MATH 143 Calculus III

1. Catalog Description

MATH 143 Calculus III
GE Area B1

4 units

Prerequisite: MATH 142 with a grade of C- or better or consent of instructor.

Infinite sequences and series, vector algebra, curves. 4 lectures. Crosslisted as
HNRS/MATH 143. Fulfills GE B1; for students admitted Fall 2016 or later, a grade of C- or
better in one GE B1 course is required to fulfill GE Area B.

2. Required Background or Experience

Math 142.

3. Learning Objectives

The student should:

a. Understand parametric equations and polar coordinates, and their applications.
b. Understand vector algebra and elementary differential vector calculus.
c. Be able to test infinite series for convergence.
d. Be able to calculate power series and Taylor series.

4. Text and References

- Weir and Hass, Thomas’ Calculus, Addison-Wesley

5. Minimum Student Materials

Paper, pencils and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.
7. **Content and Method**

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<tr>
<th>Content</th>
<th>No. of Lectures</th>
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<td>CHAPTER 10 – <strong>Infinite Sequences and Series</strong></td>
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The goal of the chapter is to develop Taylor Series.

10.1 Sequences
10.2 Infinite Series
10.3 The Integral Test
10.4 Comparison Tests
10.5 The Ratio and Root Tests
10.6 Alternating Series, Absolute and Conditional Convergence
10.7 Power Series
10.8 Taylor and Maclaurin Series
10.9 Convergence of Taylor Series
10.10 The Binomial Series and Applications of Taylor Series

CHAPTER 11 - **Parametric Equations and Polar Coordinates** | 6 |

11.1 Parametrizations of Plane Curves
11.2 Calculus with Parametric Curves
11.3 Polar Coordinates
11.4 Graphing in Polar Coordinates
11.5 Areas and Lengths in Polar Coordinates

CHAPTER 12 - **Vectors and the Geometry of Space** | 6 |

12.1 Three-Dimensional Coordinate Systems
12.2 Vectors
12.3 The Dot Product
12.4 The Cross Product
12.5 Lines and Planes in Space

CHAPTER 13 – **Vector-Valued Functions and Motion in Space** | 5 |

13.1 Curves in Space and Their Tangents
13.2 Integrals of Vector Functions; Projectile Motion
13.3 Arc Length in Space
13.4 Curvature and Normal Vectors of a Curve
13.5 Tangential and Normal Components of Acceleration
13.6 Velocity and Acceleration in Polar Coordinates

Total 30

8. **Methods of Assessment**

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination.