

MAT 263A
BRIEF CALCULUS LAB

COURSE DESCRIPTION:

Prerequisites: MAT 171 or satisfactory score on placement test

Corequisites: MAT 263

This course is a laboratory for MAT 263. Emphasis is on experiences that enhance the materials presented in the class. Upon completion, students should be able to solve problems, apply critical thinking, work in teams, and communicate effectively. *This course has been approved to satisfy the Comprehensive Articulation Agreement for transferability as a premajor and/or elective course requirement.* Course Hours Per Week: Lab, 2. Semester Hours Credit, 1.

LEARNING OUTCOMES:

Students will be able to apply the concepts and techniques of calculus and utilize appropriate technology to interpret and solve applied problems. Students will display proficiency by demonstrating the following competencies:

- a. Individually devise logical plans of solution for non-routine problems.
- b. Defend the execution of those plans of solution.
- c. Go to sources different from the text for further information related to specified class topics, gather that information, and clearly communicate it to other class members.
- d. Work with diverse groups of students to synthesize group solutions for non-routine problems.
- e. Work within a group to execute and defend group solutions to posed problems.

OUTLINE OF INSTRUCTION

- I. The Derivative
 - A. The slope of a straight line
 - B. The slope of a curve at a point
 - C. The derivative
 - D. Limits and the derivative
 - E. Differentiability and continuity
 - F. Some rules for differentiation
 - G. More about derivatives
 - H. The derivative as a rate of change
- II. Applications of the Derivative
 - A. Describing graphs of functions
 - B. The first and second derivative rules
 - C. Curve sketching
 - D. Optimization problems
 - E. Applications of derivatives to business and economics
- III. Techniques of Differentiation
 - A. The product and quotient rules
 - B. The chain rule and the general power rule
 - C. Implicit differentiation and related rates

- IV. The Exponential and Natural Logarithm Functions
 - A. Exponential functions
 - B. The exponential function e^x
 - C. Differentiation of exponential functions
 - D. The natural logarithm function
 - E. The derivative of $\ln x$
 - F. Properties of the natural logarithm function

- V. Applications of the Exponential and Natural Logarithm Functions
 - A. Exponential growth and decay
 - B. Compound interest
 - C. Applications of the natural logarithm function to economics

- VI. The Definite Integral
 - A. Antidifferentiation
 - B. Areas and Riemann sums
 - C. Definite integrals and the Fundamental Theorem
 - D. Areas in the xy -plane

- VII. Techniques of Integration
 - A. Integration by substitution
 - B. Integration by parts
 - C. Evaluation of definite integrals

REQUIRED TEXTBOOK AND MATERIALS:

Goldstein, Larry J., David C. Lay, David I. Schneider, and Nakhle H. Asmar. Calculus and Its Applications. 12th Ed. Pearson Prentice Hall, 2010.

TI-83/84 Graphing Calculator

STATEMENT OF DISABILITIES ACCOMMODATION:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 536-7207 x 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.