BROWARD COLLEGE
COURSE OUTLINE

Last Review: 01/23/2017   **Next Review:** 08/01/2021

COURSE TITLE: INTERMEDIATE ALGEBRA

COMMON COURSE NUMBER: MAT1033

EFFECTIVE TERM: Fall 2017

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(per 16 week term)

Lecture: 48	Lab:
Clinic:	Other:

College Placement Testing Requirements

Passing Placement Tests score(s) in the following area(s) is/are required:
- Math

Prerequisite

MAT0022C or MAT0028C or MAT0057 with a minimum grade of C; a qualifying placement score on the PERT, SAT, or ACT; or exemption from developmental education classes as per Florida State Senate Bill 1720.

Corequisite

None

Pre/Corequisite

None

COURSE DESCRIPTION: This is a course designed for students with strong arithmetic skills (without requiring a calculator) and an algebra background. This course will extend students' algebra skills to include solving systems of linear equations in two variables, factoring polynomials, performing operations on rational expressions, solving rational equations, solving quadratic equations with complex solutions and recognizing relationships between radical expressions and rational exponents. Problem solving involving real-life scenarios is an integral part of this course. In this course, students will enhance their problem-solving abilities and their ability to communicate concepts of algebra in the language of mathematics, both orally and in writing.

UNIT TITLES

1. Linear Equations in Two Variables: Algebra, Geometry, and Modeling
2. Systems of Linear Equations
3. Polynomial Expression Factoring
4. Rational Expressions & Equations
5. Radical Expressions
6. Complex Numbers
7. Quadratic Equations

EVALUATION:

Written Quizzes/Examinations,
Cumulative Final Examination

UNITS

Unit 1   Linear Equations in Two Variables: Algebra, Geometry, and Modeling

<u>General Outcome</u>

1.0 **The student shall be able to (1) write equations and sketch graphs of linear equations in two variables, given appropriate information, (2) model real-world scenarios using linear equations in two variables, and (3) graph linear equations in two variables.**

Specific Learning Outcomes

1.1 Explain what it means to be a solution to an equation in two variables.

1.2 Determine if a given ordered pair is a solution to an equation in two variables.

1.3 Solve appropriate word problems by modeling them with linear equations in two variables.

1.4 Define the terms "x- (or horizontal) intercept" and "y- (or vertical) intercept."

1.5 Sketch the graphs of linear equations in two variables given any two points.

1.6 Identify and determine the x- and y-intercepts of graphs of linear equations in two variables.

1.7 Define the term "slope."

1.8 Evaluate the slopes of horizontal, vertical, and diagonal lines given a graph, two points, or the equation of the line.

1.9 Interpret the practical meaning of linear slope in appropriate word problems.

1.10 Determine the equations of horizontal and vertical lines, given a graph, the slope and a point, or two points.

1.11 Determine the equation of lines, in "slope-intercept" form, "point-slope" form, and "standard" form, given the slope and a point or two points.

1.12 Sketch graphs of diagonal, horizontal, and vertical lines given the equation or other appropriate information (e.g. two points; the slope & a point).

1.13 Define the terms "parallel lines" and "perpendicular lines."

1.14 Explain the relationships between the slopes of parallel and perpendicular lines, and determine whether any pair of given linear equations in two variables represent parallel lines, perpendicular lines, or neither.

Unit 2 **Systems of Linear Equations**

General Outcome

2.0 **The student shall be able to solve systems of linear equations graphically and algebraically (using the methods of elimination and substitution), and solve word problems by modeling them with systems of linear equations.**

Specific Learning Outcomes

2.1 Explain what it means to be a solution to a system of linear equations.

2.2 Determine if a given ordered pair is a solution to a system of linear equations.

2.3 Define the terms "consistent system," "inconsistent system," "dependent system," and "independent system."

2.4 Determine graphically if a system of linear equations is consistent, inconsistent, or dependent.

2.5 Solve systems of linear equations by graphing.

2.6 Solve systems of linear equations using the elimination method (i.e. addition method).

2.7 Solve systems of linear equations using the substitution method.

2.8 Solve appropriate word problems by modeling them with systems of linear equations.

Unit 3 **Polynomial Expression Factoring**

General Outcome

3.0 **The student shall be able to factor polynomial expressions using a variety of methods.**

Specific Learning Outcomes

3.1   Factor the GCF of polynomials' terms.
3.2   Factor -1 from polynomials with negative leading coefficients.
3.3   Factor polynomial expressions by pairwise grouping.
3.4   Factor binomial expressions that are differences of perfect squares.
3.5   Factor binomial expressions that are sums and differences of perfect cubes.
3.6   Factor appropriate trinomial expressions into a product of binomials.
3.7   Factor perfect square trinomial expressions.
3.8   Define the term "prime polynomial."
3.9   Determine whether polynomial expressions are prime or factorable.

Unit 4   Rational Expressions & Equations

General Outcome

4.0   **The student shall be able to simplify rational expressions and solve rational equations.**

Specific Learning Outcomes

4.1   Define the term "rational expression."
4.2   Determine value(s) of the variable for which rational expressions are undefined.
4.3   Simplify rational expressions by canceling common monomial and binomial factors of the numerator and denominator.
4.4   Determine the least common denominator of rational expressions.
4.5   Add and subtract rational expressions with the same and with different denominators.
4.6   Multiply and divide rational expressions.
4.7   Simplify complex rational expressions with positive exponents only by rewriting as a multiplication problem.
4.8   Simplify complex rational expressions with positive exponents only using the LCD method.
4.9   Simplify complex fractions containing terms with negative exponents.
4.10   Solve rational equations.
4.11   Solve literal equations containing rational expressions.
4.12   Determine whether or not a solution to a rational equation is extraneous.

Unit 5   Radical Expressions

General Outcome

5.0   **The student shall be able to simplify, and perform operations on radical expressions, rationalize radical components of rational expressions, and convert between radical expressions and expressions with a rational exponent.**

Specific Learning Outcomes

5.1   Define the terms "square root," "principal square root," "radical," and "radicand."
5.2   Define the terms "nth root" and "index."
5.3   Simplify radical expressions with any root (both numerical and variable expressions).
5.4   Explain why any even root of a negative number is not a real number, but any odd root of a negative number is a real number.
5.5   Add, subtract, multiply, and divide radical expressions (both numerical and variable expressions).

5.6   Rationalize the denominator of rational expressions having a radical term (either a radical monomial or a binomial with a radical term).

5.7   Explain the relationship between a radical and a rational exponent.

5.8   Express radical expressions using rational exponent notation, and vice versa.

5.9   Apply the rules of exponents to simplify expressions with rational exponents.

Unit 6   Complex Numbers

General Outcome

6.0   **The student shall be able to write square roots of negative numbers as imaginary numbers, and perform operations on complex numbers.**

Specific Learning Outcomes

6.1   Define the terms "imaginary number" and "i."

6.2   Simplify i^2 as -1.

6.3   Simplify expressions of the form $\sqrt{-k}$, where $k > 0$.

6.4   Define the terms "complex number," "real part (of a complex number)," and "imaginary part (of a complex number)."

6.5   Express complex numbers in standard form, $a + bi$.

6.6   Identify the real part and the imaginary part of complex numbers in standard form.

6.7   Explain why all imaginary numbers are complex numbers, but not vice versa.

6.8   Explain why all real numbers are complex numbers, but not vice versa.

Unit 7   Quadratic Equations

General Outcome

7.0   **The student shall be able to solve quadratic equations by factoring, the square-root method, completing the square, and the quadratic formula, and solve word problems by modeling them with quadratic equations.**

Specific Learning Outcomes

7.1   Define the terms "quadratic expression" and "quadratic equation."

7.2   Determine if a given polynomial expression or equation is quadratic.

7.3   Solve quadratic equations (and other appropriate polynomial equations) having real solutions by factoring.

7.4   Use the square root property to solve quadratic equations of the form $a(bx + c)^2 + d = k$, having real or complex solutions.

7.5   Solve quadratic equations having real or complex solutions by completing the square.

7.6   State, and explain the purpose of, the quadratic formula.

7.7   Solve quadratic equations having real or complex solutions using the quadratic formula.

7.8   Solve literal polynomial equations.

7.9   Solve appropriate word problems by modeling them with quadratic (or other polynomial) equations.

7.10   State the Pythagorean Theorem, and explain what it means.

7.11   Solve appropriate Pythagorean Theorem-based word problems requiring quadratic equations.