Cañada College
Official Course Outline

1. **COURSE ID:** MATH 251 **TITLE:** Analytical Geometry and Calculus I
   Semester Units/Hours: 5.0 units; a minimum of 80.0 lecture hours/semester; a minimum of 16.0 tba hours/semester
   Method of Grading: Letter Grade Only
   Prerequisite: MATH 219, or MATH 222 or appropriate score on District math placement test and other measures as appropriate.
   Recommended Preparation:
   Eligibility for READ 836 and ENGL 836; or ENGL 847 or ESL 400.

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC
   AA/AS Degree Requirements:
   Cañada GE Area A: ENGLISH LANGUAGE COMMUNICATION AND CRITICAL THINKING: A3: Critical Thinking Requirement
   Cañada: BASIC COMPETENCY REQUIREMENTS: Math
   CSU GE:
   CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B4 - Mathematics/Quantitative Reasoning
   IGETC:
   IGETC Area 2: MATHEMATICAL CONCEPTS AND QUANTITATIVE REASONING: A: Math

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   This course is an introduction to calculus and analytic geometry including limits, continuity of functions, definition of differentiation, derivation of formulas, applications, anti-differentiation and the fundamental theorem of calculus.
   Schedule of Classes Description
   This course is an introduction to calculus and analytic geometry including limits, continuity of functions, definition of differentiation, derivation of formulas, applications, anti-differentiation and the fundamental theorem of calculus.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   A. Interpret derivatives of functions from a numerical, graphical, and symbolic point of view.
   B. Compute derivatives numerically, graphically, and symbolically for explicitly defined functions.
   C. Apply derivatives to related rates and optimization problems.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   A. Estimate and evaluate limits of functions
   B. Apply the Squeeze Theorem and L 'Hospital's Rule to solve for limits
   C. Examine the continuity properties of functions
   D. Define and interpret the derivative of a function
   E. Sketch the graphical representation of the derivative
   F. Derive, memorize and use derivative rules and formulas
   G. Evaluate derivatives implicitly
   H. Solve related rates problems
   I. Use derivative tools to examine local behaviors of functions
   J. Apply derivative tests and calculus tools to optimize functions
   K. Solve applied optimization word problems
   L. Use Newton's Method to find roots
   M. Recognize and restate the Mean Value Theorems and the Fundamental Theorem of Calculus
   N. Relate the derivative and integral processes
   O. Solve simple integrals

6. **COURSE CONTENT:**

Lecture Content:

1. Functions, including piecewise functions
2. Limits, including numerical and graphical approach to limits and symbolic computation of limits
3. Continuity: conditions and continuity of functions
4. Derivatives, including derivation of derivative rules and formulas
5. Optimization Theory, critical points, inflection points, derivative tests for inflection points and applied optimization problems
6. Other derivative applications: Newton's Method, L'Hopital's Rule
7. Fundamental Theorem of Calculus: mean value theorem, integrals and antiderivatives, differential equations, areas under a curve and Riemann sums

Lab Content:

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TBA Hours Content:

1. Functions, including piecewise functions
2. Limits, including numerical and graphical approach to limits and symbolic computation of limits
3. Continuity: conditions and continuity of functions
4. Derivatives, including derivation of derivative rules and formulas
5. Optimization Theory, critical points, inflection points, derivative tests for inflection points and applied optimization problems
6. Other derivative applications: Newton's Method, L'Hopital's Rule
7. Fundamental theorem of Calculus: mean value theorem, integrals and antiderivatives, differential equations, areas under a curve and Riemann sums

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**

Typical methods of instruction may include:

8. **REPRESENTATIVE ASSIGNMENTS**

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

A. Journals
B. written assignment relating to explanations of theorem and definitions of mathematical terms

Reading Assignments:

3-5 sections in the textbook per week.

Other Outside Assignments:

None

To be Arranged Assignments (if applicable):

Additional work in the Math Lab

9. **REPRESENTATIVE METHODS OF EVALUATION**

Representative methods of evaluation may include:

A. Home Work
B. Projects
C. Quizzes
D. In class and / or take home exams. journals and other written work.

10. **REPRESENTATIVE TEXT(S):**

Possible textbooks include:

A. Smith and Minton. *Calculus, Early Transcendental Functions*, 3rd ed. McGraw-Hill, 2002

Origination Date: February 2010
Curriculum Committee Approval Date: February 2010
Effective Term: Fall 2010
Course Originator: Raymond Lapuz