High School Course Description for **Trigonometry**

Course Title: Trigonometry

Curricular Area: Mathematics

Course Number: MTH402

Length: One semester

Grade Level: 9-12

Prerequisites: Algebra II with grade of C or better

Meets a UC a-g Requirement: yes

Meets NCAA Requirement: yes

Meets High School Graduation Requirement for:
Mathematics Elective Credit

Course Description

This course provides students with an introduction to the relationships of triangles and the theory of the periodic functions connected with them and is designed to provide the basic tools and concepts for applications in surveying, navigation, engineering, physics, and chemistry. Students will learn to model real-life problems mathematically by using plane trigonometry. Students who complete this course will be able to continue their studies with calculus and other advanced mathematics. The course is also designed to serve the needs of both college and career bound students.

Alignment

This course is aligned to the Mathematics California Content Standards for Trigonometry.

Instructional Materials

Required Textbook(s)

1. Bitzer, Robert, "Precalculus," Prentice-Hall, 3d Ed, 2007. ISBN: 013195993X

Novels and Other Readings

2. N/A

Supplemental Materials

3. Instructor's Edition
ISBN: 0131880454

4. Instructor's Solutions Manual
ISBN: 0131880373

Suggested Video/DVDs//Films

5. N/A

Web Sites

6. www.PHSchool.com/advanced

Software

7. TestGen ISBN: 0131880403

Exit Criteria

Activities	Percentage
Homework and Participation	30%
Tests and Quizzes	50%
Final Examination	20%
Total:	100%

Development Team: Francisco Villegas, Stephan Ottesen, Daniel Johnston

First Quarter

Weeks 1: Section 4.2 Unit circle
2: Section 4.1 Angles and Radian Measure
3 - 4: Sections 4.3 & 4.4 Right Triangle Trigonometry and Functions of Any Angle, Test
5: Sections 4.5 & 4.6 Graphs of Sine and Cosine and Other Trigonometric Functions
6: Sections 4.6 & 4.7 Inverse Trigonometric Functions
7: Section 4.8 Applications of Trigonometric Functions, Test
8: Section 5.1 Verifying Trigonometric Identities
9: Section 5.2 & 5.3 Sum and Difference, Double-Angle Formulas.

Standards:
Trigonometry 1.0: Students understand the notion of angle and how to measure it, in both degrees and radians. They can convert between degrees and radians.
Trigonometry 2.0: Students know the definition of sine and cosine as *y*- and *x*- coordinates of points on the unit circle and are familiar with the graphs of the sine and cosine functions.
Trigonometry 3.0: Students know the identity $\cos^2(x) + \sin^2(x) = 1$:
3.1 Students prove that this identity is equivalent to the Pythagorean theorem (i.e., students can prove this identity by using the Pythagorean theorem and, conversely, they can prove the Pythagorean theorem as a consequence of this identity).
3.2 Students prove other trigonometric identities and simplify others by using the identity $\cos^2(x) + \sin^2(x) = 1$. For example, students use this identity to prove that $\sec^2(x) = \tan^2(x) + 1$.
Trigonometry 4.0: Students graph functions of the form $f(t) = A \sin(Bt + C)$ or $f(t) = A \cos(Bt + C)$ and interpret *A, B,* and *C* in terms of amplitude, frequency, period, and phase shift.
Trigonometry 5.0: Students know the definitions of the tangent and cotangent functions and can graph them.
Trigonometry 6.0: Students know the definitions of the tangent and cotangent functions and can graph them.
Trigonometry 7.0: Students know that the tangent of the angle that a line makes with the *x*- axis is equal to the slope of the line.
Trigonometry 8.0: Students know the definitions of the inverse trigonometric functions and can graph the functions.
Trigonometry 9.0: Students compute, by hand, the values of the trigonometric functions and the inverse trigonometric functions at various standard points.
Trigonometry 10.0: Students demonstrate an understanding of the addition formulas for sines and cosines and their proofs and can use those formulas to prove and/ or simplify other trigonometric identities.
Trigonometry 11.0: Students demonstrate an understanding of half-angle and double-angle formulas for sines and cosines and can use those formulas to prove and/ or simplify other trigonometric identities.
Trigonometry 12.0: Students use trigonometry to determine unknown sides or angles in right triangles.

Unit/Lesson/Sections/Chapters: Chapter 4, sections 1 thru 8 and Chapter 5, sections 1 and 2 .

Second Quarter

Weeks 10: Sections 5.3 Double-Angle, Power Reduction, Half-Angle Formulas
11: Sections 5.3 & 5.5 Half-Angle Formulas, Test, Trigonometric Equations
12: Sections 5.5 Trigonometric Equations
13: Sections 5.6 Law of Sines and Areas of Oblique Triangles
14: Sections 5.7 Law of Cosines, Test

15: Sections 6.3 & 6.4 Polar Coordinates and Graphs of Polar Equations
16: Sections 6.4 & 6.5 Graphs of Polar Equations and Complex Numbers in Polar Form
17: Sections 6.5 & 6.6 DeMoivre's Theorem and Vectors
18: Sections 6.7 Dot Products, Final Exam

Standards:
Trigonometry 11.0: Students demonstrate an understanding of half-angle and double-angle formulas for sines and cosines and can use those formulas to prove and/ or simplify other trigonometric identities.
Trigonometry 13.0: Students know the law of sines and the law of cosines and apply those laws to solve problems.
Trigonometry 14.0: Students determine the area of a triangle, given one angle and the two adjacent sides.
Trigonometry 15.0: Students are familiar with polar coordinates. In particular, they can determine polar coordinates of a point given in rectangular coordinates and vice versa.
Trigonometry 16.0: Students represent equations given in rectangular coordinates in terms of polar coordinates.
Trigonometry 17.0: Students represent equations given in rectangular coordinates in terms of polar coordinates.
Trigonometry 18.0: Students are familiar with complex numbers. They can represent a complex number in polar form and know how to multiply complex numbers in their polar form.
Trigonometry 19.0: Students are adept at using trigonometry in a variety of applications and word problems.

Unit/Lesson/Sections/Chapters: Chapter 5, sections 1 thru 8 and Chapter 6, sections 1 and 2.

Support for English Language Learners:
Teachers will supplement with universal access materials from SB-472 training, including word walls, visual aids, and graphic organizers. SDAIE strategies will be employed based on individual student need.

Support for Special Education Students:
Teachers will supplement with universal access materials from SB-472 training, including word walls, visual aids, and graphic organizers. Scaffolding strategies will be employed based on individual student need and goals set forth in the IEP.

Stretching the Lesson for GATE Students:
Teachers may assign the "Practice Plus" problems from each set of exercises in the text book. Additional topics may be added to each unit to further their learning. Such topics may include: sum-to-product and product-to-sum identities, law of tangents, Heron's formula, vectors in three dimensions.