

Part 2: Master Course Syllabus

Mathematics 1150 – Technical Mathematics

Purpose of Document

This document contains important information about this course's objectives. It may be helpful for you to retain a copy for your records, along with the class specific syllabus. This document will be especially helpful if you decide to later change your course of study.

Pikes Peak State College and the Colorado Department of Higher Education have determined that graduates should have a broad range of learning skills as well as discipline related skills. Both types of skills are detailed below.

Course Description

Covers material designed for career and technical students who need to study particular mathematical topics. Topics include measurement, algebra, geometry, statistics, and graphs. These are presented at an introductory level and the emphasis is on applications.

3 Credit Hours & 45 Contact Hours

Course Learning Outcomes

REQUIRED COURSE LEARNING OUTCOMES:

1. Solve applications of ratios and direct and inverse proportions.
2. Examine measurement with accuracy and precision.
3. Perform computations with signed numbers including scientific and engineering notation forms.
4. Solve algebraic equations and formulas with an emphasis on applications.
5. Analyze angle relationships.
6. Solve trigonometric problems with an emphasis on applications.
7. Analyze polygons and circles with an emphasis on applications.
8. Analyze basic geometric solids with an emphasis on applications.
9. Interpret the coordinate plane and vectors with an emphasis on applications.
10. Interpret data using introductory statistics.

Topical Outline

RECOMMENDED TOPICAL OUTLINE:

- I. Applications of ratios and direct and inverse proportions
 - a. Writing a comparison of two numbers as a ratio
 - b. Writing ratios as fractions, decimals, and unit ratios
 - c. Solving a proportion
 - d. Direct and inverse proportion applications
 - e. Conversion between fractions, decimals, and percentages
- II. Measurement with accuracy and precision
 - a. Significant digits
 - b. Accuracy and precision
 - c. Dimensional analysis
- III. Computations with signed numbers including scientific and engineering notation forms
 - a. Operations on signed numbers
 - b. Powers of signed numbers and roots of positive numbers
 - c. Order of operations
 - d. Scientific and engineering notation
 - e. Multiplication, division, and powers of numbers in scientific and engineering notation
- IV. Algebraic equations and formulas with an emphasis on applications
 - a. Addition and subtraction of like terms
 - b. Multiplication and division on monomials
 - c. Algebraic distributive law
 - d. Solving linear equations, including those containing grouping symbols and fractions
 - e. Evaluation of formulas and solving formulas
 - f. Systems of equations
 - g. Rules of exponents
 - h. Basics of exponentials
 - i. Definitions of logarithms
 - j. Properties of logarithms in solving equations
- V. Angle relationships
 - a. Solving angle problems
 - b. Acute, obtuse, right, straight, vertical, complementary, supplementary, alternate interiors, alternate exterior, and corresponding angles
 - c. Conversion between degree-minutes and decimal degrees
 - d. Addition and subtraction of angle measures
- VI. Trigonometric problems with an emphasis on applications
 - a. Right triangle trigonometry
 - b. Solving right triangle problems and applications
 - c. Pythagorean Theorem
 - d. Computation of trigonometric ratios for angles in standard position
 - e. Finding angles and trigonometric function values using technology
 - f. Graph of the sine function
 - g. Laws of sines and cosines
- VII. Polygons and circles with an emphasis on applications
 - a. Acute, obtuse, isosceles, equilateral, and right triangles

- b. Perimeter and area of a triangle
 - c. Solving similar triangle problems
 - d. Squares, rectangles, parallelograms, and trapezoids
 - e. Perimeter and area of a quadrilateral
 - f. Regular pentagons, hexagons, and octagons
 - g. Perimeter and area of composite polygons
 - h. Diameter, radius, circumference, area, and arc length of a circle
- VIII. Basic geometric solids with an emphasis on applications
 - a. Prisms, cylinders, pyramids, cones, and spheres
 - b. Surface area and volume of geometric solids
- IX. The coordinate plane and vectors with an emphasis on applications
 - a. The coordinate plane
 - b. Interpreting shapes and positioning in the coordinate plane
 - c. Introduction to vectors including addition and subtraction of vectors
 - d. Conversions between polar and j-operator forms
- X. Data using introductory statistics
 - a. Mean, median, mode, and standard deviation
 - b. Finding probabilities of a normal distribution
 - c. Sketching, reading, and interpreting line, bar, and circle/pie graphs