

EMBRY - RIDDLE AERONAUTICAL UNIVERSITY
Department of Computing and Mathematics
COURSE OUTLINE FOR

Course No. MA142
Cr. Hrs. 3

Title: Trigonometry

Lecture Hours: 3

Laboratory Hours: 0

COURSE DESCRIPTION:

Trigonometric functions and their graphs; identities; radian measure with applications; compound, half and double angle identities; solving elementary trigonometric equations, right and oblique triangles, law of sines and cosines; exponential, logarithmic and inverse trigonometric functions; vectors and trigonometric form of a complex number. Prerequisite: MA006, MA106 or placement. Corequisite: MA140

GOALS:

This course is designed to provide the student with the mathematical skills to support further work in Aviation Computer Science, Aerospace Engineering, Electrical Engineering, Engineering Physics, Aircraft Engineering Technology, and Avionics degree program.

PERFORMANCE OBJECTIVES:

1. Identify the six trigonometric functions and express them as the ratio of the sides of a right triangle, solve right triangle problems.
2. Find the trigonometric function value of any angle, and know the values of six trigonometric functions for quadrantal and special angles.
3. Convert from degrees to radian measure.
4. Solve problems involving arc length, angular speed and linear speed.
5. Define amplitude, period, and phase shift for the trigonometric functions
6. Graph the trigonometric functions using information on amplitude, period, and phase shift.
7. Verify trigonometric identities using the fundamental identities, along with the sum and difference formulas, double angle formulas and half angle formulas.
8. Define the domain and range of the inverse trigonometric functions.
9. Graph the inverse trigonometric functions, using information on the domain and range.
10. Solve trigonometric equations on either a restricted domain or a general domain.

11. Use the Law of Sines and the Law of Cosines to solve problems involving oblique triangles.
12. Convert from rectangular to polar coordinates, and perform operations with complex numbers in polar form.
13. Perform vector addition, subtraction and scalar multiplication.
14. Use vectors to solve displacement and force problems.
15. Graph exponential and logarithmic functions and use properties of logarithms to simplify expressions and solve exponential equations and logarithmic equations.

Reviewed and Approved by:



Daytona Beach Campus

_____/_____
Chair Date

_____/_____
Dean of Academics Date



Prescott Campus

_____/_____
Chair Date

_____/_____
Dean of Academics Date



Extended Campus

_____/_____
Chair Date

_____/_____
Dean of Academics Date

Department of Computing and Mathematics
COURSE OUTLINE FOR MA142, Continued

TEXTBOOK:

Aufmann, Barker, *College Trigonometry*, 3rd Edition, Houghton Mifflin Co.

SUGGESTED SUPPLEMENTAL MATERIALS:

- a. Scientific Calculator

PREREQUISITE KNOWLEDGE BY TOPIC: For MA142 (Trigonometry)

1. Basic arithmetic skills of rational numbers.
2. Knowledge of elementary equation solving.
3. Polynomial arithmetic and factoring.
4. Basic knowledge of rational expressions.
5. Basic knowledge of exponents and square roots.

Topics	Class Hours	Course Objectives
1. Trigonometric Functions	3	Understand the six trigonometric functions as ratios, using the Cartesian Coordinate System. Be able to find the function of any angle and know the functions of the special angles.
2. Radian Measure	2	Be able to convert from degrees to radians and from radians to degrees. Apply radian measure to solve applications involving arc length, area of a sector, and angular and linear speed
3. Graphing Trigonometric Functions	3	Be able to graph as well as recognize the graphs of the six trigonometric functions. Be able to find the amplitude if it exists as well as period and phase shift. Graph sums of trigonometric and algebraic functions and combinations of sine and cosine functions. (Optional: Know the form of the simple harmonic model.)

NOTE: It is important to cover the first three topics first because students taking calculus at the same time need an understanding of them early in the term. Don't spend time covering the review topics in Chapter 1 until they are needed later in the course.

Con't Topics	Class Hours	Course Objectives
4. Right Triangle Trigonometry	2	Solve right triangles using the six trigonometric ratios. Solve word problems by setting up appropriate triangles.
5. Trigonometric Identities	5	Verify trigonometric identity equations by using the eight fundamental identities, compound, double and half angle formulas, and the sum or difference to product formulas. Be able to use trigonometric identities to simplify a variety of trigonometric expressions.
6. Inverse Trigonometric Functions and Trigonometric Conditional Equations	4	Graph inverse trigonometric functions. Know their domain and range. Simplify trigonometric expressions involving inverse functions. Solve conditional trigonometric equations for both principal and general solutions, using degrees and radians.
7. Oblique Triangles	3	Use the law of sines and the law cosines to solve oblique triangles.
8. Polar Coordinates	5	Convert from rectangular to polar coordinates. Graph polar equations. Graph complex numbers in rectangular and polar form. Perform operations with complex numbers in polar form.
8. Polar Coordinates	5	Convert from rectangular to polar coordinates. Graph polar equations. Graph complex numbers in rectangular and polar form. Perform operations with complex numbers in polar form.
9. Vectors	4	Find the magnitude and direction angles of vectors. Perform vector addition and scalar multiplication and interpret geometrically. Perform dot products. solve applied problems involving vectors.
10. Exponential and Logarithmic Functions and Equation	5	Graph exponential and logarithmic functions. Solve equations with variable exponent. Use theorems of logarithms to simplify equations involving logarithms. solve applied problems involving logarithmic and exponential equations and functions.
OPTIONAL TOPICS:		
11. De Moivre's theorem		Use De Moivre's theorem to find roots and powers of complex numbers.
12. Parametric Equations		Sketch curves given in parametric form.

LABORATORY:

None

COMPUTER USAGE:

None

GRADING SYSTEM:

Varies with each instructor; however grades are usually based on in-class tests, homework and a comprehensive final exam.

ESTIMATED CONTENT:**Skills 40%****Content 60%**

Signature		Date	at Daytona Beach Campus
Prepared by:	Elliot Jacobs, Ph.D. Course Monitor		
Signature		Date	at Daytona Beach Campus
Coordinated by:	William Grams, Ph.D. Associate Chair, Department of Computing and Mathematics		