NASSAU COMMUNITY COLLEGE

DEPARTMENT OF MATHEMATICS/STATISTICS/COMPUTER PROCESSING

Course Outline for

Curriculum	Interdisciplinary
Lab hours	None
Semesters offered	Indicated in Catalog
Length of semester	15 Weeks
Class hours	4.5
Credits	4
Text	Calculus, 4th ed. by Hughes-Hallett et al., published by Wiley

PREREQUISITE

At least a C in MAT l22

CATALOG DESCRIPTION

Methods of integration; improper integrals; volume and surface area of solids of revolutions; indeterminate forms; introduction to infinite series, introduction to mathematical modeling and differential equations, Euler's Method, separation of variables.

MATH CENTER REQUIREMENT

As part of this course, students should avail themselves of further study and/or educational assistance available in the Mathematics Center: B -l30 and B -l26. These activities and use of the resources provided are deemed an integral part of the course, and will help the student master necessary knowledge and skills.

OBJECTIVES

General

The course is meant to extend the student's theoretical background in analysis while providing helpful techniques, necessary drill and various applications.

Specific

This course is an extension of MAT l22, and treats integration and its applications, with emphasis on the meaning of the symbols used and the interpretation of results. Series and some work with differential equations as mathematical models are covered.

TOPICS

- The integral

  The purpose of this chapter is to acquaint the student with certain methods of integration as well as stressing the rewriting of a given integral as a standard form, which can be found in a table of integrals. The effectiveness of various approximation techniques is considered as well as approximation errors. Improper integrals and indeterminate forms are also discussed. Topics include the u substitution, less obvious substitutions,

integration by parts, tables of integrals, approximating definite integrals, approximation errors and Simpson's Rule, improper integrals..

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- Using the definite integral

  The Riemann sum concept is once again treated and is used as a basis for solving problems of average value and total change. The instructor selects applications in the areas of geometry, physics, economics and probability. Topics include Riemann sums, density, volumes of a given cross-section, volumes of revolution, arc length, selected topics which include work, present and future value, supply and demand curves, consumer and producer surplus, probability and distributions.

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- Series

  Introduces the notion of infinite series, and tests for convergence. Power series is introduced

  Class lectures and exams 6

- Approximating functions

  Functions are approximated by polynomials using Taylor Series. Errors in Taylor approximations are discussed. Topics include Taylor polynomials, Taylor series, convergence of series, intervals of convergence, new series from old (substitution, integration, differentiation), geometric series, errors in Taylor polynomial approximation.

  Class lectures and exams 5

- Differential equations

  This chapter begins with equations that involve derivatives and develops the idea that differential equations often provide a reasonable model for physical events. Topics include What are differential equations?, slope fields, Euler's method, separation of variables, growth and decay, modeling, population growth. Omit sections 11.8 through 11.11.

  Class lectures and exams 12

REFERENCES

1. Calculus: A New Horizon, by Anton, Wiley.
2. Calculus with Analytic Geometry, by Larson & Hostetler, D.C. Heath.
3. Calculus: Concepts and Contexts, by Stewart, Wadsworth.
4. Calculus and Analytic Geometry by Thomas, Finney, Addison-Wesley.
5. Calculus with Analytic Geometry by Edwards & Penney, Prentice Hall.

DATE LAST REVISED
FALL 2007