

SUFFOLK COUNTY COMMUNITY COLLEGE
COLLEGE-WIDE COURSE SYLLABUS
MAT131 (formerly MA64)

I. COURSE TITLE:

Calculus for Non-Science Majors

II. CATALOG DESCRIPTION:

For students of accounting, business, economics, social sciences and general studies. Involves study of functions, derivatives and integrals. Strong emphasis placed on application of these concepts to problems from fields of business, social sciences and some life sciences. Prerequisite: MAT124 or equivalent. Note: *Credit given for MAT131 or MAT141, but not both.*

A-E-G / 4 cr. hrs.

III. COURSE GOALS:

- A. Give a light and practical introduction to the main techniques of calculus.
- B. Study applications of those techniques in business, management science and social science.
- C. This course satisfies the SUNY general education requirement for mathematics.

IV. COURSE OBJECTIVES:

Upon successful completion of this course, students will be able to:

- A. explain a graphical and/or sequential interpretation of the limit of a function;
- B. evaluate limits of polynomial, rational, exponential, logarithmic, and algebraic functions;
- C. state, understand and apply the definitions of a continuous function and the derivative of a function;
- D. compute the derivatives of polynomial, rational, algebraic, exponential and logarithmic functions, including examples that require the use of the chain rule;
- E. use the derivative to determine extrema of a function, solve applied extrema problems, sketch polynomial functions and solve marginal analysis and growth/decay problems;
- F. evaluate antiderivatives of any of the above mentioned functions using substitutions;
- G. explain the graphical and/or sequential interpretation of a definite integral and the Fundamental Theorem of the Calculus;
- H. use the definite integral to compute total profits/costs and areas.

V. Topics Outline with Timeline

Topics	Approximate Time (Including Examinations)
A. <u>Preliminaries</u> 1. variables, coordinate systems 2. exponents 3. definitions of linear, quadratic, polynomial and rational functions 4. graphs of elementary functions 5. operations on functions including composition	2 weeks
B. <u>Differential Calculus</u> 1. limits and continuity a. an intuitive approach to limits emphasizing graphical and sequential interpretations b. properties of limits - sum, difference, product, quotient - no proofs need be covered c. intuitive introduction to continuity 2. the derivative a. definition of derivative - introduced via rate of change b. tangent line to a curve c. properties of the derivative - sum, difference product, quotient, power law - no proofs need be covered d. chain rule e. higher order derivatives	3 weeks
3. applications a. maxima and minima of functions b. first and second derivative tests c. curve sketching - polynomial cases only d. applied problems - drawn from marginal analysis in business and economics, population dynamics, inventory analysis, etc.	2 weeks
C. <u>Exponential and Logarithmic Functions</u> 1. definitions, properties and graphs of $\exp(x)$ and $\ln(x)$ 2. derivatives of these functions 3. applications - growth and decay problems in business, economics, biology, psychology, etc.	3 weeks
D. <u>Integral Calculus</u> 1. antiderivatives - definition and properties 2. area under a curve 3. definite integrals and the Fundamental Theorem - (concept only)	5 weeks

4. techniques of integration - only simple substitutions and introduction	
5. application - total profits, costs, population, learning models	
<u>Optional Topics:</u> If interest and time permit, instructors may introduce any topics that expand on the ideas in the core outline. Some suggested topics are:	
E. <u>Implicit Differentiation</u>	
F. <u>Differential Equations (first order separable)</u>	

VI. Evaluation of Student Performance:

To be determined by the instructor

VII. Programs that require this course:

Accounting/AS (recommended)

Business Administration/AS (required)

VIII. Courses that require this course as a prerequisite:

None

IX. Supporting Information:

Mathematics tutoring services, as well as video and computer aids, are provided for all students through the Math Learning Center (Ammerman Campus, Riverhead 235), the Center for Academic Excellence (Grant Campus, Health, Sports and Education Center 129), and the Academic Skills Center (Eastern Campus, Orient 213).