MATH 119 Precalculus Trigonometry

1. <u>Catalog Description</u>

    MATH 119. Precalculus Trigonometry   **4 units**
    GE Area B1

    Prerequisite: Completion of ELM requirement and passing score on appropriate

    Mathematics Placement Examination, or <u>MATH 117</u>, or <u>MATH 118</u>.
    Rectangular and polar coordinates. Trigonometric functions, fundamental identities.
    Inverse trigonometric functions and relations. Vectors, complex numbers, conic sections,
    and analytic geometry. Not open to students with credit in <u>MATH 141</u>, <u>MATH 161</u>, or
    <u>MATH 221</u>. 4 lectures. Fulfills GE B1; for students admitted Fall 2016 or later, a grade of
    C- or better in one GE B1 course is required to fulfill GE Area B.

2. <u>Required Background or Experience</u>

    Math 118 or equivalent.

3. <u>Learning Objectives</u>

    The student should:

    a. Understand the trigonometric functions as developed from both a right triangle and a
        circle.
    b. Apply trigonometric functions to simple problems involving the geometry of triangles
        and circles, vectors, and periodic phenomena.
    c. Derive basic trigonometric identities and use them to manipulate expressions
        involving trigonometric functions.
    d. Graph with facility equations similar to $y = A \sin(Bx + C)$ and combinations thereof.
    e. Understand and be able to manipulate the inverse trigonometric functions and use
        them to solve trigonometric equations.
    f. Understand analytic geometry and the polar form of the conic sections.

4. <u>Text and References</u>

    - Cohen, David, et al., <u>Precalculus: A Problems-Oriented Approach</u>,
      customized for Cal Poly, Thomson/Brooks-Cole.

5. <u>Minimum Student Materials</u>

    Paper, pencils, and notebook.

6. <u>Minimum University Facilities</u>

    Classroom with ample chalkboard space for demonstration and class use.

7. <u>Content and Method</u>

<u>Topic</u>   <u>Lectures</u>
Chapter 3: Functions   *(REVIEW)* 2
  3.1   The Definition of a Function
  3.2   The Graph of a Function
  3.3   Shapes of Graphs. Average Rate of Change
  3.4   Techniques in Graphing
  3.5   Methods of Combining Functions. (*Skip iteration*)

Chapter 6: An Introduction to Trigonometry via Right Triangles 4
  6.1   Trigonometric Functions of Acute Angles
  6.2   Right-Triangle Applications
  6.3   Trigonometric Functions of Angles
  6.4   Trigonometric Identities

Chapter 7: Trigonometric Functions 4
  7.1   Radian Measure
  7.2   Trigonometric Functions of Angles
  7.3   Evaluating theTrigonometric Functions
  7.4   Algebra and the Trigonometric Functions
  7.5   Right-Triangle Trigonometry

Chapter 8: Graphs of the Trigonometric Functions 4
  8.1   Trigonometric Functions of Real Numbers
  8.2   Graphs of the Sine and Cosine Functions
  8.3   Graphs of $y = A \sin(Bx - C)$ and $y = A \cos(Bx - C)$
  8.4   Simple Harmonic Motion
  8.5   Graphs of the Tangent and the Reciprocal Functions

Chapter 9: Analytical Trigonometry 6
  9.1   The Addition Formulas
  9.2   The Double-Angle Formulas
  9.3   The Product-to-Sum and Sum-to-Product Formulas
  9.4   Trigonometric Equations
  [*3.6   Inverse Functions (Review)*]
  9.5   The Inverse Trigonometric Functions

Chapter 10: Additional Topics in Trigonometry 8
  10.1   Right-Triangle Applications
  10.2   The Law of Sines and the Law of Cosines
  10.3   Vectors in the Plane: A Geometric Approach
  10.4   Vectors in the Plane: An Algebraic Approach
  10.5   Parametric Equations
  10.6   Introduction to Polar Coordinates
  10.7   Curves in Polar Coordinates

Chapter 12: The Conic Sections 6
  12.1   The Basic Equations
  12.2   The Parabola
  12.4   The Ellipse
  12.5   The Hyperbola
  12.6   The Focus-Directrix Property of Conics
  12.7   The Conics in Polar Coordinates   Total   34

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8. <u>Methods of Assessment</u>

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination. Students are required to show their work and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques.