MATH 221 Calculus for Business and Economics

1. Catalog Description

    MATH 221 Calculus for Business and Economics   **4 units**
    GE Area B1

    Prerequisite: Completion of ELM requirement and passing score on appropriate
    Mathematics Placement Examination, or MATH 118.

    Polynomial calculus for optimization and marginal analysis, and elementary integration.
    Not open to students with credit in MATH 142. 4 lectures. 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

    Completion of ELM requirement and a passing score on the appropriate Math Placement
    Exam. Students who have not passed Math 118 or equivalent will be advised to take Math
    118.

3. Learning Objectives

    The student should:

    a. Become proficient with the basic techniques of differential calculus.
    b. Learn the terminology and techniques involved in the processes of decision-making.
    c. Gain skills in the basic procedures of optimization via the calculus.
    d. Understand the fundamental rules of integration.
    e. Understand some applications of calculus concepts to inventory problems, marginal
        analysis, and other business problems.

4. Text and References

    -   Soo T. Tan, Applied Calculus for the Managerial, Life and Social Sciences,
        Brooks/Cole, Cengage Learning.

5. Minimum Student Materials

    Paper, pencils and notebook.

6. Minimum University Facilities

    Classroom with ample chalkboard space for class use.

7. <u>Content and Method</u>

<u>Content</u>	<u>Number of Lectures</u>

Chapter 1 **Preliminaries**   2
    1.3 The Cartesian Coordinate System
    1.4 Straight Lines

Chapter 2 **Functions, Limits and the Derivative**   5
    2.1 Functions and their Graphs
    2.2 The Algebra of Functions
    2.3 Functions and Mathematical Models
    2.4 Limits
    2.5 One-sided Limits and Continuity
    2.6 The Derivative

Chapter 3 **Differentiation**   7
    3.1 Basic Rules of Differentiation
    3.2 The Product and Quotient Rules
    3.3 The Chain Rule
    3.4 Marginal Functions in Economics
    3.5 Higher-order Derivatives
    3.6 Implicit Differentiation and Related Rates
    3.7 Differentials

Chapter 4 **Applications of the Derivative**   6
    4.1 Applications of the First Derivative
    4.2 Applications of the Second Derivative
    4.3 Curve Sketching
    4.4 Optimization I
    4.5 Optimization II

Chapter 5 **Exponential and Logarithmic Functions**   6
    5.1 Exponential Functions
    5.2 Logarithmic Functions
    5.3 Compound Interest
    5.4 Differentiation of Exponential Functions
    5.5 Differentiation of Logarithmic Functions
    5.6 Exponential Functions as Mathematical Models

Chapter 6 **Integration**   7
    6.1 Antiderivatives and the Rules of Integration
    6.2 Integration by Substitution
    6.3 Area and the Definite Integral
    6.4 The Fundamental Theorem of Calculus
    6.5 Evaluating Definite Integrals
    6.6 Area Between Two Curves
    6.7 Applications of the Definite Integral to Business and Economics

                                                     Total   33

<u>Method</u>

Lectures with chalkboard illustrations, discussions, supervised work, and assigned homework.

8.   <u>Methods of Assessment</u>

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. 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.