

MATH 141 Calculus I

1. Catalog Description

MATH 141 Calculus I
GE Area B1

4 units

Prerequisite: Completion of ELM requirement and passing score on appropriate Mathematics Placement Examination, or MATH 118 and high school trigonometry, or MATH 119.

Limits, continuity, differentiation. Introduction to integration. 4 lectures. Crosslisted as HNRS/MATH 141. 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

Math 118 and Math 119 or equivalent.

3. Learning Objectives

The student should:

- a. Understand the meanings of functions, and be able to represent them by means of graphs.
- b. Understand fundamental concepts of limits and continuity.
- c. Understand the meaning of a derivative and be able to compute derivatives of algebraic functions and trigonometric functions.
- d. Be able to use derivatives to solve problems involving maxima, minima, and related rates.
- e. Begin to understand integration.

4. Text and References

- Weir and Hass, Thomas' Calculus, Addison-Wesley

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>No. of Lectures</u>
CHAPTER 1 – FUNCTIONS	1
CHAPTER 2 – LIMITS AND CONTINUITY	6
2.1 Rates of Change and Tangents to Curves	
2.2 Limit of a Function and Limit Laws	
2.4 One-Sided Limits	
2.5 Continuity	
2.6 Limits Involving Infinity; Asymptotes of Graphs	
CHAPTER 3 – DIFFERENTIATION	9
3.1 Tangents and the Derivative at a Point	
3.2 The Derivative as a Function	
3.3 Differentiation Rules	
3.4 The Derivative as a Rate of Change	
3.5 Derivatives of Trigonometric Functions	
3.6 The Chain Rule	
3.7 Implicit Differentiation	
3.8 Related Rates	
3.9 Linearization and Differentials	
CHAPTER 4 – APPLICATIONS OF DERIVATIVES	9
4.1 Extreme Values of Functions	
4.2 The Mean Value Theorem	
4.3 Monotonic Functions and the First Derivative Test	
4.4 Concavity and Curve Sketching	
4.5 Applied Optimization	
4.7 Antiderivatives	
CHAPTER 5 – INTEGRATION	6
5.1 Area and Estimating with Finite Sums	
5.2 Sigma Notation and Limits of Finite Sums	
5.3 The Definite Integral	
5.4 The Fundamental Theorem of Calculus	
5.5 Indefinite Integrals and the Substitution Method	
5.6 Substitution and Area Between Curves	

Total 31

Method

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

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. 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.