MTH 251 : CALCULUS I

Transcript title

Calculus I

Credits

4

Grading mode

Standard letter grades

Total contact hours

60

Lecture hours

30

Lab hours

30

Recommended preparation

MTH 112 (or higher) or minimum placement Math Level 22.

Course Description

Introduces concepts of differential calculus for science, mathematics and engineering students. Includes limits and continuity; the derivative; rates of change; derivatives of polynomial, rational and trigonometric, log, and exponential functions; applications including related rates and optimization; and antiderivatives. Graphing calculator required.

Course learning outcomes

1. Calculate and apply limits.
2. Apply the basic techniques of differentiation on polynomial, rational, trigonometric, exponential, and logarithmic functions to investigate the behavior of mathematical models.
3. Apply and interpret the relationships between applied or theoretical models and their derivatives, with emphasis given to applications of rates of change.
4. Determine and analyze the rate of change of functions given function data from a graph, table of values, or formula.
5. Use the topics from calculus in conjunction with the graphing calculator to obtain precise graphs of models, including a graphical analysis of rates of change, concavity, and extrema for the model.
6. Analyze mathematical problems, develop solutions, and communicate those solutions through a technical or laboratory report.

Content outline

1. Limits and continuity
2. Introduction to derivatives
3. Differentiation rules
    a. Basic rules
    b. Product and quotient rules
    c. Chain rule
    d. Derivatives of various function families
    e. Implicit differentiation
4. Rates and related rates
5. Derivatives and graphs
    a. Extrema
    b. Concavity and the derivative tests
6. Optimization

Required materials

Students are required to have a license for web-based software which will include an e-text. Paper copy of the textbook is optional.

General education/Related instruction lists

- Mathematics