# MDE 10 Course Outline

**MDE 10** – Introduction to Algebra (3 CR)

Course Type: Developmental

**Description:** Covers topics in arithmetic through introduction to variables and equations. Lecture 3 hours per week.

**MDE 10 Goal:** The goal of MDE 10 is to prepare students to pursue further coursework in MDE 60, MTH 101-133, or direct enrollment in MTH 154 or MTH 155 with co-requisite.

**Text:** Knewton Alta Single Term Access (180 Day) - \$48.00 ISBN: 9781635452440 Author: Knewton Publisher: Knewton, Inc

## **Course Objectives:**

- Perform basic operations (+, -, x, /) using whole numbers, integers, fractions, and decimals.
- Use percentages and proportions to solve real-life applications.
- Solve multi-step algebraic equations utilizing rational numbers.
- Simplify algebraic expressions containing rational numbers.
- Convert a number from expanded form to scientific notation and vice versa.
- Use the Properties of Real Numbers and The Properties of Equality to solve an equation.
- Compute the slope of a given line.
- Graph a linear equation using the slope and the y-intercept.

# Unit Objectives:

## Unit 1: Integers

- understand place value of whole numbers
- round numbers to a given place value
- divide, with quotients and remainder
- express numbers using repeated factors using exponents
- evaluate powers of numbers
- calculate the principle square root of a perfect square number
- simplify numerical expressions using the Order of Operations
- locate positive & negative numbers on the number line
- order positive & negative numbers
- find opposites
- translate word phrases to expressions with integers

- determine absolute value
- add/subtract/ multiply/divide signed numbers
- solve applications of adding & subtracting integers
- simplify expressions with signed numbers using order of operations
- evaluate variable expressions using integers
- Optional Topics:
  - prime factorization
  - finding the LCM

#### **Unit 2: Fractions**

- identify proper and improper fractions
- convert between improper fractions and mixed numbers
- find equivalent fractions
- reduce fractions to simplest form
- multiply fractions
- find reciprocals of fractions
- divide fractions
- add and subtract fractions with like denominators
- add and subtract fractions with unlike denominators
- find the LCD of 2 or more fractions
- write equivalent fractions using the LCD
- simplify expressions with fractions using order of operations
- Optional Topics:
  - add/subtract/multiply/divide mixed numbers

#### **Unit 3: Decimals, Percents, and Proportions**

- write decimals using standard notation and word notation
- understand decimal place values
- round decimals to a given place value
- add/subtract/multiply/divide decimals
- estimate sum, difference, product, and quotient
- convert between integer powers of ten and equivalent decimals
- convert numbers between scientific notation and standard notation.
- write parts to a whole using percent notation
- convert fractions to decimals and percent
- convert percents to fractions and decimals
- solve problems using proportions
- calculate all values in the basic percent proportion
- Optional Topics:
  - rates, unit price
  - U.S. and metric systems of measurement

- Optional application problems:
  - calculate percent increase/decrease
  - calculate sales tax
  - calculate discount and mark-up
  - calculate simple interest

#### **Unit 4: Solving Equations**

- simply an algebraic expression by combining like terms
- simplify an algebraic expression using the order of operations, including distribution
- evaluate a formula or algebraic expression for a give values of the variable
- solve one-step equations using integer or rational numbers
- solve first-degree equations in one variable using The Properties of Equality
- solve first-degree equations in one variable with variables and constants on both sides of the equal sign
- solve first-degree equations in one variable using the distributive property
- solve equations for a specific variable
- Optional Topics:
  - graphing and solving inequalities
  - writing solutions to inequalities in interval notation
  - calculating area, perimeter and circumference of shapes

#### **Unit 5: Slope and Graphing Lines**

- determine the coordinates of point plotted on the coordinate plane
- determine whether an ordered pair is a solution to an equation in two variables
- graph a linear equation by finding and plotting ordered pair solutions
- identify the x and y intercepts
- define what slope is
- calculate the slope of a line
- graph an equation given in slope-intercept form
- graph a horizontal line given its equation
- graph a vertical line given its equation

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