Math 100: INTERMEDIATE ALGEBRA   (4-0-4)
November 2, 2015

Catalog Description: Fundamentals of algebra, linear and quadratic equations, systems of equations, inequalities, functions and graphs, radicals and exponents, and stated problems. (May not be used for graduation credit.)

Prerequisite: MATH 70 with grade C or better, placement or equivalent.

Course Objectives: After completing this course, students will be able to

1. Evaluate, simplify and factor algebraic expressions.

2. Solve equations and systems of equations.

3. Graph functions and answer questions about functions.

4. Apply mathematics to solve problems.

Learning Outcomes and Performance Criteria

1. Evaluate, simplify and factor algebraic expressions.
   Criteria:

   (a) Evaluate algebraic expressions for given numerical values.
   (b) Simplify expressions containing exponents, including rational exponents.
   (c) Factor expressions:
       i. quadratic expressions
       ii. higher degree that reduce to quadratics or have quadratic form
       iii. third degree, using factoring by grouping
   (d) Simplify rational expressions. Identify values for which a rational expression is undefined.
   (e) Add, subtract, multiply and divide irrational numbers.
   (f) Add, subtract, multiply and divide rational expressions.
   (g) Add, subtract, multiply and divide complex numbers, giving the result in $a + bi$ form.

   Additional Criteria:

   (h) Factor sums and differences of cubes.

2. Solve equations and systems of equations.
   Criteria:

   (a) Solve linear equations.
   (b) Solve linear equations containing absolute values.
   (c) Solve polynomial equations by factoring.
   (d) Use the quadratic formula to find both simplified exact solutions and approximate solutions to quadratic equations.
   (e) Solve quadratic equations of the form by completing the square.

(f) Find complex solutions to a quadratic equation.

(g) Solve a formula for a variable or parameter.

(h) Solve equations containing rational expressions.

(i) Solve equations containing radical expressions.

(j) Solve a system of two equations in two unknowns by both the addition and substitution methods.

3. Graph functions and answer questions about functions.

Criteria:

(a) Evaluate a function for a numerical value.

(b) Find all values of x so that $f(x)$ is a given numerical value (algebraically and graphically).

(c) Find the composition of two functions.

(d) Identify the graphs of $y = \frac{1}{x}$, $\sqrt{x}$, $|x|$, x^2, x^3.

(e) Graph a line.

(f) Determine the equation of a line from

    i. a graph

    ii. a slope and y-intercept

    iii. two points

    iv. a point and a slope

(g) Graph a quadratic function by plotting points.

(h) Determine the vertex of a parabola from a graph and an equation.

(i) Find the distance between two points on the number line or in the Cartesian plane.

(j) Obtain the intercepts of a function from a graph and an equation.

Additional Criteria:

(k) Graph a simple relation.

(l) Graph the solution to a system of two linear inequalities.

(m) Obtain the intercepts of a relation from a graph and an equation.

4. Apply mathematics to solve problems.

Criteria:

(a) Write an equation whose solution solves a word problem.

(b) Solve an applied problem using a given quadratic function (e.g. height of a projectile, revenue/profit model).

(c) Solve an applied problem using a system of linear equations.