

**University of Arkansas – Fort Smith
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General Syllabus

MATH 12003 Plane Trigonometry

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: MATH 11003 College Algebra or required placement

score Effective Catalog: 2018~2019

I. Course Information

A. Catalog Description

The theory of trigonometric and circular functions and the study of their applications. Topics include graphs, identities, and equations involving trigonometric functions, inverse trigonometric functions, triangles, vectors, polar coordinates, and polar representations of complex numbers. (ACTS: MATH 1203)

B. Additional Information

A graphing calculator is required.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Define the six trigonometric functions as functions of angles and as functions of real numbers.
2. Evaluate trigonometric functions.
3. Sketch the graphs of trigonometric functions, including transformations.
4. State the basic trigonometric identities and be able to prove other identities.
5. Evaluate and graph inverse trigonometric functions.
6. Solve trigonometric equations.
7. Plot points and graphs in polar coordinates.
8. Convert between rectangular and polar representations of complex numbers.
9. Apply trigonometry to solve applied problems involving triangles, circular motion, periodic behavior, and vectors.
10. Use technology appropriately to solve problems involving trigonometry analytically or numerically.

B. University Learning Outcomes

Communication Skills (written and oral)

Students will communicate orally and in writing with trigonometric function and applications in a public setting.

Analytical Skills

Quantitative Reasoning: Students will apply trigonometry to solve problems that arise in physical and scientific applications. Students will analyze strategies used to compute with angle, ratio, and percentage.

III. Major Course Topics

- A. Relations, Functions and Periodic Functions
 - 1. Find the domain and range of a relation
 - 2. Find the domain and range of a function
 - 3. Definition of a periodic function
 - 4. Properties of the period function
- B. The Trigonometric Functions Defined on Angles
 - 1. Trigonometric functions of any angle
 - 2. Trigonometric functions of quadrantal angles
 - 3. Signs of Trigonometric function
 - 4. The reference angles
- C. Radian measure
 - 1. Use radian measure
 - 2. Convert between degrees and radians
 - 3. Find the conterminal angles
- D. The Circular Functions
 - 1. The wrapping function
 - 2. Trigonometric functions of real numbers
 - 3. Properties of trigonometric functions of real numbers
- E. Trigonometric Identities
 - 1. Fundamental trigonometric identities
 - 2. Verification of trigonometric identities
- F. Trigonometric Equations
 - 1. Solve trigonometric equations quadratic in form
 - 2. Use factoring to separate different functions in trigonometric equation
 - 3. Use identities to solve trigonometric equations
- G. The Inverse Trigonometric Equations
 - 1. Understand and use the inverse trigonometric function
 - 2. Solve the inverse trigonometric equation
- H. Oblique Triangles
 - 1. The Law of Sines
 - 2. Solve applied problems using the Law of Sines
 - 3. The Law of Cosines
 - 4. Solve applied problems using the Law of Cosines

I. Polar Coordinates and Complex Numbers

1. Polar coordinate system
2. Graph of equations in a polar coordinate system
3. Simplify an imaginary number
4. Simplify an expression containing complex numbers
5. Rationalize the denominator of a fraction that contains a complex number