I. Course Title: Calculus III

Course Number: 223  
Catalog Prefix: Math

II. Prerequisites: Math 222

III. Credit Hours: 5  
Lecture Hours: 5
Laboratory Hours:  
Observation Hours: 

IV. Course Description:

This course includes infinite series, Taylor’s series, polar coordinates and applications, two-dimensional vectors and surfaces, three-dimensional cartesian coordinate systems, vector functions, and motion in space.

V. Adopted Text:

*Thomas’ Calculus*, Updated Tenth Edition  
Finney, Weir, Giordano  
Addison Wesley, 2003  
ISBN 0–201–75527–0

VI. Course Objectives

At the completion of this course the student will be able to:

1. Evaluate limits of all indeterminate forms using l’Hôpital’s Rule.
2. Find limits or determine divergence of sequences.
3. Determine convergence or divergence of infinite series.
4. Find intervals of convergence for power series.
5. Establish and apply Taylor and Maclaurin series.
6. Apply vectors to concepts in plane analytic geometry.
7. Apply vectors to projectile motion.
8. Apply calculus techniques in polar coordinates.
9. Apply vectors to geometry in three-dimensional Euclidean space.
10. Apply vectors to three-dimensional motion and acceleration.

VII. Grading

Grading will follow the policy in the catalog.

VIII. Course Outline

Chapter 7  Integration Techniques, l’Hôpital’s Rule, and Improper Integrals  
7–6  L’Hopital’s Rule (all indeterminate forms)

Chapter 8  Infinite Series  
8–1  Limits of Sequences of Numbers  
8–2  Subsequences, Bounded Sequences, and Picard’s Method  
8–3  Infinite Series  
8–4  Series of Nonnegative Terms  
8–5  Alternating Series, Absolute and Conditional Convergence
8–6 Power Series
8–7 Taylor and Maclaurin Series
8–8 Applications of Power Series
8–9 Fourier Series (Optional)
8–10 Fourier Cosine and Sine Series (Optional)

Chapter 9 Vectors in the Plane and Polar Functions
9–1 Vectors in the Plane
9–2 Dot Products
9–3 Vector-Valued Functions
9–4 Modeling Projectile Motion
9–5 Polar Coordinates and Graphs
9–6 Calculus of Polar Curves

Chapter 10 Vectors and Motion in Space
10–1 Cartesian (Rectangular) Coordinates and Vectors in Space
10–2 Dot and Cross Products
10–3 Lines and Planes in Space
10–4 Cylinders and Quadric Surfaces
10–5 Vector-Valued Functions and Space Curves
10–6 Arc Length and the Unit Tangent Vector $\mathbf{T}$
10–7 The $\mathbf{TNB}$ Frame; Tangential and Normal Components of Acceleration
10–8 Planetary Motion and Satellites

IX. Other Required Books and Materials
A graphing calculator is required. Symbolic manipulator calculators (e.g., TI–89 or TI–92) are prohibited on tests.

X. Evaluation
Instructor will distribute the method of evaluation to students.

XI. Specific Management Requirements
Assignments will be evaluated according to instructor directives.