



# ILLINOIS VALLEY COMMUNITY COLLEGE

## COURSE OUTLINE

**DIVISION: Natural Sciences and Business**

**COURSE: MTH 0920 Intermediate Algebra – Foundations of STEM Mathematics**

Date: Spring 2022

Credit Hours: 3

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

Prerequisite(s): MTH 0910 with a C or better

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 Corequisite(s): None

Consent of Instructor:  Yes  No

Delivery Method:	<input checked="" type="checkbox"/> <b>Lecture</b>	<b>3 Contact Hours (1 contact = 1 credit hour)</b>
	<input type="checkbox"/> <b>Seminar</b>	<b>0 Contact Hours (1 contact = 1 credit hour)</b>
	<input type="checkbox"/> <b>Lab</b>	<b>0 Contact Hours (2-3 contact = 1 credit hour)</b>
	<input type="checkbox"/> <b>Clinical</b>	<b>0 Contact Hours (3 contact = 1 credit hour)</b>
	<input checked="" type="checkbox"/> <b>Online</b>	
	<input checked="" type="checkbox"/> <b>Blended</b>	
	<input checked="" type="checkbox"/> <b>Virtual Class Meeting (VCM)</b>	

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

**CATALOG DESCRIPTION and IAI NUMBER (if applicable):** This course is for students planning to continue on a STEM path for degree completion. Topics of study include: systems of linear equations in 2 & 3 variables, relations & functions, compound inequalities, absolute value equations/inequalities, polynomials, factoring, rational expressions/equations; exponents, radicals, and quadratic equations & functions. 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-1003, MTH-1004, MTH-1005, MTH-1009 or MTH-1010.

**ACCREDITATION STATEMENTS AND COURSE NOTES:**

Successful completion requires a C or better in the course.

**COURSE TOPICS AND CONTENT REQUIREMENTS:**

- I. Systems of equations
  - a. Solve by graphing
  - b. Solve by addition
  - c. Solve by substitution
  - d. Applications
- II. Relations & functions
  - a. Relations
  - b. Functions
  - c. Evaluate
  - d. Graphing
  - e. Operations with functions
  - f. Composition functions
  - g. Applications
- III. Compound & Absolute Value equations/inequalities
  - a. Compound inequalities
  - b. Absolute value equations
  - c. Absolute value inequalities
  - d. Graph inequalities in 2 variables
- IV. Exponents & polynomials
  - a. Add & subtract polynomials
  - b. Multiply polynomials
  - c. Divide polynomials
  - d. Zero exponent
  - e. Negative exponents
  - f. Scientific notation
  - g. Product & quotient rules for exponents
  - h. Power rule for exponents
- V. Factoring polynomials
  - a. Greatest common factor
  - b. Factor by grouping
  - c. Trinomials
  - d. Special products
  - e. Multi-step factoring
  - f. Solve equations by factoring
  - g. Applications
- VI. Rational expressions/equations
  - a. Simplifying rational expressions
  - b. Multiply & divide rational expressions
  - c. Add and subtract rational expressions
  - d. Solve equations containing rational expressions

- e. Applications
- VII. Roots & radicals
  - a. Rational exponents
  - b. Simplify radicals
  - c. Operations with radical expressions
  - d. Solve radical equations
  - e. Complex numbers
  - f. Operations with complex numbers
- VIII. Quadratic equations & functions
  - a. Square root method
  - b. Quadratic formula
  - c. Applications
  - d. Graphing quadratics

### **INSTRUCTIONAL METHODS:**

Lectures

Small group/one-on-one discussion

Discussion boards

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 exams

Computer assignments

Conferences

### **INSTRUCTIONAL MATERIALS:**

#### **Textbooks (E-text)**

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

Student Access Kit for ALEKS or MyMathLab

#### **Resources**

None

### **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

1. Demonstrate the skills needed to solve systems of equations in 2 and 3 variables.
  - 1.1. Solve linear systems by graphing, addition or substitution.
  - 1.2. Determine that a linear system has no solution.
  - 1.3. Determine if a linear system has an infinite number of solutions.
  - 1.4. Use linear systems to solve real-world problems
2. Demonstrate a working knowledge of polynomials.
  - 2.1. Add and subtract polynomials.
  - 2.2. Multiply two or more polynomials.
  - 2.3. Special products.
  - 2.4. Divide polynomials.
3. Demonstrate a working knowledge of the rules of exponents.
  3. 1 Evaluate expressions raised to zero power.
  3. 2 Evaluate expressions raised to negative powers.
  3. 3 Convert between scientific and standard notation.
  3. 4 Use product and quotient rules to evaluate expressions containing exponents.
  3. 5 Use the power rules to evaluate expressions containing exponents.
4. Demonstrate the ability to graph linear equations.
  4. 1 Graph points on a Cartesian coordinate system.
  4. 2 Graph linear equations in two variables.
  4. 3 Determine the slope of a line.
  4. 4 Determine whether two lines are parallel, perpendicular, or neither.
5. Demonstrate the ability to write equations of lines.
  5. 1 Determine the equation of a line given two points on the line.
  5. 2 Determine the equation of a line given the slope and one point on the line.
  5. 3 Determine the equation of a line parallel to a given line.
  5. 4 Determine the equation of a line perpendicular to a given line.
6. Demonstrate the ability to factor polynomials.
  6. 1 Factor out the greatest common factor from an expression.
  6. 2 Factor by grouping.
  6. 3 Factor the difference of two squares.
  6. 4 Factor the sum or difference of two cubes.
  6. 5 Factor trinomials.
  6. 6 Factor expressions that contain combinations of the above types of factoring.
  6. 7 Solve quadratic equations by factoring.
7. Demonstrate the ability to manipulate rational expressions and solve equations that contain rational expressions.
  7. 1 Identify values for which a rational expression is undefined.
  7. 2 Simplify rational expressions.
  7. 3 Multiply and divide rational expressions.
  7. 4 Add and subtract rational expressions.
  7. 5 Solve equations containing rational expressions.
  7. 6 Solve real-world problems involving rational expressions.
8. Demonstrate a working knowledge of functions.
  8. 1 Define and identify relation and function.
  8. 2 Identify domain and range.

- 8. 3 Evaluate functions.
- 8. 4 Write linear functions.
- 8. 5 Graph linear functions.
- 8. 6 Operations and composition of functions.
- 9. Demonstrate the ability to solve compound inequalities and absolute value equations and inequalities.
  - 9. 1 Solve compound inequalities.
  - 9. 2 Solve absolute value equations and inequalities.
  - 9. 3 Graph linear inequalities in two variables.
- 10. Demonstrate a working knowledge of rational exponents, radicals, and complex numbers.
  - 10. 1 Find roots.
  - 10. 2 Use fractional exponents to simplify expressions.
  - 10. 3 Simplify radicals.
  - 10. 4 Perform operations with radical expressions.
  - 10. 5 Solve radical equations.
  - 10. 6 Write complex numbers using  $i$  notation.
  - 10. 7 Add, subtract, multiply, and divide complex numbers.
- 11. Demonstrate the ability to solve quadratic equations.
  - 11. 1 Solve quadratic equations by the square root method.
  - 11. 2 Solve quadratic equations by the quadratic formula.
  - 11. 3 Solve real-world problems using quadratic equation.
  - 11. 4 Graph quadratic equations.