Wisconsin Indianhead Technical College

32804365 Math 365

Course Outcome Summary

Course Information

Description	This technical diploma course is a continuation of Math 355. Topics covered include the basic geometry of plane and solid figures, right-triangle trigonometry, oblique-triangle trigonometry, and applications of these topics to trade and technical programs. Additional topics covered in this course are program specific. These topics include applications to machine shop formulas, Cartesian coordinates, point-to-point programming, land-surveying mathematics, and framing-square calculations.
Instructional Level	Two-Year Technical Diploma
Total Credits	3.00
Total Hours	80.00

Types of Instruction

Instruction Type	Credits/Hours
Classroom Presentation (Lecture/Demonstration/Discussion)	3/80

Pre/Corequisites

Prerequisite 32804355 Math 355

Course Competencies

1 Solve problems involving ratios and proportions

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner solves for an unknown in a proportion
learner reduces ratios to the lowest terms
learner converts given elements into a ratio
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Write comparisons as ratios
Express ratios in lowest terms
Solve for the unknown term of a proportion

Substitute given numerical values for symbols in a proportion and solve for the unknown term
Apply skills to related technical problems

2 Perform calculations with angular measurements

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner adds, subtracts, multiplies, and divides angles in degree, minute, second form
learner converts between decimal degrees and degree, minute, second form
learner constructs angles with a protractor to the acuate degree
learner reads angles on a vernier protractor to the acurate degree
learner figures compliments and supplements of given angles
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Perform arithmetic operations on angles using degrees, minutes, and seconds
Convert between decimal degrees and degrees, minutes, and seconds
Construct angles with a simple protractor
Read settings on a vernier-bevel protractor
Compute complements and supplements of angles
Apply skills to related technical problems

3 Identify relationships between lines and angles

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner differentiates between acute, obtuse, right, reflex, straight and angles
learner differentiates between classification of angles given parallel lines intersected by a transversal
learner calculates the values of unknown angles given a set of intersecting lines
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Identify different classifications of angles
Apply principles of vertical , alternate interior, corresponding, parallel, and perpendicular angles to determine unknown angles
Apply skills to related technical problems

4 Determine missing elements of triangles using definitions and geometric principles

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner calculates a missing angle of a triangle given two angles
learner identifies which sides of a triangle corresponds to a given triangle
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Identify different types of triangles
Apply the sum of the three angles of a triangle to determine unknown angles of triangles

Identify corresponding parts of triangles
Apply skills to related technical problems

5 Determine missing elements of polygons using geometric principles

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner computes sides and angles of polygons using geometric principles
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Identify similar triangles
Compute unknown sides and angles of similar triangles
Compute angles and sides of isosceles, equilateral, and right triangles
Determine interior angles of any polygon
Apply skills to related technical problems

6 Calculate missing dimensions as related to the geometry of the circle

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner computes angles and distances
learner computes linear distances and arc lengths
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Identify parts of a circle
Solve problems by using geometric principles involving chords, arcs, central angles, perpendiculars, and tangents
Solve problems using geometric principles involving angles inside, on, and outside a circle
Solve problems which involve internally- and externally-tangent circles
Apply mathematics skills to related technical problems

7 Develop basic principles of trigonometry

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner lists the six trig ratios for a given angle on a right triangle
learner determines the values of the trig ratios for angles in decimal degrees form and degrees, minutes, seconds form
learner calculates the values of angles in decimal degrees form and degrees, minutes, seconds form given the value of the trig ratios
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Identify the sides of a right triangle referenced to any angle
State the six trigonometric ratios referenced to either acute angle of a right triangle
Determine the functions of angles in decimal degrees or degrees, minutes, and seconds
Find angles in decimal degrees or degrees, minutes, and seconds using the inverse trigonometric functions

Apply mathematics skills to related technical problems

8 Calculate sides and angles of right triangles

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner calculates the value of a specified angle of a right triangle given two sides
learner calculates the value of the length of a side of a right triangle given an acute angle and another side
learner identifies auxiliary lines needed to solve a problem
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Compute an unknown angle of a right triangle given two sides
Compute an unknown side of a right triangle given an acute angle and a side
Solve right-triangle trigonometry problems requiring the projections of auxiliary lines and geometric principles
Solve complex right-triangle trigonometry problems requiring two or more right triangles and the projection of auxiliary lines
Apply mathematics skills to related technical problems

9 Calculate sides and angles of oblique triangles

Assessment Strategies
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner solves for the missing elements of an oblique triangle using the law of sines
learner solves for the missing elements of an oblique triangle using the law of cosines
learner identifies auxiliary lines needed to solve a problem
learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly

Learning Objectives
Solve oblique-triangle problems using the law of sines
Solve oblique-triangle problems using the law of cosines
Apply mathematics skills to related technical problems

10 Apply principles of mathematics to specific technical applications

Assessment Strategies
group project
periodic written quizzes
comprehensive written test

Criteria

Criteria - Performance will be satisfactory when:

learner sets up the technical problems as needed to achieve the proper solution
learner performs calculations correctly
learner explains how the solution is a clear and strong match to the specific technical application

Learning Objectives
Solve cutting speed, revolutions per minute, and cutting time formulas by substitution in given formulas
Solve production time and cutting feed problems by rearrangement and combination of formulas
Compute functions of angles greater than 90 degrees
Locate points in a two-axis Cartesian coordiante system
Plot points in a two-axis Cartesian coordinate system
Sketch point locations in a three-axis Cartesian coordinate system

Perform the calculations to do a surveying traverse closure
Verify, by calculations, framing-square tables