Revised: Fall 2016

MTH 174
Calculus with Analytic Geometry II
COURSE OUTLINE

Prerequisites:

MTH 173 or equivalent.

Course Description:

Continues the study of analytic geometry and the 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. Prerequisite: MTH 173 or equivalent. (Credit will not be awarded for more than one of MTH 174, MTH 176 or MTH 274.)
Lecture 4 hours per week. The computer algebra system Maple will be used.

Semester Credits: 4 Lecture Hours:4 Lab/Recitation Hours: 0

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Course Outcomes

At the completion of this course, the student should be able to:

1. **Solve appropriate applied problems from the area of science and engineering.**
2. **Evaluate improper integrals.**
3. **Integrate transcendental functions.**
4. **Find area and volume of solids of revolution.**
5. **Use the rectangular and polar coordinate systems including finding area, lengths, and graphing.**
6. **Graph, evaluate, differentiate, integrate, and define parametrized functions and applications.**
7. **Determine whether an infinite series is convergent or divergent.**
8. **Find the radius of convergence of a Taylor Series.**
9. **Use Maple to solve integral calculus problems and applications.**

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Required Materials:

Textbook

Textbook:

University Calculus, Hass, Weir, & Thomas, 3rd edition, Pearson/Addison-Wesley, ISBN # 9780321999580

The following supplementary materials are available:

1. Student Solutions Manual
2. Software: Maple 15, Waterloo Maple Inc.

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Topical Description: (Outline chapters and sections to be covered in the book – may include timeline)

Topics	Chapter	Sections
1. Application of Integrals **a. Disk, Washer, Shell** **b. Applications to Physics**	**6**	**6.1, 6.2, 6.5, 6.6**
2. Techniques of Integration **a. Integration of Parts** **b. Partial Fractions** **c. Trig Integrals** **d. Trig Substitution**	**8**	**8.1-8.4**
3. Numerical Integration and Improper Integrals	**8**	**8.5- 8.7**
4. Sequences and Series, tests for convergence. **a. Infinite Series** **b. Tests for Convergence/Divergence** **c. Power, Taylor, MacLaurin, and Binomial series**	**9**	**9.1-9.10**
5. Parametric Equations and Polar Coordinates **a. Polar Coordinates and Graphing** **b. Parametric Equations** **c. 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

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Notes to Instructors

1. Listing of all topics.

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9.9 Convergence of Taylor Series
9.10 The Binomial Series and Applications of Taylor Series
10 Parametric Equations and Polar Coordinates
10.1 Parametrizations of Plane Curves
10.2 Calculus with Parametric Curves
10.3 Polar Coordinates
10.4 Graphing 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.

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