

ROWAN UNIVERSITY  
Department of Mathematics

Syllabus  
**Math 01.140 - Accelerated Calculus I**

**CATALOG DESCRIPTION:**

Math 01 140 Accelerated Calculus I 4 s.h.

This course covers limit concepts and continuity, derivative and its applications, the integral and its applications. The techniques of integration as well as numerical integrations will be discussed. Students are expected to be familiar with the basic ideas of calculus. A graphing calculator is required for this course, and so is the use of computer software, such as Mathematica.

**OBJECTIVES:**

Students will demonstrate the ability to: (i) compute limits; (ii) differentiate and integrate polynomial, rational, algebraic, exponential, logarithmic and trigonometric functions; (iii) use differentiation to solve extreme and related rate problems, (iv) differentiate and integrate hyperbolic functions and the inverse trigonometric functions; (v) perform integration by parts, partial fractions and various substitutions as well as with selected numerical techniques; (vi) recognize and evaluate indeterminate forms and improper integrals; and (vii) use integration to find areas and volumes.

**CONTENTS:**

1: Limits and Continuity:

Definition and evaluation of limit of a function; Continuity; Limits involving infinity

2.The Derivative

Definition and examples; Techniques of derivatives (sum, product and quotient rules); Chain Rule; Implicit Differentiation; Linear Application

3.Applications of Derivative

Related rates; First and Second Derivative Tests; Curve sketching; Optimization Problems; Newton's Method

4.Integration

Antiderivatives and indefinite integrals; Definite Integral and Area; The Fundamental Theorem of Calculus; Techniques of integrations (substitution, integration by parts and partial fractions); Numerical integration; Improper Integrals

5.Application of Integration

Volume and Arc length

**REMARKS:** In each chapter we will be studying a little about the history of the development of Calculus through a brief study of the biographies of the great mathematicians who developed it. In addition, we will begin to learn to use Mathematica as a tool.

Examples of textbooks suitable for this course:

Rogawski, Jon, Calculus: Early Transcendentals Combo (Mathematica) & CalcPortal, 2008, Freeman

Stewart Calculus: Concepts and Contexts 3rd edition

Larson et al Calculus Early Transcendental Functions 2nd edition

(Note: There are many suitable texts available that cover the same material at the same level. Among these are those by

Finney/Thomas, Stein, Hunt and Leithold).