



ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences & Business

COURSE: MTH 0910 Foundations of Algebra

Date: Spring 2021

Credit Hours: 3

Prerequisite(s): Appropriate score on Accuplacer

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 (VCM)
 Blended

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

IAI Equivalent – **Only for Transfer Courses**–go to <http://www.itransfer.org>:

CATALOG DESCRIPTION:

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. This course is offered in an individualized lab format in the Math Learning Center. 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.

GENERAL EDUCATION GOALS ADDRESSED

[See last page for Course Competency/Assessment Methods Matrix.]

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

[Choose up to three goals that will be formally assessed in this course.]

- To apply analytical and problem solving skills to personal, social, and professional issues and situations.
- To communicate successfully, both orally and in writing, to a variety of audiences.
- To construct a critical awareness of and appreciate diversity.
- To understand and use technology effectively and to understand its impact on the individual and society.
- To develop interpersonal capacity.
- To recognize what it means to act ethically and responsibly as an individual and as a member of society.
- To recognize what it means to develop and maintain a healthy lifestyle in terms of mind, body, and spirit.
- To connect learning to life.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals. See last page for more information.]

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

1. Demonstrate a working knowledge of fractions
 - 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.

MAPPING LEARNING OUTCOMES TO GENERAL EDUCATION GOALS

[For each of the goals selected above, indicate which outcomes align with the goal.]

Goals	Outcomes
First Goal	
#1: <i>Critical Thinking</i>	<ul style="list-style-type: none"> • Solve real-word problems involving fractions. • Solve real-world problems involving decimals. • Determine whether a given proportion is true or false. • Use proportions to solve real-world problems. • Solve real-world problems involving percent. • Determine whether an equation is a conditional, an identity or a contradiction. • Translate sentences into equations and solve them • Solve real-world application problems using equations. • Translate sentences into inequalities and solve them. • Solve real-world application problems using inequalities. • Determine if lines are parallel, perpendicular, or neither. • Write the equation of a line given the slope and one point. • Write the equation of a line given two points. • Write the equation of a line parallel to a given line. • Write the equation of a line perpendicular to a given line. • Apply the Pythagorean Theorem to real-world applications.
Second Goal	
#8: <i>To connect learning to life.</i>	<ul style="list-style-type: none"> • Solve real-word problems involving fractions. • Solve real-world problems involving decimals. • Use proportions to solve real-world problems. • Solve real-world problems involving percent • Solve real-world application problems using equations. • Solve real-world application problems using inequalities. • Apply the Pythagorean Theorem to real-world applications.

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:

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

INSTRUCTIONAL MATERIALS:

1. Student Access Kit for ALEKS
2. Textbook: Developmental Mathematics (Miller/O'Neill/Hyde 1st edition, McGraw-Hill, 2018)
3. Computer
4. Scientific calculator

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

- A= 91 – 100
- B= 82 – 90.9
- C= 74.5 – 81.9
- D= 64.5 – 74.4
- F= 0 – 64.4

1. Homework assignments
2. Class participation and activities
3. Quizzes (Quizzes are 20% of the overall grade)
4. Chapter tests – 100 points each ((Tests are 60% of the overall grade)
A minimum grade of 75% is required on each chapter test.
5. Comprehensive final exam – 100 points
6. Computer assignments
7. Conferences

OTHER REFERENCES

Beginning & Intermediate Algebra, 6th Edition, by M. Lial, J. Hornsby, T. McGinnis
Prealgebra, 2nd Edition, by J. Miller, M. O'Neill, N. Hyde

Course Competency/Assessment Methods Matrix

MTH 0910		Assessment Options																																
For each competency/outcome place an "X" below the method of assessment to be used.	Assessment of Student Learning	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Computer Assignment		
	Direct/ Indirect	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D							D	
1.1 Find the least common multiple of 2 or 3 numbers								X	X																								X	
1.2 Find the greatest common factor of 2 or 3 numbers								X	X																									X
1.3 Write fractions to represent parts of units								X	X																									X
1.4 Convert between improper fraction and mixed number notation								X	X																									X
1.5 Write equivalent fractions								X	X																									X
1.6 Reduce a fraction to lowest terms								X	X																									X
1.7 Add, subtract, multiply and divide 2 or more fractions and/or mixed numbers								X	X																									X
1.8 Identify the order relationship between 2 or more fractions								X	X																									X

7.2 Solve inequalities using the addition property									X	X																												X
7.3 Solve inequalities using the multiplication property									X	X																												X
7.4 Solve multi-step inequalities									X	X																												X
7.5 Represent solutions to inequalities in interval and graph forms									X	X																												X
7.6 Translate sentences into inequalities and solve them									X	X																												X
7.7 Solve real-world application problems using inequalities									X	X																												X
8.1 Find ordered pairs that satisfy a given equation									X	X																												X
8.2 Decide whether a given ordered pair is a solution of a given equation									X	X																												X
8.3 Graph ordered pairs									X	X																												X
9.1 Graph linear equations by plotting points									X	X																												X
9.2 graph linear equations by the intercept method									X	X																												X
9.3 Find the slope of a line									X	X																												X
9.4 Graph linear equations by using the slope									X	X																												X
9.5 Determine if lines are parallel, perpendicular, or neither									X	X																												×
10.1 Write the equation of a line given the slope and one point									X	X																												X
10.2 Write the equation of a line given two points									X	X																												X
10.3 Write the equation of a line parallel to a given line									X	X																												X

10.4 Write the equation of a line perpendicular to a given line									X	X																											X
11.1 Find the square roots of perfect squares									X	X																											X
11.2 Approximate square roots using a calculator									X	X																											X
11.3 Use the Pythagorean Theorem to find the length of any side of a right triangle									X	X																											X
11.4 Apply the Pythagorean Theorem to real-world applications									X	X																											X