Virginia Western Community College
MTH 264
Calculus II

Prerequisites
Completion of MTH 263 or equivalent with a grade of C or better.

Course Description
Continues the study of calculus of algebraic and transcendental functions including rectangular, polar, and parametric graphing, indefinite and definite integrals, methods of integration, and power series along with applications. Designed for mathematical, physical, and engineering science programs.

Semester Credits: 4   **Lecture Hours: 4**

Required Materials
Textbook:
University Calculus. Hass, Weir & Thomas. 3rd edition. Pearson/Addison-Wesley. ISBN: 9780321999580.

Course Outcomes

At the completion of this course, the student should be able to:
- Solve appropriate applied problems from the area of science and engineering.
- Evaluate improper integrals.
- Integrate transcendental functions.
- Find area and volume of solids of revolution.
- Use the rectangular and polar coordinate systems including finding area, lengths, and graphing.
- Graph, evaluate, differentiate, integrate and define parametrized functions and applications.
- Determine whether an infinite series is convergent or divergent.
- Find the radius of convergence of a Taylor Series.
- Use Maple to solve integral calculus problems and applications.

Topical Description

Topic	Chapter	Section

Application of Integrals
  Disk, Washer, Shell
  Applications to Physics
	6	6.1, 6.2, 6.5, 6.6

Techniques of Integration
  Integration of Parts
  Partial Fractions
  Trig Integrals
  Trig Substitution
	8	8.1-8.4

Numerical Integration and Improper Integrals	8	8.5-8.7
Sequences and Series, tests for convergence	9	9.1-9.10

Infinite Series Tests for Convergence/Divergence Power, Taylor, MacLaurin, and Binomial series		

Parametric Equations and Polar Coordinates
    Polar Coordinates and Graphing
    Parametric Equations
    Calculus with Parametric Equations
	10	10.1-10.5

Maple Labs (To Be Determined)
1. Introduction Lab
2. Project 1: Solids of Revolution
3. Project 2: Numerical Integration
4. Project 3: Centroids

Notes to Instructors

1. Listing of all topics.
   - 6   Applications of Definite Integrals
   - 6.1   Volumes Using Cross-Sections
   - 6.2   Volumes Using Cylindrical Shells
   - 6.3   Arc Length
   - 6.4   Areas of Surfaces of Revolution
   - 6.5   Work
   - 6.6   Moments and Centers of Mass
   - 7   Integrals and Transcendental Functions
   - 7.1   The Logarithm Defined as an Integral
   - 7.2   Exponential Change and Separable Differential Equations
     Techniques of Integration
   - 8   Integration by Parts
   - 8.1   Trigonometric Integrals
   - 8.2   Trigonometric Substitutions
   - 8.3   Integration of Rational Functions by Partial Fractions
   - 8.4   Integral Tables and Computer Algebra Systems
   - 8.5   Numerical Integration
   - 4.5   Indeterminate Forms and L'Hôpital's Rule
   - 8.6   Improper Integrals
   - 8.7   Infinite Sequences and Series
   - 9   Sequences
   - 9.1   Infinite Series
   - 9.2   The Integral Test
   - 9.3   Comparison Tests
   - 9.4   The Ratio and Root Tests
   - 9.5   Alternating Series, Absolute and Conditional Convergence

9.6   Power Series
9.7   Taylor and Maclaurin Series
9.8   Convergence of Taylor Series
9.9   The Binomial Series and Applications of Taylor
         Series
9.10   Parametric Equations and Polar Coordinates
10   Parametrizations of Plane Curves
10.1   Calculus with Parametric Curves
10.2   Polar Coordinates
10.3   Graphing in Polar Coordinates
10.4   Areas and Lengths in Polar Coordinates
10.5   Areas and Lengths in Polar Coordinates

2.   Maple labs are optional; however, there should be some kind of "project" given."