Middlesex Community College
COURSE OUTLINE

MAT	095	Elementary Algebra Foundations	3
Dept. Abbr.	**Course No.**	**Course Title**	**Credits**

Course Description

This Intensive-Level developmental course does not meet graduation requirements.
MAT 095 is an introductory course in the basics of algebra. This course includes a study of the basic properties and theorems of rational numbers; expressions and equations with polynomials, rational and radical expressions, and integer exponents; linear equations in one and two variables; systems of linear equations in two variables; functions; and applications in geometry and algebra. Credit does not count toward meeting degree requirements. .

Prerequisite:
*MAT*075 with "C" or better OR MAT*085 with a "D+ or C-" OR MAT*095I with a "D+ or C-" OR Math placement.*

General Objectives of the Course

(Statement identifying educational goals of the course)

This course provides a solid foundation in the basics of algebra to prepare the student for the next course in algebra. It also includes the following Combined Mathematics Standards/Quantitative Literacy Outcomes:

1) Exhibit perseverance, ability, and confidence to use mathematics to make sense of and solve problems
2) Perform mental arithmetic and use proportional reasoning
3) Analyze problem situations through numerical, graphical, symbolic and/or verbal approaches and modeling
4) Use appropriate tools strategically in solving problems
5) Recognize patterns, draw inferences
6) Communicate and interpret results
7) Demonstrate an understanding and appreciation of the usefulness of mathematics in everyday life

Unit No	***Instructional Unit***	***Specific Objectives of Instructional Unit*** (The specific objectives reflect the behavioral outcomes, which include what the student will be able to do at the completion of the unit. Evaluation is then to be based on the student's accomplishment of these objectives. Assume that each statement is prefixed with "The student will be able to".)
1.	Real Numbers	1. Identify and distinguish between rational and irrational numbers. 2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. (e.g., π^2, $\sqrt{8}$) 3. Use square root symbols to represent solutions to equations of the form $x^2 = p$, where *p* is a positive rational number 4. Evaluate square roots of perfect squares 5. Demonstrate understanding that numbers such as $\sqrt{2}$ are irrational 6. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two dimensions. 7. Interpret parts of an expression, such as terms, factors, and coefficients and evaluate expressions for a given replacement value(s) 8.
2.	Linear equations and inequalities in one variable	1. Solve linear equations and inequalities in one variable. 2. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. 3. Manipulate formulas to highlight a quantity of interest, using the same reasoning as in solving equations. 4. Construct and interpret equations as two expressions set equal to each other. 5. Create linear equations and inequalities in one variable and use them to solve real world applications. 6. Recognize examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. 7. Apply geometrical formulas for two and three-dimensional figures such as rectangles, circles, rectangular solids, cylinders, spheres, etc.

3.	Linear equations in two variables	1. Interpret the rate and unit rate as the slope of the graph 2. Derive the equation $y = mx + b$ for a line intercepting the vertical axis at *b* and having a slope of *m*. 3. Identify parallel and perpendicular lines based on their slopes 4. Graph a linear equation in two variables 5. Construct a linear equation to model a linear relationship between two quantities. Determine and interpret the rate of change and initial value from a description of a relationship or from two values, including reading these from a table or graph (x, y) 6. Construct linear equations given a graph, a description of a relationship, or two input-output pairs (include reading these from a table) using point-slope form and slope-intercept form
4.	Systems of linear equations;	1. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs 2. Solve systems of two linear equations in two variables algebraically (using both substitution and addition methods), graphically (by hand and/or technology), Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be and 5 and 6. 3. Recognize systems of linear equations with one solution, infinitely many solutions, or no solutions 4. Solve real-world problems leading to two linear equations in two variables
5.	Exponents and Polynomials	1. Know and apply the properties of exponents. 2. Identify polynomials among algebraic expressions. 3. Add, subtract, and multiply polynomials. 4. Divide polynomials by a monomial. 5. Know and apply the properties of integer exponents to generate equivalent numerical expressions. (e.g. $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$) 6. Express very large or very small quantities in scientific notation. 7. Perform operations with numbers expressed in scientific notation.

6.	Functions	1. Understand that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output 2. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line. 3. Use functions to model linear relationships between quantities 4. Use function notation. Evaluate functions for inputs in their domains 5. Graph linear functions and show intercepts 6. Recognize that linear functions have a constant rate of change and interpret the rate of change in the context of the problem