ATLB-2813: SPECIAL TOPICS IN ESSENTIAL COMPUTATIONS FOR CONSTRUCTION

Cuyahoga Community College

Viewing: ATLB-2813 : Special Topics in Essential Computations for Construction

Academic Term:
Summer 2026

Subject Code
ATLB - AIT-Construct/Hazard Material

Course Number:
2813

Title:
Special Topics in Essential Computations for Construction

Catalog Description:
As a result of participating in Essential Computations for Construction, students will be able to correctly solve problems, using addition, subtraction, multiplication, and division with whole numbers, decimals, fractions and percentages. Students will also be able to correctly read measuring tools using standard, decimal, and metric units.

Credit Hour(s):
2

Lecture Hour(s):
2

Requisites

Prerequisite and Corequisite
Departmental approval: admission to the Construction Tending and Hazardous Material Abatement program.

Outcomes

Course Outcome(s):
Implement student skills in addition, subtraction, multiplication and division of fractions, decimals, and percentages.

Objective(s):
1. Accurately add and subtract whole numbers by hand, using carrying.
2. Accurately multiply and divide whole numbers by hand, up to three digits.
3. Accurately solve long division problems by hand, with up to two digits in the divisor.
4. Demonstrate understanding and proficiency when reducing fractions.
5. Accurately add, subtract, multiple and divide fractions.
6. Demonstrate understanding of decimal place values, and to correctly round to specific decimal places.
7. Correctly add, subtract, multiple and divide numbers with different place values.

Course Outcome(s):
Calculate basic geometric and trigonometric functions as they relate to construction, will gain an understanding of how all these functions work with an emphasis on developing the critical thinking skills needed to use them to solve construction- related problems

Objective(s):
1. Linear, area, volume and weight formulas.
2. Different aspects of angles and circles, such as how to draw and measure angles with a protractor, how to add and subtract angles, and an introduction to azimuths and bearings.
3. How to use trigonometric functions to solve for missing sides and angles in right and isosceles triangles, as well as to find the chord of a polygon.

4. The four expressions of slope and how to interpret them.

Course Outcome(s):

Develop and implement skills in measurements - standard, engineers', metric, square roots and order of operations.

Objective(s):

1. Ability to explain what squaring is and what a square root is. Understanding the inverse relationship between them.
2. Ability to use rules of mathematics regarding the order of operations to correctly solve equations.
3. Demonstrate understanding of the applications of the different metric system units of measure. Ability to compare and equate metric system measurements.
4. Demonstrate proficiency in reading measurements using feet, inches, and fractions of an inch.
5. Ability to use rules of mathematics regarding the order of operations to correctly solve equations.

Methods of Evaluation:

Quizzes, tests and class participation

Course Content Outline:

1. Introductions, a brief orientation and summary of expectations in the class.
2. Addition with carrying
3. Subtraction with borrowing
4. Multiplication
   a. 2 digit by 2 digit
   b. 3 digit by 3 digit
5. Long Division
   a. Single digit with remainder
   b. Double digit with remainder

6. Introduction to fractions

a) Pertinent explanations of how fractions work

b) Key definitions pertaining to fractions

c) Reducing fractions

7. Discussion of improper fractions and mixed numbers

1. Creating improper fractions from mixed numbers.

b) Creating mixed numbers from improper fractions.

1. Adding fractions
   a. With the same denominators
   b. With different denominators
   c. Adding mixed numbers
   d. Adding mixed numbers with carrying

1. Subtracting fractions

1. With the same denominators
2. With different denominators
3. Subtracting mixed numbers
4. Subtracting mixed numbers with borrowing

9. Multiplying fractions

1. Multiplying two fractions
2. Multiplying fractions with whole numbers
3. Multiplying fractions with mixed numbers
4. Multiplying two mixed numbers

10. Dividing fractions

1. Reciprocal discussion
2. Dividing fractions with whole numbers
3. Dividing fractions with fractions
4. Dividing fractions with mixed numbers

5. Dividing mixed numbers with mixed numbers
6. Group Activity: Adjusting recipes using fractions and mixed numbers

11. Decimals

1. Place values
2. Adding decimals
3. Subtracting decimals
4. Multiplying Decimals
5. Dividing decimals

1. Dividing decimals with whole numbers
2. Dividing decimals with decimals
3. Converting decimals to fractions

ix. Converting fractions to decimals

12. Percentages

1. Percentages as fractions
2. Percentages as decimals
3. Multiplying percentages and fractions
4. Proportions

13. Squares, square roots and the order of operations

1. Squaring numbers
2. Square roots
3. Equation explanation
4. Order of operations discussion
5. Group activity – order of operations “Stump the Other Teams”

14. The Metric System (8:10-10:00)

1. Meters - km, m, cm, and mm
2. Liters - kL, L, dL, and mL
3. Grams – kg, g, and mg

15. Measuring in construction

1. Standard ruler
2. Engineers’ ruler
3. Measurement practice and comparison activity

16. Measurement conversions

a) Explanation of how conversions work
b) Converting standard measurements to decimal feet
c) Converting decimal feet to standard measurements

17. Stations in construction

1. What stationing is and how it works
2. Calculating distances using stationing
3. Group Activity: Using stations for production reports and materials planning
4. **Questions and Daily Recap Quiz**

18. Review and questions to prepare for final exam
19. Exam

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

Weekly Schedule

	Topics
Week 1	Course Introduction & Basic Addition
Week 2	Subtraction
Week 3	Multiplication (Fundamentals)
Week 4	Advanced Multiplication
Week 5	Division
Week 6	Introduction to Fractions
Week 7	Improper Fractions & Mixed Numbers
Week 8	Adding & Subtracting Fractions
Week 9	Multiplying Fractions
Week 10	Dividing Fractions
Week 11	Decimals
Week 12	Decimal Division & Percentages
Week 13	Exponents & Order of Operations
Week 14	Metric System
Week 15	Measurement in Construction
Week 16	Finals Week

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

Instructor provided materials.

Resources for the Instructor

Mary S. Charuhas & Dorothy McMurty. "Unit 1 Basic Arithmetic Review" *Essential Mathematics for Life Book 6*. 4. Westerville, Ohio: Glencoe McGraw Hill, 1996.

Johnny E. Hamilton and Margaret S. Hamilton. "Units of Measurement and Converting Fractions to Decimals" *Math to Build On*. 1. Clinton, North Carolina Construction Trades Press, 1993. http://www.constructpress.com/

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