

MATH R116: COLLEGE TRIGONOMETRY

Originator

ptrujillo

College

Oxnard College

Discipline (CB01A)

MATH - Mathematics

Course Number (CB01B)

R116

Course Title (CB02)

College Trigonometry

Banner/Short Title

College Trigonometry

Credit Type

Credit

Start Term

Fall 2023

Catalog Course Description

This course is designed to give Calculus-bound students a solid foundation in trigonometric functions. Emphasis will be placed on trigonometric functions, their inverses and their graphs, identities and proofs related to trigonometric expressions, trigonometric equations, solving right triangles, solving triangles using the Law of Cosines and the Law of Sines, polar coordinates, and introduction to vectors.

Taxonomy of Programs (TOP) Code (CB03)

1701.00 - Mathematics, General

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

B (Transferable to CSU only)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

B - Satisfies Math/Quantitative Reasoning req (CSUGE-B B4, IGETC 2, or 4-yr)

Support Course Status (CB26)

N - Course is not a support course

Field trips

Will not be required

Grading method

(L) Letter Graded

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Minimum Contact/In-Class Lecture Hours

52.5

Maximum Contact/In-Class Lecture Hours

52.5

Activity

Laboratory

Total in-Class

Total in-Class

Total Minimum Contact/In-Class Hours

52.5

Total Maximum Contact/In-Class Hours

52.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid**Unpaid****Total Outside-of-Class****Total Outside-of-Class****Minimum Outside-of-Class Hours**

105

Maximum Outside-of-Class Hours

105

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

157.5

Total Maximum Student Learning Hours

157.5

Minimum Units (CB07)

3

Maximum Units (CB06)

3

Prerequisites

Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process.

Advisories on Recommended Preparation

MATH R115 or concurrent enrollment

Entrance Skills**Entrance Skills**

Algebraic fluency with expressions and equations. Understanding functions and graphs.

Requisite Justification**Requisite Type**

Prerequisite

Requisite

Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)

Upon satisfactory completion of the course, students will be able to:

1

Using the basic identities, students will be able to evaluate trigonometric functions, inverse trigonometric functions, and compositions of trigonometric functions.

- 2 Students will be able to apply standard algebraic techniques and inverse trigonometric concepts to solve trigonometric equations, first giving exact values, then using a calculator to approximate the results.

Course Objectives

Upon satisfactory completion of the course, students will be able to:

- | | |
|----|--|
| 1 | Identify special triangles and their related angle and side measures; |
| 2 | Evaluate the trigonometric function of an angle in degree and radian measure; |
| 3 | Manipulate and simplify a trigonometric expression; |
| 4 | Solve trigonometric equations, triangles, and applications; |
| 5 | Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs; |
| 6 | Evaluate and graph inverse trigonometric functions; |
| 7 | Prove trigonometric identities; |
| 8 | Convert between polar and rectangular coordinates and equations; |
| 9 | Graph polar equations; |
| 10 | Calculate powers and roots of complex numbers using DeMoivre's Theorem; |
| 11 | Represent a vector (a quantity with magnitude and direction) in the form $a+bi$. |

Course Content

Lecture/Course Content

1. Rectangular coordinates, angles and circular/radian measure
2. Definitions of the six trigonometric functions according to the right triangle, the unit circle, and the rectangular coordinate system
3. Applications of the right triangle
4. Simplification of trigonometric expressions
5. Proofs of trigonometric identities
6. Graphs of trigonometric functions: period, amplitude, phase shift, asymptotes
7. Inverse trigonometric functions and their graphs
8. Trigonometric equations
9. Solving Triangles: Law of Sines and Law of Cosines
10. Polar coordinates and equations
11. DeMoivre's Theorem and applications
12. Introduction to vectors.

Laboratory or Activity Content

None

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Written expression
 Problem solving exercises
 Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Computational homework
 Objective exams
 Problem-solving exams
 Quizzes
 Problem-Solving Assignments

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Class activities
 Collaborative group work
 Computer-aided presentations

Distance Education
 Instructor-guided interpretation and analysis
 Instructor-guided use of technology
 Lecture
 Small group activities

Describe specific examples of the methods the instructor will use:

1. Instructor-led class discussion on theories and processes used to analyze trigonometric functions and their graphs.
2. Instructor lecture and/or demonstration of concepts such as the various techniques used to set up and solve trigonometric equations.
3. Small group practice utilizing mathematical skills and problem-solving techniques. For example, given the angle of elevation and distance to an object, determine the height of the object.
4. Use of technology, such as graphing calculators and online simulations.

Representative Course Assignments

Writing Assignments

Written responses to critical thinking examples. For example, "Determine if the following statement is true or false. $\sin(A + B) = \sin A + \sin B$. If the statement is false, give three counter examples (in which you state the values of A and B). If it is true, support your conclusion using identities or other theorems."

Critical Thinking Assignments

1. Participate in class and small group discussions discussing, debating, and developing problem solving techniques in real world applications.
2. Mathematical problem solving. For example, "Determine the amplitude, period, and phase shift for the given function. Graph the function over an interval of two complete periods."

Reading Assignments

Critical reading and thinking in application problems. For example, "The angle of elevation from a point on the ground to the top of a tree is 53° . The point on the ground is 20 ft. from the base of the tree. Find the height of the tree."

Outside Assignments

Representative Outside Assignments

1. Homework skill building exercises.
2. Preparation for exams (including review of notes, watching video, practice exams).
3. Written assignments detailing thought processes of problem solving techniques, and reflection.

Articulation

C-ID Descriptor Number

MATH 851

Status

Approved

Comparable Courses within the VCCCD

MATH M06 - Trigonometry

MATH V05 - Plane Trigonometry

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type

Textbook

Description

Lial, M.L., Hornsby, J., Schneider, D.I., Daniels, C. (2017). *Trigonometry* (11). Pearson.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (1%–50% online)
Hybrid (51%–99% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.
Video Conferencing	Students will participate in group activities through a video conferencing tool.
E-mail	Responses to specific email questions.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.
Video Conferencing	Students will participate in group activities through a video conferencing tool.
E-mail	Responses to specific email questions.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch lecture videos.
E-mail	Responses to specific email questions.
Video Conferencing	Students will participate in group activities through a video conferencing tool.

Examinations

Hybrid (1%–50% online) Modality

On campus
Online

Hybrid (51%–99% online) Modality

On campus
Online

Primary Minimum Qualification

MATHEMATICS

Review and Approval Dates

Department Chair

05/09/2023

Dean

05/09/2023

Technical Review

05/10/2023

Curriculum Committee

05/10/2023

DTRW-I

MM/DD/YYYY

Curriculum Committee

MM/DD/YYYY

Board

MM/DD/YYYY

CCCCO

MM/DD/YYYY

Control Number

CCC000317162

DOE/accreditation approval date

MM/DD/YYYY