Mathematics 249 Introductory Calculus

Algebraic operations. Functions and graphs. Limits, derivatives, and integrals of exponential, logarithmic and trigonometric functions. Fundamental theorem of calculus. Applications.
Course Hours: H(4-1T-1)
Prerequisite(s): A grade of 70 per cent or higher in Pure Mathematics 30. (Alternatives are presented in the paragraph titled Mathematics Diagnostic Test in the Program section of this Calendar).
Antirequisite(s): Not open to students with 60% or higher in Mathematics 31, except with special departmental permission. Credit for more than one of Mathematics 249, 251, 281, or Applied Mathematics 217 will not be allowed.

Syllabus

Topics

- Algebraic Operations**,** Equations of lines
- Inequalities, signs of factored expressions
- Functions including the definitions and properties of absolute value, power, polynomial, rational, trigonometric, exponential, and logarithmic functions
- Composition of functions, Definitions and calculational methods for limits
- Horizontal and vertical asymptotes, Continuity
- Intermediate value theorem
- Derivative, definition and geometrical interpretation
- Derivative as rate of change; velocity and acceleration
- Rules of differentiation, differentiation formulas for power, trigonometric, exponential and logarithmic functions
- Chain rule, Implicit differentiation
- Linear approximation to a differentiable function
- Maxima and minima; extreme value theorem; mean value theorem
- Increasing and decreasing functions. Concavity.
- First derivative test; second derivative test
- Curve sketching
- Applied maximum - minimum problems
- Antiderivatives; integration formulas
- Area, Definite integral
- Fundamental theorem of calculus
- Integration by substitution

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