

M: Course Objectives / Learning Outcomes

The aims of the course are for students to:

1. Basic Algebraic Skills
 - a. perform operations with real numbers including absolute value and exponential notation
 - b. simplify expressions using rules for order of operations and properties of exponents
 - c. translate common language into algebraic expressions
 - d. evaluate algebraic expressions by substitution
 - e. simplify algebraic expressions with nested parentheses
2. Solving Linear Equations and Inequalities
 - a. solve first degree/linear equations in one variable
 - b. solve simple formulas for a given variable
 - c. solve and graph linear inequalities in one variable
 - d. write interval notation for the solution set or graph of an inequality
 - e. use linear equations, formulas and linear inequalities to solve applied problems
 - f. find the intersection of two sets
 - g. solve and graph compound inequalities (conjunctions only)
3. Graphing, Relations, and Functions
 - a. write linear equations in slope intercept form
 - b. graph linear equations and non-linear equations using a table of values
 - c. graph linear equations using the y-intercept and slope and using x- and y-intercepts
 - d. graph horizontal and vertical lines
 - e. find the slope of a line given two points on the line
 - f. find the equation of a line given graphic data: the slope and y-intercept, the slope and one point, or two points on the line
 - g. determine whether a pair of lines is parallel
 - h. find the equation of a line parallel to a given line and through a given point
 - i. use the definition of function and the vertical-line test to distinguish between functions and non-functions
 - j. use and interpret function notation to evaluate functions for given x-values and find x-values for given function values
 - k. determine the domain and range of a function
 - l. graph linear functions and non-linear functions such as quadratic, cubic, square root, reciprocal, exponential and absolute value functions
 - m. graph linear inequalities in two variables
 - n. analyze functions to determine line of symmetry, vertices, asymptotes, and intercepts
 - o. understand and demonstrate transformations in graphs resulting from the following changes in the defining equation: translation and dilation
 - p. use a graphing calculator or other appropriate technology to graph equations
 - q. identify an appropriate graph for a given relation
 - r. develop a model function from a given graph or set of data
4. Systems of Linear Equations and Inequalities
 - a. solve systems of linear equations in two variables by graphing, substitution and elimination methods
 - b. determine if a system of equations will have one/no solution or an infinite number of solutions
 - c. use systems of equations to solve applied problems
5. Polynomials and Polynomial Functions
 - a. determine the degree of a polynomial
 - b. distinguish between monomials, binomials, trinomials, and other polynomials
 - c. add, subtract, multiply polynomials
 - d. divide polynomials by monomials
 - e. factor polynomials using an appropriate strategy or a combination of techniques: common factors, difference of squares, perfect square trinomials, general trinomials or grouping
 - f. solve polynomial equations using the principle of zero products
 - g. solve applied problems using polynomial equations/functions

6. Rational Expressions and Equations and Variation
 - a. identify situations and find values for which a rational expression will be undefined
 - b. simplify rational expressions
 - c. add, subtract, multiply and divide rational expressions
 - d. solve rational equations and check
 - e. solve formulas involving rational expressions for a given variable
 - f. solve applied problems that can be modeled with rational equations
 - g. simplify complex fractions
 - h. express variations in the form of equations (direct, inverse, joint, combined)
 - i. solve problems involving direct, inverse, joint and combined variation

7. Radical Expressions and Equations
 - a. write radicals as powers with rational exponents and vice versa
 - b. use rational exponents to simplify radical expressions
 - c. simplify, add, subtract, multiply and divide radical expressions (numeric or algebraic)
 - d. rationalize denominators in fractional expressions containing radicals
 - e. solve equations involving radical expressions or powers with rational exponents and check for extraneous roots
 - f. solve formulas involving powers and square roots for a given variable
 - g. solve applied problems which can be modeled by radical equations, and determine if solutions are reasonable given the context of the problem

8. Quadratic Equations and Quadratic Functions
 - a. solve quadratic equations by factoring, principle of square roots and the quadratic formula
 - b. solve rational and radical equations reducible to a quadratic pattern and check that answers are reasonable
 - c. solve selected polynomial equations that can be factored simplifying to linear and/or quadratic factors
 - d. graph quadratic functions of the form $f(x) = a(x-h)^2 + k$ and demonstrate translations, reflections and stretching/shrinking resulting from changes in the function equation
 - e. find the vertex, line of symmetry, minimum or maximum values, x- and y-intercepts, domain and range, given the function $f(x) = a(x-h)^2 + k$
 - f. rewrite $f(x) = ax^2 + bx + c$ as $f(x) = a(x-h)^2 + k$ by completing the square
 - g. solve problems that can be modeled using quadratic equations including maximum and minimum problems
 - h. use a graphing calculator or other appropriate technology to graph and solve quadratic equations
 - i. solve quadratic inequalities by graphing

9. Trigonometry
 - a. label the sides of a right triangle with respect to a given angle
 - b. determine sine, cosine, and tangent ratios of an angle in a right triangle using the side lengths
 - c. use a scientific calculator to find the trigonometric value for a given angle and to find an angle given its trigonometric value
 - d. solve right triangles and applied problems using the basic trigonometric ratios, the Pythagorean theorem, and sum of the angles (180°)
 - e. use the Law of Sines and the Law of Cosines to solve non-right (oblique) triangles and applied problems

N: Course Content:

The course consists of the following topics:

1. The Real Numbers
 - a. the natural numbers
 - b. quotients of natural numbers
 - c. the integers and rational numbers
 - d. from rationals to irrationals
 - e. radical arithmetic
 - f. rationalizing the denominator
 - g. the real numbers
 - h. solving radical equations

2. Powers
 - a. powers and exponents
 - b. exponent laws for positive integral exponents
 - c. extending the exponent laws for integral exponents
 - d. rational exponents
 - e. simplifying expressions using exponent laws
 - f. solving equations involving exponents

3. Polynomials and Rational Expressions
 - a. operations with monomials
 - b. operations with polynomials
 - c. factoring trinomials
 - d. factoring a difference of squares and a trinomial square
 - e. factoring by grouping
 - f. simplifying rational expressions
 - g. multiplying and dividing rational expressions
 - h. adding and subtracting rational expressions

4. Quadratic Equations
 - a. introduction to quadratic equations
 - b. solving quadratic equations by graphing: zeros of a polynomial
 - c. solving quadratic equations by factoring
 - d. solving quadratic equations using the quadratic formula
 - e. solving problems using quadratic equations

5. Functions
 - a. relations
 - b. functions
 - c. function notation
 - d. linear functions: direct variation
 - e. linear functions: partial variation
 - f. inverse variation
 - g. extending direct and inverse variation

6. Quadratic Functions
 - a. introduction to quadratic functions
 - b. comparing the graphs of $y = x^2$ and $y = x^2 + q$
 - c. comparing the graphs of $y = x^2$ and $y = (x - p)^2$
 - d. comparing the graphs of $y = x^2$ and $y = ax^2$
 - e. graphing $y = a(x - p)^2 + q$
 - f. graphing $y = ax^2 + bx + c$ by completing the square
 - g. minimum and maximum values of a quadratic function
 - h. minimum and maximum value problems

7. Transformations of Relations
 - a. some functions and their graphs
 - b. graphing $y = f(x) + q$
 - c. graphing $y = f(x - p)$
 - d. graphing $y = af(x)$
 - e. graphing $y = af(x - p) + q$
 - f. the inverse; the inverse of quadratic functions and restricting the domain
 - g. the equation of a circle; transforming the equation of a circle
 - h. the ellipse
 - i. quadratic inequalities in two variables

8. Trigonometry
 - a. the primary trigonometric ratios
 - b. solving right triangles
 - c. the cosine law and the sine law
 - d. solving oblique triangles

O: Methods of Instruction

A combination of different instructional methods will be used in order to balance instructional efficiency with individual student needs. Group instruction, individual assistance in lab tutorial or scheduled appointments and student-directed learning will be selected where appropriate and possible.

P: Textbooks and Materials to be Purchased by Students

Students are required to supply a three-ring binder, paper, pen, pencil and a scientific calculator with direct algebraic logic (D.A.L. or S.-V.P.A.M.).

Main textbooks will be available on loan from the library to registered students. A course pack for this course must be purchased from the bookstore.

Q: Means of Assessment

Attendance is a course requirement. The final grade may be UN if more than 30% of classes are missed or if less than 70% of items for evaluation are undertaken.

Evaluation will be based on examinations and assignments in accordance with college policy. Details regarding the number and weighting of individual components will be announced in a "Course Information" handout at the beginning of the semester.

Grades will be assigned as follows:

A+ 95-100%	B+ 80-84%	C+ 65-69%	P 50-54%
A 90-94%	B 75-79%	C 60-64%	F < 50%
A- 85-89%	B- 70-74%	C- 55-59%	

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

No

 Course Designer(s)

 Education Council / Curriculum Committee Representative

 Dean / Director

 Registrar