

Syllabus
MATH 1020
Technical Mathematics
2021

Committee Members:

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No Representative, Northeast Community College
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Facilitator: Jody Wingert

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	03/30/2021	Adopt
 Chief Academic Officer, Little Priest Tribal College	03/26/2021	Adopt
 Chief Academic Officer, Metropolitan Community College	03/29/2021	Decline
 Chief Academic Officer, Mid-Plains Community College	03/26/2021	Adopt
 Chief Academic Officer, Nebraska Indian Community College	04/08/2021	Adopt
 Chief Academic Officer, Northeast Community College	03/26/2021	Adopt
 Chief Academic Officer, Southeast Community College	03/29/2021	Adopt
 Chief Academic Officer, Western Nebraska Community College	03/30/2021	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 agreed students need to know how to do basic mathematical operations 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. 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. Discussed how to address – lab setting or knowing how to read the measurements by looking at a picture – will leave as is

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)