UNIVERSITY OF CALGARY

FACULTY OF SCIENCE
Department of Mathematics and Statistics

MATHEMATICS 251
"CALCULUS I"

Calendar Description: H(3-1T-1)
Functions and graphs, transcendental functions. Limits, derivatives, and integrals of exponential, logarithmic and trigonometric functions. Fundamental theorem of calculus. Applications.

Prerequisite: A grade of 70% of higher in Mathematics 30 or Pure Mathematics 30 or a B- or better in Math II (Continuing Ed.); and a grade of 50% or higher in Math 31.

Note: Credit for more than one of Mathematics 249, 251, Applied Mathematics 207 and 217 will not be allowed.

Syllabus

Topics

- 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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