

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. Content and Method

<u>Content</u> <u>Lectures</u>	<u>Number of</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	<u>33</u>
<u>Method</u>	

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

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.