



September 2008

## **MATH 151 Calculus Laboratory I**

### 1. Catalog Description

**MATH 151, 152, 153 Calculus Laboratories I, II, III (1) (1) (1) (CR/NC)**

Facilitated study and discussion of the theory, problems, and applications of calculus. Credit/No Credit grading only. 1 laboratory. **MATH 151** corequisite: Concurrent enrollment in the associated section of MATH 141. **MATH 152** corequisite: Concurrent enrollment in the associated section of MATH 142. **MATH 153** corequisite: Concurrent enrollment in the associated section of MATH 143.

### 2. Required Background or Experience

Concurrent enrollment in the associated section of Math 141.

### 3. Learning Objectives

The student should be able to achieve the course objectives of Math 141 at a higher level of understanding. Examples include, but are not limited to:

- a. Challenging enrichment activities.
- b. Additional tutorial assistance.
- c. Selected computer applications.

### 4. Text and References

Stewart, James, Calculus, 5th ed., 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 MethodContentCHAPTER 1 – **FUNCTIONS AND MODELS**CHAPTER 2 – **LIMITS AND RATES OF CHANGE**

- 2.1 The Tangent and Velocity Problems
- 2.2 The Limit of a Function
- 2.3 Calculating Limits using the Limit Laws
- 2.4 The Precise Definition of a Limit
- 2.5 Continuity
- 2.6 Tangents, Velocities, and Other Rates of Change

CHAPTER 3 – **DERIVATIVES**

- 3.1 Derivatives
- 3.2 Derivative as a Function
- 3.3 Differentiation Formulas
- 3.4 Rates of Change in the Natural and Social Sciences
- 3.5 Derivatives of Trigonometric Functions
- 3.6 The Chain Rule
- 3.7 Implicit Differentiation
- 3.8 Higher Derivatives
- 3.9 Related Rates
- 3.10 Linear Approximations and Differentials

CHAPTER 4 – **APPLICATIONS OF DIFFERENTIATION**

- 4.1 Maximum and Minimum Values
- 4.2 The Mean Value Theorem
- 4.3 How Derivatives Affect the Shape of the Graph
- 4.4 Limits at Infinity; Horizontal Asymptotes
- 4.5 A Summary of Curve Sketching
- 4.6 Graphing with Calculus and Calculators
- 4.7 Optimization Problems
- 4.8 Applications to Business and Economics
- 4.9 Newton's Method
- 4.10 Antiderivatives

CHAPTER 5 – **INTEGRALS**

- 5.1 Area and Distances
- 5.2 The Definite Integral
- 5.3 The Fundamental Theorem of Calculus
- 5.4 Indefinite Integrals and the Total Change Theorem
- 5.5 The Substitution Rule

Method

Supervised work both individually and in small groups aimed at improving study skills and raising the level of mathematical competence.

8. Methods of Assessment

Credit will be awarded on the basis of attendance, and a grade of C- or better in MATH 141.