

COLLIN COLLEGE EXPANDED GENERIC COURSE SYLLABUS

COURSE INFORMATION

Course Number: MATH 1316

Course Title: Trigonometry

Credit Hours: 3

Lecture Hours: 3

Lab Hours: 0

Prerequisite

MATH 1314; or equivalent.

Course Description

In-depth study and applications of trigonometry including definitions, identities, inverse functions, solutions of equations, graphing, and solving triangles. Additional topics such as vectors, polar coordinates and parametric equations may be included.

Textbook/Supplies

Onsite Courses: *Trigonometry 8th edition by Charles P. McKeague and Mark D. Turner, Cengage Learning. New packages purchased from any Collin bookstore will include an access code for WebAssign.*

Online Courses: *Trigonometry 8th edition with Webassign access by Charles P. McKeague and Mark D. Turner, Cengage. eText comes with WebAssign access.*

Supplies: Graphing calculator required.

STUDENT LEARNING OUTCOMES (SLO)

Upon completion of this course the students should be able to do the following:

1. Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.
2. Graph trigonometric functions and their transformations.
3. Prove trigonometric identities. (Communication Skills and Critical Thinking)
4. Solve trigonometric equations.
5. Solve right and oblique triangles. (Empirical/Quantitative)
6. Use the concepts of trigonometry to solve applications. (Communication Skills, Critical Thinking, and Empirical/ Quantitative)

REQUIRED CORE OBJECTIVES FOR MATHEMATICS

As per the Texas Higher Education Coordinating Board, mathematics students must develop and demonstrate the following three required core objectives:

- Critical Thinking Skills - creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills - effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills - manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

METHOD OF EVALUATION

Course requirements

Attending class, completing homework assignments, and completing required exams.

Course format

Lecture and guided practice.

A minimum of four written exams, online homework, and a comprehensive final exam. Homework may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including home assignments, service- learning, extra credit, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams. The departmental final exam must count at least 20% of the course grade.

COURSE POLICIES

College-wide policies are pre-loaded into the Concourse Syllabi and are not duplicated in the Expanded Generic Syllabi for each course. Instructor specific policies should be added to the Concourse Syllabus.

COURSE CONTENT

Proofs and derivations will be assigned at the discretion of the instructor. The student will be responsible for knowing all definitions and statements of theorems for each section outlined in the following modules.

Module 1

The student will be able to:

1. Interpret angles and degree measure. SLO 1
2. Interpret the different kinds of triangles. SLO 1
3. Solve right triangles using the Pythagorean Theorem SLO 1
4. Solve special right triangles. SLO 1 & 6
5. Draw angles in standard position and determine when two such angles are coterminal. SLO 1
6. Interpret the trigonometric functions for angles in standard position. SLO 1
7. Determine the algebraic sign of the trig functions in each of the four quadrants. SLO 1
8. Use the basic trigonometric identities to find trigonometric function values, simplify expressions, and prove new identities. SLO 3
9. Use the definition of the trigonometric functions as right triangle ratios. SLO 1
10. Use the Cofunction Theorem. SLO 1
11. Recall the exact values of the trigonometric functions for special angles. SLO 1
12. Use decimal degrees for angles. SLO 1
13. Use a calculator to find trigonometric function values for acute angles and how to find the angle whose trigonometric function value is given. SLO 1
14. Solve right triangles, using the correct significant digits for sides and angles. SLO 5
15. Solve applied problems using right triangles and understand the concepts of angle of elevation and depression and bearings. SLO 5 & 6
16. Use geometric vectors to solve problems involving force and work. SLO 6

Module 2

The student will be able to:

1. Calculate reference angles and use the reference angle theorem. SLO 1 & 6
2. Use reference angles to calculate exact values of trig functions. SLO 1
3. Use a calculator to calculate approximate values of trig functions as well as the angles whose trig value is given, and which lie in a given interval. SLO 1
4. Calculate radian measure and convert between degrees and radians. SLO 1
5. Describe the definition of the circular functions. SLO 1
6. Use the unit circle to evaluate trig functions. SLO 1
7. Identify the domains and ranges of the six circular functions. SLO 2
8. Calculate the arc length of a circle, the area of a circular sector, and solve applied problems. SLO 6
9. Discuss of periodic function, period, and amplitude of the six trigonometric functions SLO 2
10. Graph the six basic trigonometric functions. SLO 2
11. Determine which of the six trigonometric functions are even and which are odd. SLO 2
12. Conclude how a change in amplitude, period, and reflection alters a function's graph. SLO 2
13. Sketch the graphs of trig functions and determine their periods and amplitudes. SLO 2
14. Graph sine and cosine functions with vertical and horizontal (phase) shifts. SLO 2
15. Graph tangent, cotangent, secant, and cosecant graphs with transformations of their basic graphs. SLO 2
16. Determine the equation given the graph of a trigonometric function. SLO 2

Module 3

The student will be able to:

1. Recall the notation and properties of inverse functions. SLO 2
2. Define the inverse sine, cosine, and tangent functions and their domains and ranges. SLO 2
3. Evaluate the inverse sine, cosine, and tangent functions exactly and with a calculator. SLO 1
4. Simplify compositions of a trig function with an inverse function. SLO 2 S
5. Simplify expressions involving inverse functions without a calculator. SLO 3
6. Verify identities using the basic trigonometric identities. SLO 3
7. Determine when an equation is not an identity. SLO 3
8. Use the sum and difference formulas and to find exact values and verify other identities. SLO 3
9. Use the double-angle formulas and use them to find exact values and verify other identities. SLO 3
10. Use the half-angle formulas and use them to find exact values and verify other identities. SLO 3

Module 4

The student will be able to:

1. Solve trigonometric equations which are of linear or quadratic form. SLO 4
2. Use identities to solve trigonometric equations. SLO 4
3. Solve trigonometric equations that involve multiple angles. SLO 4
4. Solve AAS or ASA triangles and applications involving such triangles using the Law of Sines. SLO 5
5. Solve ambiguous SSA triangles and applications involving such triangles using the Law of Sines. SLO 5
6. Solve SAS and SSS triangles and applications involving such triangles using the Law of Cosines. SLO 5