

ROWAN UNIVERSITY
Department of Mathematics

Syllabus
Math OI.141- Accelerated Calculus II

CATALOG DESCRIPTION:

Math O I 141 Accelerated Calculus TI 4 s.h.

This course covers sequences and infinite series, vectors, vector functions, velocity, acceleration, partial differentiation, directional derivatives, and multiple integrations. The student is expected to use computer software, such as Mathematica, in addition to a graphing calculator.

OBJECTIVES:

Students will demonstrate the ability to: (i) determine convergence and divergence of infinite series and find Taylor Series and their interval of convergence, (ii) calculate dot and cross products; (iii) identify and find equations for lines, planes and quadric surfaces, (iv) compute partial derivatives; and (vi) evaluate double and triple integrals and find area and volumes with them.

CONTENTS:

I. Sequences and Series:

Sequences, Series, Convergence Tests (Integral, Comparison, Ratio, Root), Power Series, Taylor and Maclaurin Series and their applications

2. Vectors

Vectors in two and three dimension, The Dot and Cross products, Equation of Lines and Plane

3 Vector Functions

Vector functions and space curves, Calculus of vector functions, Arc length and Curvature, Motion in space

4. Partial Derivatives

Limit and continuity of functions of several variables, Partial derivatives, Tangent Planes and Linear Approximations, The Chain Rule, Directional Derivative and the Gradient, Optimization problems

5. Multiple Integrals

Double Integrals and Iterated Integrals, Double integrals in polar coordinates, Applications of Double integrals, Triple integrals and their applications, Triple Integrals in Cylindrical and Spherical coordinates

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) & Cal Portal, 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).