San Bernardino Valley College
Curriculum Approved: SP99

I. **CATALOG DESCRIPTION**
    Mathematics; Math 250; Single Variable Calculus
    Lecture: 4 hours per week = 4 units
    A first course in calculus, including limits, continuity, derivatives of algebraic and trigonometric functions, applications of derivatives, antiderivatives, definite integrals and their applications.
    Prerequisite: Math 151: Precalculus and Math 103:Plane Trigonometry with a grade of C or better or eligibility for Math 250 as determined through the SBVC assessment process.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS

    Upon successful completion of the course, the student should be able to:
    A. Interpret and compute limits graphically, numerically and algebraically.
    B. Determine continuity of functions
    C. Differentiate algebraic, trigonometric, transcendental and implicit functions graphically, numerically and algebraically.
    D. Apply differentiation techniques in optimization, related rates, curve sketching, extrema, concavity.
    E. Determine antiderivatives and definite integrals of algebraic, trigonometric, transcendental functions graphically, numerically and algebraically.
    F. Apply integration techniques as related to exponential growth and decay.

IV. CONTENT

    A. Brief review of functions (instructor's discretion) which may include
        1. Linear models; rates of change
        2. Graphs of functions; symmetry, domain, range
        3. Operations with functions
        4. Functions and their inverses

    B. Limits and their properties
        1. Evaluating limits graphically, numerically and algebraically
        2. Two-sided, one-sided and infinite limits.
        3. Continuity

    C. Differentiation
        1. Basic differentiation rules
        2. Product, quotient rules
        3. Higher order derivatives
        4. Implicit differentiation
        5. Chain rule
        6. Related rates

    D. Applications of differentiation
        1. Extrema
        2. First, second derivative tests
        3. Curve sketching
        4. Optimization

E. Integration
1. Antiderivatives and indefinite and definite integrals
2. Riemann sums
3. Fundamental Theorem of Calculus
4. Integration by substitution

F. Transcendental functions
1. Differentiation of logarithmic, exponential and inverse trigonometric functions
2. Integration of logarithmic, exponential and inverse trigonometric functions

V. METHODS OF INSTRUCTION
A. Lecture
B. Discussion
C. Collaborative Methods
D. Multimedia-aided Instruction

VI. TYPICAL ASSIGNMENTS
A. Daily reading and/or problem assignments will reinforce and extend classroom presentations
B. Written assignments will include solutions of various problems illustrative of the appropriate mathematical concepts and processes
C. Term project to require usage of calculus techniques

VII. EVALUATIONS
A. Three to six regularly scheduled examinations
B. Quizzes, textbook and/or supplementary assignments
C. Term Project
D. Comprehensive final examination

VIII. TYPICAL TEXT
A. Larson/Hostetler/Edwards, <u>Calculus</u>, Sixth edition
B. Anton, Calculus, Fourth edition
C. Hughes-Hallett, Calculus, Second edition

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: A. Graphing Calculator – Texas Instruments 85 or equivalent model