MATH 117
College Algebra in Context I
<u>Course Objectives</u>

Unit 1: Linear Functions
1.1 Generalize linear equations from tables and graphs
1.1.1   Given a verbal description, write a linear equation.
1.1.2   Given a table write a linear equation.
1.1.3   Given a graph write a linear equation.
1.2 Use function notation
1.2.1   Define and identify functions.
1.2.2   Evaluate and graph functions.
1.2.3   Interpret functions from their graphs.
1.3 Determine the equation of the line given conditions
1.3.1   Use slope-intercept to determine the equation of the line.
1.3.2   Use point-slope to determine the equation of the line.
1.3.3   Find equations of parallel and perpendicular lines.
1.4 Solving equations and inequalities
1.4.1   Solve linear equations.
1.4.2   Solve linear inequalities.
1.4.3   Solve literal equations.
1.5 Model with linear functions
1.5.1   Determine if a data set is linear.
1.5.2   Given a data set determine a trend line and make predictions.

Unit 2: Absolute Value and Piecewise-Defined Functions
2.1 Graph absolute functions
2.1.1   Given an absolute value function, sketch its graph.
2.1.2   Given the graph of an absolute value function, determine its equation.
2.2 Graph piecewise-defined functions
2.2.1   Graph and interpret piecewise-defined functions.
2.2.2   Given a piecewise-defined function determine the rules and domains.
2.3 Solve absolute value equations
2.3.1   Develop and apply methods to solve absolute value equations of the form $|u| = a$ where a>0.
2.3.2   Develop and apply methods to solve absolute value equations of the form $|u| = v$, where v is an expression in x.
2.4 Solve absolute value inequalities
2.4.1   Develop and apply methods to solve absolute value inequalities of the form $|u| < a$, where a>0.
2.4.2   Develop and apply methods to solve absolute value inequalities of the form $|u| > a$, where a>0.
2.5 Model with absolute value and piecewise-defined functions
2.5.1   Model and interpret situations with absolute value functions.
2.5.2   Model and interpret situations with piecewise-defined functions.

Unit 3: Quadratic Relations and Functions

3.1 Graph quadratic functions
3.1.1   Given the graph of a quadratic function, determine its equation.
3.1.2   Write a quadratic function in vertex form and sketch a graph.
3.1.3   Solve quadratic maximum/minimum applications.
3.2 Solve quadratic equations
3.2.1   Solve quadratic equations by factoring and using technology.
3.2.2   Solve quadratic equations by completing the square and with the quadratic formula.
3.3   Solve quadratic inequalities
3.3.1   Develop and apply methods to solve quadratic inequalities.
3.3.2   Solve quadratic inequality applications.
3.4   Graph circles and ellipses
3.4.1   Determine the distance between two points.
3.4.2   Graph and interpret graphs of the form $(x-h)^2 + (y-k)^2 = r^2$.

3.4.3   Graph and interpret graphs of the form $\dfrac{(x-h)^2}{a^2} + \dfrac{(y-k)^2}{b^2} = 1$.

3.5   Model with quadratic functions and relations
3.5.1   Solve applications.
3.5.2   Model and interpret situations with quadratic functions.

Unit 4: Systems of Equations and Inequalities

4.1 Solve systems of linear equations
4.1.1   Solve systems using substitution.
4.1.2   Solve systems using elimination.
4.2 Solve systems using matrices
4.2.1   Solve two variable systems using row reduction.
4.2.2   Solve multi-variable systems using matrices.
4.3 Solve systems of linear inequalities
4.3.1   Solve linear inequalities.
4.3.2   Solve systems of linear inequalities.
4.4 Solve systems with other functions and relations
4.4.1   Solve nonlinear systems of equations.
4.4.2   Solve nonlinear systems of inequalities.
4.5 Model with systems
4.5.1   Model with systems I.
4.5.2   Model with systems II.