    g. Indeterminate Forms and L′Hopital's Rule
    h. Improper Integrals

3) Infinite Series
    a. Sequences
    b. Series and Convergence
    c. The Integral Test and p-Series
    d. Comparisons of Series
    e. Alternating Series
    f. The Ratio and Root Tests
    g. Taylor Polynomials and Approximations
    h. Power Series
    i. Representation of Functions by Power Series
    j. Taylor and Maclaurin Series

4) Conics, Parametric Equations, and Polar Coordinates
    a. Conics and Calculus
    b. Plane Curves and Parametric Equations
    c. Parametric Equations and Calculus
    d. Polar Coordinates and Polar Graphs
    e. Area and Arc Length in Polar Coordinates
    f. Polar Equations of Conics and Kepler's Laws

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Textbook:

Larson, Ron, and Bruce H. Edwards. *Calculus, Hybrid: Early Transcendental Functions, 6th ed.* Boston: Cengage Learning, 2014.

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