

ROWAN UNIVERSITY
Department of Mathematics

Syllabus
Math 01.230 - Calculus III

CATALOG DESCRIPTION:

Math 01.230 Calculus III 4 s.h.

(Prerequisite: Math 01.131 Calculus II with a grade of C- or better)

This course includes: vectors, vector functions, velocity, acceleration, partial differentiation, directional derivatives, multiple integration, and vector calculus. The student is expected to use a computer algebra system, such as Mathematica, in addition to a graphing calculator.

OBJECTIVES:

Students will demonstrate the ability to: (i) graph and find areas in polar coordinates; (ii) calculate dot and cross products; (iii) identify and find equations for lines, planes and quadric surfaces, (iv) compute partial derivatives; (v) evaluate double and triple integrals and find area and volumes with them, and (vi) compute and apply line integrals, Green's Theorem, and Stokes Theorem.

CONTENT:

1: Three-Dimensional Space; Vectors

The definition of a vector is introduced, then dot and cross products are defined. Other topics covered are lines and planes in space, quadric surfaces, cylindrical and spherical coordinates.

2: Vector Valued Functions

An introduction to and calculus of vector valued functions.

3: Partial Derivatives

Functions of several variables are defined. Other topics covered include partial derivatives and consideration of conditions for differentiability, the chain rule, extreme, directional derivatives and gradients, and Lagrange multipliers.

4: Multiple Integrals

Topics covered include double and triple integrals, surface area and volumes, and centers of mass.

5: Topics in Vector Calculus

Line integrals, Green's Theorem, and Stokes Theorem.

REMARKS: We will continue our study of the history of calculus through the study of biographies of the great mathematicians who helped create this subject. Also, we continue our work with Mathematica as a tool in solving problems.

TEXTBOOK(s):

Textbook used:

- Rogawski, Jon; Colin Adams, CALCULUS: EARLY TRANSCENDENTALS (3rd Edition), 2015, Freeman

Additional textbooks:

- Stewart, James, CALCULUS: EARLY TRANSCENDENTALS (8th Edition), 2016, Cengage Learning.

(Note: There are many suitable texts available that cover the same material at the same level. Among these are those by Anton, Larson, Thomas, Stein, Hunt and Leithold.)