CAL POLY

MATH 143 Calculus III

September 2008

1. Catalog Description

MATH 141, 142, 143 Calculus I, II, III (4) (4) (4) GE B1
(Also listed as HNRS 141, 142, 143)

Limits, continuity, differentiation, integration. Techniques of integration, applications to physics, transcendental functions. Infinite sequences and series, vector algebra, curves. 4 lectures. **MATH 141** prerequisite: Completion of ELM requirement and passing score on appropriate Mathematics Placement Examination, or MATH 118 and MATH 119 or equivalent. **MATH 142** prerequisite: MATH 141 with a grade of C- or better or consent of instructor. **MATH 143** prerequisite: MATH 142.

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

James Stewart, Multivariable Calculus, 5th edition, Thomson Brooks/Cole, 2003.

5. Minimum Student Materials

Paper, pencils and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

Chapter	No. of Lectures
CHAPTER 11 - **Parametric Equations and Polar Coordinates**	7
11.1 Curves Defined by Parametric Equations	
11.2 Calculus with Parametric Curves	
11.3 Polar Coordinates	
11.4 Areas and Lengths in Polar Coordinates	
* 11.5 Conic Sections	
* 11.6 Conic Sections in Polar Coordinates	

CHAPTER 12- **Infinite Sequences and Series** 15

12.1	Sequences
12.2	Series
12.3	The Integral Test and Estimates of Sums
12.4	The Comparison Tests
12.5	Alternating Series
12.6	Absolute Convergence and the Ratio and Root Tests
12.7	Strategy for Testing Series
12.8	Power Series
12.9	Representations of Functions as Power Series
12.10	Taylor and Maclaurin Series
*12.11	The Binomial Series
*12.12	Applications of Taylor Polynomials

CHAPTER 13 - **Vectors and the Geometry of Space** 6

13.1	Three Dimensional Coordinate Systems
13.2	Vectors
13.3	The Dot Product
13.4	The Cross Product
13.5	Equations of Lines and Planes

CHAPTER 14 - **Vector Functions** 5

14.1	Vector Functions and Space Curves
14.2	Derivatives and Integrals of Vector Functions
14.3	Arc Length and Curvature
14.4	Motion in Space: Velocity and Acceleration

Total 33

*Instructors should monitor their progress in relation to the suggested number of lectures in each chapter and attempt to cover the entire syllabus. If an instructor anticipates being unable to do so, topics identified with an asterisk may be covered more lightly. It is essential that topics without an asterisk be covered carefully in order to prepare students for subsequent courses.

Method

Largely lecture with chalkboard illustration of the discussion along with supervised work and individual conferences.

8. Methods of Assessment

The primary methods of assessment are, in decreasing order of importance: essay examinations, quizzes and homework. Typically, there will be two or three hour-long examinations during the quarter, and a comprehensive final examination. Students are required to show their work, and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques. Quizzes are typically given once or twice a week to provide a spot check of student learning. Homework is required daily.