

Syllabus
Math 01.131 - Calculus II

CATALOG DESCRIPTION:

Math 01.131 Calculus II 4 s.h.

Prerequisite: Math 01.130 Calculus I with a grade of C- or better)

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This course begins with applications of integration (such as volume of a solid of revolution work, arc length, area of a surface of revolution, center of mass) and derivatives of inverse trigonometric functions. Integration by parts, partial fractions and other more advanced integration techniques are introduced, along with a discussion of numerical integration, improper integrals, indeterminate form, sequences and infinite series. Polar coordinates and parametric equations will also be discussed. A graphing calculator is required for this course, and so is the use of a computer algebra system, such as Mathematica.

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OBJECTIVES:

Students will demonstrate the ability to (i) differentiate and integrate hyperbolic functions and the inverse trigonometric functions; (ii) perform integration by parts, partial fractions and various substitutions as well as with selected numerical techniques; (iii) recognize and evaluate indeterminate forms and improper integrals; (iv) determine convergence and divergence of infinite series and find Taylor Series and their interval of convergence, and (v) find area and arc length in polar coordinates and parametric equations.

CONTENT:

1: Applications of Definite Integrals

A review of area between two curves. Differentiation of inverse trig. functions, and inverse hyperbolic functions are presented, as well as volume of a solid of revolution, the concept of work, arc length, area of a surface of revolution and fluid pressure.

2: Techniques of Integration

General techniques of integration, including integration by parts, partial fractions, substitutions, and numerical

integration are presented. Numerical integration, L'Hopital's Rule and improper integrals are also covered.

3: Infinite Series

Sequences and infinite series are introduced. Standard tests for convergence and absolute convergence are presented. Finally, power series are defined which leads to all the important topics of Taylor series.

4: Analytic Geometry

Polar coordinates and parametric equations are introduced and used for graphing and to find areas. Also, conic sections are studied.

REMARKS: We will continue studying briefly the history of calculus through the study of biographies of the great mathematicians who helped create this subject. In addition, we will continue our work using 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 Finney/Thomas, Stein, Hunt and Leithold).