

MATHEMATICS

STUDENT LEARNING OUTCOME ALIGNMENT FORM

Course Prefix/Number: MATH 1316

Course Title: Trigonometry with Analytic Geometry

Brief Course Description:

Trigonometric functions, radian measure, solutions of triangles, graphs of trigonometric functions, trigonometric identities, trigonometric equations, polar coordinates, vectors, and conic sections.

Foundational Component Area: Mathematics. Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

*Choose at least one Core SLO from the Core Objective.

Core Objective	ASU SLO	Course SLO	Assignment	Assessment Method
Critical Thinking*	CT1: Gather, analyze, evaluate, and synthesize information relevant to a question or issue.	Students will evaluate trigonometric functions and inverse trigonometric functions.	Student will complete textbook or instructor-generated exercises related to evaluating trigonometric functions and inverse trigonometric functions.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to evaluating trigonometric functions and inverse trigonometric functions.
	CT2: Develop and demonstrate a logical position (i.e. perspective, thesis, hypothesis) that acknowledges ambiguities or contradictions.			

Communication*	CS1: Develop, interpret, and express ideas through effective written communication.			
	CS2: Develop, interpret, and express ideas through effective oral communication.			
	CS3: Develop, interpret, and express ideas through effective visual communication.	Students will create and interpret graphs of trigonometric functions, inverse trigonometric functions, and polar equations.	Student will complete textbook or instructor-generated exercises related to graphing trigonometric functions, inverse trigonometric functions, and polar equations.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to evaluating trigonometric functions and inverse trigonometric functions.
Empirical & Quantitative Skills*	EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion.			
	EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion.	Students will use the facts, formulas, and techniques learned in this course to prove trigonometric identities, solve trigonometric equations, and solve applied problems.	Student will complete textbook or instructor-generated exercises related to trigonometric identities, trigonometric equations, and applications of trigonometric functions.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to trigonometric identities, trigonometric equations, and applications of trigonometric functions.

Mathematics 1316 – Trigonometry with Analytic Geometry

Student Learning Outcomes

- 1. The students will demonstrate factual knowledge including the mathematical notation and terminology used in this course.** Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in trigonometry including definitions of the six trigonometric functions; types of angle measure and notation; parts of triangles and circles; the various types of triangles.
- 2. The students will describe the fundamental principles including the laws and theorems arising from the concepts covered in this course.** Students will identify and apply the laws and formulas that result directly from the definitions; for example, the fundamental identities, properties of angles and triangles, and characteristics of the trigonometric functions and inverse trigonometric functions (including graphs).
- 3. Students will apply course material along with techniques and procedures covered in this course to solve problems.** Students will use the facts, formulas, and techniques learned in this course to prove identities and solve trigonometric equations; and solve various types of triangle problems, distance and navigation problems, and linear and angular velocity problems.
- 4. The Student will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire a level of proficiency in the fundamental concepts and applications necessary for further study in academic areas requiring trigonometry as a prerequisite, or for work in occupational fields requiring a background in trigonometry. These fields might include education, business, finance, marketing, computer science, physical sciences, and engineering, as well as mathematics.

Course Content

Textbook: *Trigonometry*, Eighth Edition, by McKeague, Turner. The following chapters including the particular sections listed are covered. (See textbook “Contents.”)

- 1. The Six Trigonometric Functions.** Angles, degrees, and special triangles; the rectangular coordinate system; definitions - the trigonometric functions; identities.
- 2. Right Triangle Trigonometry.** Definitions in right triangle trigonometry; calculators and functions of an acute angle; solving right triangles; applications; geometric approach to vectors.
- 3. Radian Measure.** Reference angle; radians and degrees; definition - circular functions; arc length and area of a sector; velocity.
- 4. Graphing and Inverse Functions.** Basic graphs and amplitude; period, reflection, and vertical translation; phase shift; inverse trigonometric functions.

- 5. Identities and Formulas.** Proving identities; sum and difference formulas; double-angle and half-angle formulas, additional identities.
- 6. Equations.** Solving trigonometric equations; more on trigonometric equations; equations involving multiple angles.
- 7. Triangles.** The law of sines; the ambiguous case; the law of cosines; vectors: an algebraic approach; dot product.
- 8. Complex Numbers and Polar Coordinates.** Polar coordinates; equations in polar coordinates and their graphs.

Additional Content

Conic Sections. Parabolas; ellipses; hyperbolas; polar equations of conics.