ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences and Business

COURSE: MTH 0910 Foundations of Algebra

Date: Spring 2022

Credit Hours: 3

Complete all that apply or mark "None" where appropriate:

Prerequisite(s): None

Enrollment by assessment or other measure? ☒ Yes ☐ No
If yes, please describe: Appropriate score on Accuplacer or by other appropriate assessment

Corequisite(s): None

Pre- or Corequiste(s): None

Consent of Instructor: ☒ Yes ☐ No

Delivery Method:

☒ **Lecture**	**3 Contact Hours**	**(1 contact = 1 credit hour)**
☐ **Seminar**	**0 Contact Hours**	**(1 contact = 1 credit hour)**
☐ **Lab**	**0 Contact Hours**	**(2-3 contact = 1 credit hour)**
☐ **Clinical**	**0 Contact Hours**	**(3 contact = 1 credit hour)**
☒ **Online**		
☒ **Blended**		
☒ **Virtual Class Meeting (VCM)**		

Offered: ☒ **Fall** ☒ **Spring** ☒ **Summer**

CATALOG DESCRIPTION and IAI NUMBER (if applicable):
This course is for students planning to continue on a Non-STEM path for degree completion. (For those pursuing a STEM path, this is the first course in a 2-semester developmental algebra sequence.) Topics of study include: whole numbers, fractions, decimal numerals, percents, ratios and proportions, integers, algebraic expressions, linear equations & inequalities, linear equations in two variables, and square roots &

Pythagorean Theorem. The grade in this course is not computed in G.P.A. or applicable to any degree or certificate program for graduation. This course is a prerequisite for MTH-0920, MTH-1000, or MTH-1008.

ACCREDITATION STATEMENTS AND COURSE NOTES:
Successful completion requires a C or better in the course.

COURSE TOPICS AND CONTENT REQUIREMENTS:

I. Fractions
   a. Least Common Multiple
   b. Greatest Common Factor
   c. Equivalency
   d. Computation
   e. Ordering
   f. Applications

II. Decimals
   a. Place Value
   b. Rounding
   c. Computation
   d. Equivalency to fraction and percent form
   e. Ordering
   f. Applications

III. Ratios & Proportion
   a. Unit rate
   b. Solve Proportions
   c. Applications

IV. Percents
   a. Computation
   b. Percent increase/decrease
   c. Simple Interest
   d. Discount
   e. Sales tax
   f. Commission

V. Signed Numbers
   a. Ordering
   b. Absolute value
   c. Computation
   d. Properties
   e. Order of operations
   f. Algebraic expressions

VI. Solving Linear Equations
   a. Solve equations
   b. Applications
   c. Solve formulas
   d. Translate sentences to equations

VII. Linear Inequalities
   a. Solve inequalities

b. Applications
c. Interval notation
d. Graphing solutions on a number line

VIII. Cartesian Coordinate System
a. Find ordered pair solutions
b. Graph ordered pairs

IX. Graphing Linear Equations
a. Plotting points
b. Slope-intercept method
c. Slope
d. Parallel & Perpendicular lines

X. Writing Equations of Lines
a. Using 2 points
b. Using slope and a point
c. Writing equations of parallel & perpendicular lines

XI. Square Roots
a. Perfect squares
b. Approximate square roots
c. Pythagorean Theorem

INSTRUCTIONAL METHODS:

- Lectures
- Small group/one-on-one discussion
- Class participation and activities
- Computer assignments (homework, section videos, examples, etc.)
- Quizzes
- Unit Tests

EVALUATION OF STUDENT ACHIEVEMENT:

- Homework assignments
- Class participation and activities
- Quizzes
- Chapter tests
- Comprehensive final exam
- Computer assignments
- Conferences

INSTRUCTIONAL MATERIALS:

Textbooks

Student Access Kit for ALEKS or MyMathLab

Textbook: Developmental Mathematics (Miller/O'Neill/Hyde 1st edition, McGraw-Hill, 2018)

Resources

- Computer
- Scientific calculator
- Links to course-related videos and materials

LEARNING OUTCOMES AND GOALS:

Institutional Learning Outcomes

☐ 1) Communication – to communicate effectively;
☒ 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;
☐ 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
☐ 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies

Upon completion of the course, the student will be able to:

1. Demonstrate a working knowledge of factions
    1.1. Find the least common multiple of 2 or 3 numbers.
    1.2. Find the greatest common factor of 2 or 3 numbers.
    1.3. Write fractions to represent parts of units.
    1.4. Convert between improper fraction and mixed number notation.
    1.5. Write equivalent fractions.
    1.6. Reduce a fraction to lowest terms.
    1.7. Add, subtract, multiply and divide two or more fractions and/or mixed numbers.
    1.8. Identify the order relationship between 2 or more fractions.
    1.9. Solve real-world problems involving fractions.
2. Demonstrate a working knowledge of decimals
    2.1. Write decimals in standard form and in words.
    2.2. Identify the place value of any digit of a decimal number.
    2.3. Round a decimal to a given place value.
    2.4. Add, subtract, multiply or divide two or more decimal numbers.
    2.5. Convert between decimal notation and fraction/mixed number notation.
    2.6. Identify the order relationship between 2 decimals or a fraction and a decimal.
    2.7. Solve real-world problems involving decimals.
3. Demonstrate a working knowledge of ratios and proportions
    3.1. Write a ratio of quantities in simplest form.
    3.2. Find rates and unit rates.
    3.3. Determine whether a given proportion is true or false.
    3.4. Solve proportions.
    3.5. Use proportions to solve real-world problems.
4. Demonstrate a working knowledge of percents
    4.1. Write a percent as a fraction or decimal.
    4.2. Find the amount when the percent and base are given.
    4.3. Find the percent when the base and amount are given.
    4.4. Find the base when the percent and amount are given.
    4.5. Solve percent problems using proportions.
    4.6. Solve real-world problems involving percent.

5. Demonstrate a working knowledge of signed numbers and perform operations with them.
   5.1. Find the additive inverse of a number.
   5.2. Determine the order of signed numbers.
   5.3. Find the absolute value of a number.
   5.4. Add, subtract, multiply, and divide signed numbers.
   5.5. Identify and use the properties of real numbers: commutative, associative, identity, inverse and distributive.
   5.6. Use the rules for order of operations to evaluate expressions.
   5.7. Evaluate a variable expression for specific values.
6. Demonstrate a working knowledge of basic equation solving
   6.1. Determine if a number is a solution to equations.
   6.2. Solve equations using the addition property.
   6.3. Solve equations using the multiplication property.
   6.4. Solve multi-step equations.
   6.5. Determine whether an equation is a conditional, an identity or a contradiction.
   6.6. Solve formulas.
   6.7. Translate sentences into equations and solve them.
   6.8. Solve real-world application problems using equations.
7. Demonstrate a working knowledge of solving linear inequalities.
   7.1. Determine if a number is a solution to an inequality
   7.2. Solve inequalities using the addition property.
   7.3. Solve inequalities using the multiplication property.
   7.4. Solve multi-step inequalities.
   7.5. Represent solutions to inequalities in interval and graph forms.
   7.6. Translate sentences into inequalities and solve them.
   7.7. Solve real-world application problems using inequalities.
8. Demonstrate a working knowledge of the Cartesian coordinate system.
   8.1.Find ordered pairs that satisfy a given equation.
   8.2.Decide whether a given ordered pair is a solution of a given equation.
   8.3. Graph ordered pairs.
9. Demonstrate the skills needed to graph linear equations.
   9.1. Graph linear equations by plotting points
   9.2. Graph linear equations by the intercept method.
   9.3. Find the slope of a line.
   9.4. Graph linear equations by using the slope.
   9.5. Determine if lines are parallel, perpendicular, or neither.
10. Demonstrate the skills needed to write the equation of a line.
   10.1.Write the equation of a line given the slope and one point.
   10.2.Write the equation of a line given two points.
   10.3.Write the equation of a line parallel to a given line.
   10.4.Write the equation of a line perpendicular to a given line.
11. Demonstrate the skills need to simplify basic square roots.
   11.1.Find the square roots of perfect squares.
   11.2.Approximate square roots using a calculator.
   11.3.Use the Pythagorean Theorem to find the length of any side of a right triangle.
   11.4.Apply the Pythagorean Theorem to real-world applications.