

College of San Mateo
Official Course Outline

1. **COURSE ID:** MATH 241 **TITLE:** Applied Calculus I **C-ID:** MATH 140
Units: 5.0 units **Hours/Semester:** 80.0-90.0 Lecture hours; and 160.0-180.0 Homework hours
Method of Grading: Letter Grade Only
Prerequisite: MATH 120 or placement by other college approved methods

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU; UC
AA/AS Degree Requirements:
 CSM - COMPETENCY REQUIREMENTS: C1 Math/Quantitative Reasoning Basic Competency
 CSM - GENERAL EDUCATION REQUIREMENTS: E2b. Communication and Analytical Thinking
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:
 Selected topics from analytic geometry, plus basic techniques of differential and integral calculus. (This sequence may not be substituted for the MATH 251 sequence for mathematics, physics or engineering majors.)

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
 Upon successful completion of this course, a student will meet the following outcomes:
 1. Find the derivatives of polynomial, rational, exponential, and logarithmic functions;
 2. Find the derivatives of functions involving constants, sums, differences, products, quotients, and the chain rule;
 3. Sketch the graph of functions using horizontal and vertical asymptotes, intercepts, and first and second derivatives to determine intervals where the function is increasing and decreasing, maximum and minimum values, intervals of concavity and points of inflection;
 4. Analyze the marginal cost, profit and revenue when given the appropriate function;
 5. Determine maxima and minima in optimization problems using the derivative;
 6. Use derivatives to find rates of change and tangent lines;
 7. Use calculus to analyze revenue, cost, and profit;
 8. Find definite and indefinite integrals by using the general integral formulas, integration by substitution, and other integration techniques; and
 9. Use integration in business and economics applications.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
 Upon successful completion of this course, a student will be able to:
 1. Find the derivatives of polynomial, rational, exponential, and logarithmic functions;
 2. Find the derivatives of functions involving constants, sums, differences, products, quotients, and the chain rule;
 3. Sketch the graph of functions using horizontal and vertical asymptotes, intercepts, and first and second derivatives to determine intervals where the function is increasing and decreasing, maximum and minimum values, intervals of concavity and points of inflection;
 4. Analyze the marginal cost, profit and revenue when given the appropriate function;
 5. Determine maxima and minima in optimization problems using the derivative;
 6. Use derivatives to find rates of change and tangent lines;
 7. Use calculus to analyze revenue, cost, and profit;
 8. Find definite and indefinite integrals by using the general integral formulas, integration by substitution, and other integration techniques; and
 9. Use integration in business and economics applications.

6. **COURSE CONTENT:**

Lecture Content:

1. Functions and their graphs, including exponential and logarithmic functions;
2. Limits and intuitive limit definition of derivative;
3. Increments, tangent lines, and rate of change;
4. Rules of differentiation including sum, product, quotient, and the chain rule;
5. Implicit differentiation;
6. Applications of differentiation such as marginal analysis, optimization, and curve sketching;
7. Antiderivatives, indefinite and definite integrals;
8. Multiple techniques of integration including substitution;
9. Area between curves;
10. Approximating definite integral as a sum; and
11. Applications of integration in business and economics.

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Discussion
- C. Other (Specify):
 - a. Out-of-class assignments: students will need to complete assigned problems and projects.
 - b. Reading assignments: Instructor will assign text readings for discussion of a topic in class.
 - c. Writing assignments: 1. Students will submit written homework assignments. 2. Students may be assigned papers including mathematical modeling.
 - d. Critical thinking: 1. Lecture/discussion to understand problem-solving process. 2. Students will practice critical thinking in small group problem solving. 3. Students will evaluate proposed solutions in light of constraints of the problem.
 - e. Resources available on CD and the internet may be used to augment the text.

8. REPRESENTATIVE ASSIGNMENTS

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

Writing Assignments:

Students will submit written and/or online homework assignments.

Students may be assigned papers including mathematical modeling.

Reading Assignments:

Instructor may assign text readings for discussion of a topic in class.

Other Outside Assignments:

Students will need to complete assigned problems and projects

Resources available on CD and the internet may be used to augment the text.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Class Work
- C. Exams/Tests
- D. Homework
- E. Quizzes
- F. Written examination
- G.
 - a. Written individual assignments and/or journal- to demonstrate individual student progress toward objectives.
 - b. Small group presentations - to demonstrate student participation in problem-solving process
 - c. Written exams/quizzes - to reflect student knowledge of vocabulary, concepts, and application of concepts to problem-solving as presented in lectures and discussion, small group sessions, and text readings.
 - d. Final Examination - to reflect student knowledge of vocabulary, concepts, and applications of concepts to problem-solving as presented in lectures and discussions, small group sessions, and text readings.
 - e. Participation - to reflect student involvement in class discussions, small group sessions and presentations, etc.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Goldstein, Lay & Schneider. *Calculus and Its Applications*, ed. Prentice-Hall, 2017

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