Syllabus
MATH 1020
Technical Mathmatics
2024

Committee Members:

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The Institution agrees to the contents in this syllabus including course prefix, number, course description and other contents of this syllabus.

Chief Academic Officer, Central Community College	04/19/2024	Adopt
Chief Academic Officer, Little Priest Tribal College	04/25/2024	Adopt
Tom McDonnell Chief Academic Officer, Metropolitan Community College	04/19/2024	Decline
Jody Tomanek Chief Academic Officer, Mid-Plains Community College	04/19/2024	Adopt
Chief Academic Officer, Nebraska Indian Community College	04/19/2024	Adopt
Charlene Widener Chief Academic Officer, Northeast Community College	04/20/2024	Adopt
Joel Michaelis Chief Academic Officer, Southeast Community College	04/25/2024	Adopt
Grant Wilson Chief Academic Officer, Western Nebraska Community College	04/19/2024	Adopt

I. CATALOG DESCRIPTION

MATH 1020
Technical Mathematics
Pre-Requisites/Co-Requisites: Appropriate assessment score

This course provides the math skills required in career/technical fields. The course includes a review of arithmetic operations, ratios and proportions, algebraic operations, geometrical relationships, and right triangle trigonometry with emphasis placed on applications.

3 semester credit hours/4.5 quarter credit hours/45 contact hours

II. COURSE OBJECTIVES/COMPETENCIES

The course encompasses the real-world technical application of

1. Arithmetic properties.
2. Measurement concepts.
3. Ratios and proportions to problem-solving.
4. Formula manipulation and evaluation for problem solving for unknown values.
5. Geometric formulas and concepts to problem solving.
6. Right triangle relationships to problem solving.

III. STUDENT LEARNING OUTCOMES

Students will be able to

1. Apply arithmetic to technical applications.
2. Convert English and metric measurements.
3. Compare quantities in ratio form and by solving both direct and inverse proportions.
4. Analyze and manipulate formulas for problems with unknown values.
5. Identify and apply perimeter, area, and volume formulas for two-dimensional and three-dimensional figures.
6. Solve right triangles.

IV. CONTENT/TOPICAL OUTLINE

A. Arithmetic

i. Review ~~of~~ operations with whole numbers, fractions, and decimals with a focus on applications.

ii. Perform basic mathematical operations with and without a calculator.

B. Percent

i. Convert between fractions, decimals, and percents.

ii. Solve percent problems for base, percent, or amount given two of the quantities.

iii. Apply percents to real world applications, ie. sales tax, discount, tolerance, commission.

C. Ratios, Rates, Inverse and Direct Proportions

i. Translate and simplify an application by using rates and ratios.

ii. Solve application problems using inverse or direct proportions.

D. Measurement Systems

i. Convert units of length, area, volume, and weight within the metric system.

ii. Memorize the metric prefixes from kilo to milli, at a minimum.

iii. Convert units of length, area, volume, and weight within the English system.

iv. Convert units of length, area, volume, and weight between the metric and English systems.

E. Significant Digits, Precision, Accuracy

i. Identify the precision and accuracy of measurements.

ii. Round calculations to the appropriate precision or accuracy.

F. Measuring Tools

i. Perform calculations with readings from instruments from various trades.

G. Scientific Notation

i. Convert between standard and scientific notation.

ii. Multiply and divide numbers in scientific notation.

H. Exponential Notation and Square Roots

i. Evaluate a number raised to an exponent.

ii. Evaluate square roots.

I. Integers

i. Perform integer operations with and without a calculator.

J. Order of Operations

i. Simplify numerical expressions involving several operations, parentheses, roots, and exponents.

K. Algebra

i. Translate English phrases to mathematical equations.

ii. Isolate a variable in an equation or a formula.

iii. Solve one and two-step equations.

iv. Apply formulas to practical situations.

L. Geometry

i. Classify angles.

ii. Determine the value of angles in relationship with a transversal.

iii. Identify polygons, i.e. triangles, quadrilaterals, pentagons, hexagons.

iv. Calculate area and perimeter of basic shapes, i.e. squares, rectangles, parallelograms, triangles, circles.

v~~i~~. Calculate volume of basic solids, i.e. prisms, cylinders, spheres.

vi. Calculate the area and volume of irregular shapes consisting of the basic shapes.

Note: A reference sheet with formulas will be provided.

M. Right Triangle Trigonometry

i. Apply the Pythagorean Theorem.
ii. Find the sine, cosine, and tangent of an angle.
iii. Solve right triangles for all sides and angles.
iv. Solve real world applications involving right triangles.

V. INSTRUCTIONAL MATERIALS:

A. Mathematics for the Trades, Saunders & Carman
B. Elementary Technical Mathematics, Cengage
C. Mathematical Applications in Agriculture, Mitchell, Cengage
D. Math for the Automotive Trade, Peterson & DeKryger

Supplemental materials:
Scientific calculator

VI. METHOD OF PRESENTATION

A. Methods of presentation are determined by the instructor. They traditionally include some combination of the following:
   1. Lecture
   2. Small Group Discussion
   3. Speaker Presentation
   4. Online/Hybrid
   5. Engaged Learning Experience Activities
   6. Lab Setting
   7. Modular

VII. METHOD OF EVALUATION

A. Methods of evaluation are determined by the instructor. They traditionally include some combination of the following:
   1. Unit Tests
   2. Comprehensive Final Exam
   3. Quizzes
   4. Assignments- Written, Hands-on Application, and/or Online

VIII. INSTITUTIONAL DEFINED SECTION

(to be used at the discretion of each community college as deemed necessary)