College of San Mateo
Official Course Outline

1. **COURSE ID:** MATH 252 **TITLE:** Calculus with Analytic Geometry II **C-ID:** MATH 220
   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 251
   Recommended Preparation:
   READ 400 or an equivalent level of reading proficiency.

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC
   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:
   Study of the Fundamental Theorem of Calculus, techniques of integration, applications of the definite integral, exponential, logarithmic and hyperbolic functions, polar coordinates, conic sections infinite series, Taylor series, and Taylor's formula.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques.
   2. Apply integration to areas and volumes, and other applications such as work or length of a curve.
   3. Evaluate improper integrals.
   4. Apply convergence tests to sequences and series.
   5. Represent functions as power series.
   6. Graph, differentiate and integrate functions in polar and parametric form.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques.
   2. Apply integration to areas and volumes, and other applications such as work or length of a
   3. Evaluate improper integrals.
   4. Apply convergence tests to sequences and series.
   5. Represent functions as power series.
   6. Graph, differentiate and integrate functions in polar and parametric form.

6. **COURSE CONTENT:**
   Lecture Content:
   1. Areas between curves;
   2. Volume, volume of a solid of revolution;
   3. Additional techniques of integration including integration by parts and trigonometric substitution;
   4. Numerical integration; trapezoidal and Simpson's rule;
   5. Improper integrals;
   6. Applications of integration to areas and volumes;
   7. Additional applications such as work, arc length, area of a surface of revolution, moments and centers of mass, separable differential equations, growth and decay;
   8. Introduction to sequences and series;
   9. Multiple tests for convergence of sequences and series;
   10. Power series, radius of convergence, interval of convergence;
   11. Differentiation and integration of power series;
   12. Taylor series expansion of functions;
   13. Parametric equations and calculus with parametric curves; and

14. Polar curves and calculus in polar coordinates;

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
   Typical methods of instruction may include:
   A. Lecture
   B. Other (Specify): Examples of instructor-initiated strategies that will assist students in meeting the course objectives include: A. Out-of-class assignments: The instructor selects problems and project for students to complete that aid students in meeting the goals of the course. B. Reading assignments: Instructor will assign text readings for discussion of a topic in class. C. Writing assignments: Students may be assigned papers and/or projects more expansive than homework questions (e.g. mathematical modeling). D. Critical thinking: 1. Lectures and class discussion are used to model critical thinking in problem solving. 2. Small groups of students are given challenging problems to solve to encourage critical and innovative approaches to problem solving. 3. Instructors will take steps to encourage students to evaluate proposed problem solutions in the constraints and context of questions posed. 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 may be assigned papers and/or projects more expansive than homework questions (e.g. mathematical modeling).
   Reading Assignments:
   Instructor will assign text readings for discussion of a topic in class.
   Other Outside Assignments:
   The instructor selects problems and project for students to complete that aid students in meeting the goals of the course.

9. **REPRESENTATIVE METHODS OF EVALUATION**
   Representative methods of evaluation may include:
   A. Class Participation
   B. Exams/Tests
   C. Group Projects
   D. Quizzes
   E. 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; to include calculation of measures and models, but also interpretation of results in the context of the data being analyzed. D. Directed questions in quizzes and exams as to the meaning of various parts of formulas. E. A comprehensive and cumulative Final Examination - to reflect and demonstrate student knowledge of vocabulary, concepts, and applications of concepts to problem solving as presented in lectures and discussions, small group sessions, and text readings. F. Participation - to reflect student involvement in class discussions, small group sessions and presentations.

10. **REPRESENTATIVE TEXT(S):**
    Possible textbooks include:
    A. Stewart, James. *Calculus, Early Transcendentals*, 8th ed. Cengage, 2016

Origination Date: September 2020
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Course Originator: Christopher Walker