MATH A120: TRIGONOMETRY

Item	Value
Curriculum Committee Approval Date	03/20/2024
Top Code	170100 - Mathematics, General
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• OC Comm/Analytical Thinking - AA (OA2)
Associate Science Local General Education (GE)	• OCC Comm/AnalyticalThinking-AS (OAS2) • OCC Mathematics (OMTH)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

Topics covered will be trigonometric (circular) and inverse trigonometric functions, graphs of trigonometric functions, identities and conditional equations, solutions for triangles, vectors, complex numbers and applications. PREREQUISITE: MATH A030 or higher or appropriate placement. Transfer Credit: CSU. C-ID: MATH 851.**C-ID:** MATH 851.

Course Level Student Learning Outcome(s)

1. Evaluate the six trigonometric functions of angles represented in radians and degrees.
2. Solve trigonometric equations and prove trigonometric identities.
3. Solve right triangles and oblique triangles.

Course Objectives

- 1. Define trigonometric functions using right triangles and reference angles.
- 2. Recognize fundamental relationships of the trigonometric functions.
- 3. Identify special triangles and their related angle and side measures.
- 4. Recognize trigonometric function values of special angles in degrees and radians.
- 5. Find trigonometric function values of any measure (in degrees or radians) using a calculator.
- 6. Solve applications using right triangle trigonometry.
- 7. Solve trigonometric applications using vectors.
- 8. Convert radian to degree measure and degree to radian measure.
- 9. Apply circular functions to the unit circle.
- 10. Graph the six basic trigonometric functions applying changes in period, amplitude, and translations.
- 11. Use identities to manipulate and simplify trigonometric expressions.
- 12. Prove trigonometric identities.
- 13. Prove identities involving the sum and differences of two angles, the half angle, and the double angle identities.
- 14. Solve trigonometric equations.
- 15. Evaluate and graph inverse sine, inverse cosine, and inverse tangent functions.
- 16. Solve triangles and applications involving the law of cosines or law of sines.
- 17. Calculate the area of triangles using trigonometric functions.
- 18. Graph complex numbers.
- 19. Change complex numbers from standard to trigonometric form.
- 20. Use De Moivres theorem to find powers of a complex number.
- 21. Find roots of complex numbers.
- 22. Represent vectors ina,b > and ai+bj form.
- 23. Calculate the dot product of two vectors.
- 24. Convert between polar and rectangular coordinates and equations.
- 25. Sketch graphs of polar equations.

Lecture Content

Trigonometric functions Define angles, degrees and special triangles Define trigonometric functions of angles in standard position in the rectangular coordinate system Define trigonometric functions as ratios of sides of a right triangle Solve right triangles and applications Solve applications of trigonometric functions Circular functions Define reference angle Define radians and degrees Define trigonometric functions based on the unit circle Calculate circular function values Solve applications of circular functions arc length area of sector linear and angular velocity Graphing and inverse trigonometric functions Graph the six trigonometric functions Graph using changes in: period amplitude phase shift vertical translation asymptotes Inverse trigonometric functions and their graphs Prove and apply identities to manipulate and simplify trigonometric expressions Pythagorean Sum and difference formulas Double angle formulas Half-angle formulas Equations Solve trigonometric equations Solve trigonometric equations involving multiple angles Solve applications of triangles involving Law of sines Law of cosines Areas of triangles Vectors Define vectors geometrically Define vectors in the formsa, b > and ai + bj Addition, subtraction, Scalar multiplication of vectors Dot product Complex numbers Define complex numbers Addition, subtraction, multiplication and division in a + bi form Represent complex numbers in trigonometric form Products and quotients in trigonometric form De Moivres theorem Roots of complex numbers Polar coordinates Define polar coordinates Convert from rectangular to polar, and from polar to rectangular coordinates Convert from rectangular to polar, and from polar to rectangular equations Graph basic polar equations

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

Lecture, discussion, written homework

Reading Assignments

Students will spend approximately 1 hour per week reading from assigned text.

Writing Assignments

Students will spend approximately 1 hour per week on writing assignments.

Out-of-class Assignments

Students will spend approximately 4 hours per week on out-of-class assignments.

Demonstration of Critical Thinking

Exams covering several units and a comprehensive final exam

Required Writing, Problem Solving, Skills Demonstration

Writing is encouraged throughout the course but is not necessarily a part of the grading or exams.

Eligible Disciplines

Mathematics: Masters degree in mathematics or applied mathematics OR bachelors degree in either of the above AND masters degree in statistics, physics, or mathematics education OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Lial, Margaret. Trigonometry, 12th ed. Pearson, 2021
Rationale: -

Other Resources

1. Other appropriate textbook as chosen by faculty.