

Syllabus
MATH1020
Technical Mathematics
2018

Committee Members:

Kathy Woitaszewski, Central Community College
No Representative, Little Priest Tribal College
Cathy Brunkhorst, Metropolitan Community College
Chad Swanson, Mid-Plains Community College
Hank Miller, Nebraska Indian Community College
Beth Welke, Northeast Community College
Dana Nimic, Southeast Community College
Andrew Shiers, Western Community College

Facilitator: Chad Swanson

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

Deb Brennan

[Deb Brennan \(Apr 5, 2018\)](#)

Chief Academic Officer, Central Community College

Adopt

Janyce L. Woodard

[Janyce L. Woodard \(Apr 5, 2018\)](#)

Chief Academic Officer, Little Priest Tribal College

Adopt

Tom McDonnell

[Tom McDonnell \(Apr 30, 2018\)](#)

Chief Academic Officer, Metropolitan Community College

Not Offered

Jody Tomansk

[Jody Tomansk \(Apr 5, 2018\)](#)

Chief Academic Officer, Mid-Plains Community College

Adopt

Kristine Sudbeck

[Kristine Sudbeck \(May 1, 2018\)](#)

Chief Academic Officer, Nebraska Indian Community College

Not Offered

Lyle Kathol

[Lyle Kathol \(Apr 5, 2018\)](#)

Chief Academic Officer, Northeast Community College

Adopt

Dennis Headrick

[Dennis Headrick \(Apr 5, 2018\)](#)

Chief Academic Officer, Southeast Community College

Adopt

Kim Kuster Dale

[Kim Kuster Dale \(Apr 5, 2018\)](#)

Chief Academic Officer, Western Nebraska Community College

Adopt

I. CATALOG DESCRIPTION

MATH 1020 Technical Mathematics

Pre-Requisites/Co-Requisites: Appropriate assessment score

Description: 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 applications.

Credit/Contact Hour Designation: 3 semester credit hours; 4.5 quarter credit hours; 45 contact hours

II. COURSE OBJECTIVES/COMPETENCIES

Course will

1. Apply arithmetic properties
2. Apply measurement concepts to real-world applications
3. Apply ratios and proportions to problem-solving for technical applications
4. Apply formula manipulation and evaluation for problem solving for unknown values
5. Apply geometric formulas and concepts to problem solving of technical applications
6. Apply right triangle relationships to problem solving of technical applications.

III. STUDENT LEARNING OUTCOMES

Students will be able to

1. Apply arithmetic to technical applications.
2. Find and convert 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. With and without technology

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. Metric to metric conversions for length, area, volume, and weight

The minimum expectation is that the metric prefixes from kilo- to milli- are memorized.

- ii. English to English conversions for length, area, volume, and weight

- iii. Metric to English conversions, and vice versa, for length, area, volume, and weight

E. Significant Digits, Precision, Accuracy

- i. Identify the precision and accuracy of measurement numbers

- ii. Round calculations to the appropriate precision or accuracy

F. Measuring Tools

- i. Measure and read a variety of tools which could include the ruler, tape measure, caliper, and micrometer.

G. Scientific Notation

- i. Convert between standard notation 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 operations with and without technology

J. Order of Operations

- i. Include square roots and exponents

K. Algebra

- i. Translate an English phrase to a mathematical equation

- 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. Measure angles with a protractor

- iii. Determine the value of angles in relationship with a transversal

- iv. Identify polygons, ie. triangles, quadrilaterals, pentagons, hexagons

- v. Calculate area and perimeter of basic shapes, ie. squares, rectangles, parallelograms, triangles, circles

- vi. Calculate volume of basic solids, ie. prisms, cylinders, spheres

- vii. 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.

Note: Definitions of the sine, cosine, and tangent ratios are to be memorized.

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:

Measuring tools or online simulators (tape measure, micrometer, caliper and other measuring tools)

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

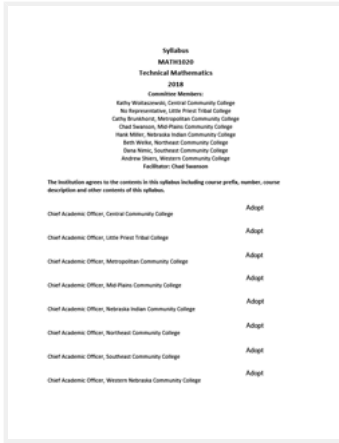
VIII. **INSTITUTIONAL DEFINED SECTION**

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

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