City College of San Francisco
Course Outline of Record

I. GENERAL DESCRIPTION
   A. Approval Date
   B. Department
   C. Course Number
   D. Course Title
   E. Course Outline Preparer(s)
   F. Department Chair
   G. Dean

II. COURSE SPECIFICS
   A. Hours
   B. Units
   C. Prerequisites
      MATH 60 or MATH 92; and MATH 55 or MATH 50
      None
      MATH 90
   D. Course Justification
      This course is a prerequisite to the Calculus sequences.
   E. Field Trips
      No
   F. Method of Grading
      Letter
   G. Repeatability
      0

III. CATALOG DESCRIPTION
   Trigonometric functions and their graphs; trigonometric identities and equations; inverse trigonometric functions; solving triangles; complex numbers.

IV. MAJOR LEARNING OUTCOMES
   Upon completion of this course a student will be able to:
   A. Define, evaluate, compare, and contrast the six fundamental trigonometric functions and their inverses.
   B. Graph trigonometric functions and their transformations based on analysis of their key attributes.
   C. Solve trigonometric equations.
   D. Develop facility with trigonometric identities in order to simplify and evaluate expressions, and to verify other identities.
   E. Solve applied problems using trigonometry.

V. CONTENTS
   A. Review of Functions and Analytic Geometry
      1. Functions
      2. Graphs

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3. Transformations of functions
4. Inverse functions

B. Trigonometric Functions
1. Degree measure of angles
2. Right triangle trigonometry
3. Radian measure
4. The unit circle definition of the six fundamental trigonometric functions
   a. Domain and range
   b. Symmetry in the unit circle
   c. Periodicity

C. Graphing
1. Graphs of the six fundamental trigonometric functions
   a. Domain and range
   b. Intercepts
   c. Period
   d. Amplitude
   e. Asymptotes
   f. Symmetry
2. Graphs of transformations of trigonometric functions
   a. Period
   b. Amplitude
   c. Phase Shift
   d. Asymptotes
3. Graphs of the inverse trigonometric functions

D. Identities and Equations
1. Fundamental identities
   a. Reciprocal
   b. Quotient
   c. Pythagorean
   d. Even/odd
   e. Co-function
2. Sum and difference formulas
3. Double-angle and half-angle formulas
4. Sum-to-product and product-to-sum identities
5. Verifying identities
6. Solving trigonometric equations

E. Inverse Trigonometric Functions
1. Existence motivated from restricted domains of the fundamental trigonometric functions
2. Definitions and notation
3. Graphs
4. Using inverse trigonometric functions to solve equations

F. Applications of Trigonometry
1. Solving right triangles
2. Modeling and solving applications
3. Solving oblique triangles
   a. Law of Sines
b. Law of Cosines
4. Area of a triangle
5. Complex numbers
   a. Polar form
   b. De Moivre's Theorem
6. Introduction to vectors in two dimensions

VI. INSTRUCTIONAL METHODOLOGY
A. Assignments
   1. In-class assignments
      a. Individualized work that involves practice with topics and procedures appropriate to
         the day's lesson such as graphing trigonometric functions or solving triangles
      b. Group work that requires critical analysis, discussion, and creative problem solving
   2. Out-of-class assignments
      a. Regular reading related to the material being covered in class either from the
         textbook or from other class materials
      b. Regular homework that provides students with review and practice on the topics and
         procedures taught such as verifying identities, evaluating trigonometric functions,
         graphing, and solving applied problems
B. Evaluation
   1. In-class assignments
   2. Homework assignments
   3. Periodic exams that assess students' conceptual understanding and computational
      competency in topics such as evaluating and graphing trigonometric functions, utilizing
      identities to simplify expressions and solve equations, applying the Law of Sines and
      the Law of Cosines, solving word problems, and demonstrating familiarity with
      complex numbers
   4. Comprehensive in-class final exam covering key topics such as graphing, evaluation of
      inverse functions, solving equations, and setting up and solving applications
C. Textbooks and other instructional materials
   2. A scientific or graphing calculator
   3. Instructor developed materials, for example supplementary exercises or notes

VII. TITLE 5 CLASSIFICATION
CREDIT/DEGREE APPLICABLE (meets all standards of Title 5, Section 55002(a)).