COWLEY COLLEGE
& Area Vocational Technical School

COURSE PROCEDURE FOR

INTERMEDIATE ALGEBRA WITH REVIEW
MTH4411   5 Credit Hours

Student Level:
This course is open to students on the college level in their freshman or sophomore year.

Catalog Description:

MTH4411 – INTERMEDIATE ALGEBRA WITH REVIEW (5 hrs)
This course involves simplifying algebraic expressions, solving equations and word problems involving linear and quadratic polynomials, rational expressions, rational exponents, and radicals and graphing linear and quadratic functions. This course requires that the students furnish their own TI-83 or TI-83 PLUS graphing calculator. This course does not fulfill AS, AA, or AAS math degree requirement.

Prerequisites:
A qualifying score on the mathematics placement assessment.

Controlling Purpose:
This course is designed to help prepare the student for success in College Algebra by providing prerequisite knowledge in various topics in algebra.

Learner Outcomes:
Upon successful completion of this course the student should be able to simplify, manipulate, evaluate and perform operations on algebraic expressions, solve equations, graph simple equations on the rectangular coordinate plane, and analyze and solve application problems involving one variable.

Units Outcomes and Criterion Based Evaluation Key for Core Content:
The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:
A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.

F = Failing, will be computed in GPA and hours attempted.

N = No instruction or training in this area.

							Specific Competencies
A	**B**	**C**	**D**	**F**	**N**		Demonstrate the ability to:
						*	Classify numbers.
						*	*Plot points on the real number line.*
						*	Use inequalities to order real numbers.
						*	*Compute the absolute value of a real number.*
						*	*Add, subtract, multiply, and divide integers with like signs and with different signs.*
						*	Add, subtract, multiply, and divide rational numbers expressed as fractions.
						*	Add, subtract, multiply, and divide decimal numbers.
						*	Use the identity, commutative, and associative properties of addition and multiplication.
						*	Use the multiplication and division properties of 0.
						*	*Evaluate exponential expressions.*
						*	*Apply the rules for Order of Operations.*
						*	*Evaluate algebraic expressions.*
						*	Identify like terms and unlike terms.
						*	Use the distributive property.
						*	Simplify algebraic expressions by combining like terms.

OPERATIONS ON REAL NUMBERS AND ALGEBRAIC EXPRESSIONS

Outcomes: Students will review and confirm their ability to perform operations on real numbers, learn to evaluate and simplify expressions using the properties of real numbers, and learn to evaluate and simplify expressions with variable.

*DENOTES OPTIONAL MATERIAL: **Bold** and Italicized items denote course competencies agreed upon by the Kansas Core Outcomes Project
DISCLAIMER: THIS INFORMATION IS SUBJECT TO CHANGE. CONTACT ACADEMIC AFFAIRS OFFICE FOR OFFICIAL COURSE PROCEDURE.

LINEAR EQUATIONS AND INEQUALITIES

Outcomes: Upon completion of this material the student will be able to set up and solve application problems involving linear equations and inequalities in one variable and two variables.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Solve linear equations.
							Model and solve direct translation problems.
							Model and solve mixture problems.
							Model and solve uniform motion problems.
							Solve for a variable in a formula.
							Use formulas to solve problems.
							Represent inequalities using the real number line and interval notation.
							Understand the properties of inequalities.
							Solve linear inequalities.
							Solve problems involving linear inequalities.
							Plot points in the rectangular coordinate system.
							Determine whether an ordered pair is a point on the graph of an equation.
							Graph an equation using the point-plotting method.
							Identify the intercepts from the graph of an equation.
							Interpret graphs.
							Graph Linear equations using point plotting.
							Graph linear equations using intercepts.
							Graph vertical and horizontal lines.
							Find the slope of a line given two points.
							Interpret slope as an average rate of change.
							Graph a line given a point and its slope.
							Use the point-slope form of a line.
							Identify the slope and y-intercept of a line from its equation.
							Find the equation of a line given two points.
							Define parallel lines.
							Define perpendicular lines.
							Find equations of parallel and perpendicular lines.
							Determine whether an ordered pair is a solution to a linear inequality.
							Graph linear inequalities.
							Solve problems involving linear inequalities.

RELATIONS, FUNCTIONS, AND MORE INEQUALITIES

Outcomes: Upon completion of this unit the student will be able to recognize, graph and perform operations on functions. Student will also be able to sketch linear equations and functions in 2 variables and use a multivariate approach to solving application problems involving linear equations

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Understand relations.
							Find the domain and the range of a relation.
							Graph a relation defined by an equation.
							Determine whether a relation expressed as a map or ordered pairs represents a function.
							Determine whether a relation expressed as an equation represents a function.
							Determine whether a relation expressed as a graph represents a function.
							Find the value of a function.
							Work with applications of functions.
							Find the domain of a function.
							Graph a function.
							Obtain information from the graph of a function including the domain and range.
							Interpret graphs of functions.
							Graph linear functions.
							Find the zero of a linear function.
							Determine the intersection or union of two sets.
							Solve compound inequalities involving "and".
							Solve compound inequalities involving "or".
							Solve problems using compound inequalities.
							Solve absolute value equations.
							Solve absolute value inequalities involving $<$ or $\leq$.
							Solve absolute value inequalities involving $>$ or $\geq$.
							Model and solve problems involving direct variation.
							Model and solve problems involving inverse variation.
							Model and solve problems involving combined or joint variation.

SYSTEMS OF LINEAR EQUATIONS AND INEQUALITIES

Outcomes: Upon completion of this unit students will be able to solve systems of equations by graphing and using the substitution and addition methods.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Determine whether an ordered pair is a solution to a system of linear equations.
							Solve a system of two linear equations containing two unknowns by graphing.
							Solve a system of two linear equations containing two unknowns by substitution.
							Solve a system of two linear equations containing two unknowns by elimination.
							Identify inconsistent systems.
							Express the solution of a system of dependent equations.

| | | | | | | Specific Competencies |
A	B	C	D	F	N	Demonstrate the ability to:
						POLYNOMIALS AND POLYNOMIAL FUNCTIONS
						Outcomes: Upon completion of this unit students will be able to perform standard polynomial operations and solve equations involving polynomials.
						Convert decimal notation to scientific notation.
						Convert scientific notation to decimal notation.
						Use scientific notation to multiply and divide.
						Define monomial and determine the coefficient and degree of a monomial.
						Simplify exponential expressions using the product rule and power rule.
						Simplify exponential expressions containing products.
						Simplify exponential expressions using the quotient rule, quotient to a power rule, and using zero as an exponent.
						Simplify exponential expressions involving negative exponents.
						Simplify exponential expressions using the laws of exponents.
						Define polynomial and determine the degree of a polynomial.
						Simplify polynomials by combining like terms.
						Evaluate polynomial functions.
						Add and subtract polynomial functions.
						Multiply a monomial by a monomial.
						Multiply a monomial and a polynomial.
						Multiply a binomial by a binomial using the distribute property and the FOIL method.
						Square a binomial.
						Multiply the sum and difference of two terms.
						Multiply a polynomial by a polynomial.
						Multiply special products.

							Multiply polynomial functions.
							Divide a polynomial by a monomial.
							Divide polynomials using long division.
							Divide polynomials using synthetic division.
							Divide polynomial functions.
							Use the remainder and factor theorems.
							Factor the greatest common factor.
							Factor by grouping.
							Factor trinomials of the form $x^2 + bx + c$.
							Factor trinomials of the form $ax^2 + bx + c$.
							Factor trinomials using substitution.
							Factor perfect square trinomials.
							Factor the difference of two squares.
							Factor the sum of difference of two cubes.
							Factor polynomials completely.
							Write polynomial functions in factored form.
							Solve polynomial equations using the zero-product property.
							Solve equations involving polynomial functions.
							Model and solve problems involving polynomials.

RATIONAL EXPRESSIONS AND RATIONAL FUNCTIONS

Outcomes: Upon completion of this unit students will be able to solve equations involving rational expressions.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Determine the domain of a rational expression.
							Simplify rational expressions.
							Multiply rational expressions.
							Divide rational expressions.
							Work with rational functions.
							Add or subtract rational expressions with a common denominator.
							Find the least common denominator of two or more rational expressions.
							Add or subtract rational expressions with different denominators.
							Simplify a complex rational expression by simplifying the numerator and denominator separately.
							Simplify a complex rational expression using the least common denominator.
							Solve equations containing rational expressions.
							Solve equations involving rational functions.
							Solve for a variable in a rational expression.
							Model and solve ratio and proportion problems.
							Model and solve work problems.
							Model and solve uniform motion problems.

RADICALS AND RATIONAL EXPONENTS

Outcomes: Upon completion of this unit students will be able to simplify expressions containing rational exponents and radicals and solve equations containing such expressions.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Evaluate square roots.
							Find square roots of variable expressions.
							Use the product rule to simplify square roots of constants.
							Use the product rule to simplify square roots of variable expressions.
							Use the quotient rule to simplify square roots of constants and variable expressions.
							Evaluate nth roots.
							Simplify expressions that are in radical form.
							Evaluate expressions of the form $a^{1/n}$.
							Evaluate expressions of the form $a^{m/n}$.
							Use the laws of exponents to simplify expressions involving rational exponents.
							Use the laws of exponents to simplify radical expressions
							Factor expressions containing rational exponents.
							Use the product property to multiply radical expressions.
							Use the product property to simplify radical expressions.
							Multiply radicals with unlike indices.
							Add or subtract radical expressions.
							Multiply radical expressions.
							Rationalize a denominator containing one term.
							Rationalize a denominator containing two terms.
							Evaluate functions whose rule is a radical expression.
							Find the domain of a function whose rule contains a radical.
							Graph functions involving square roots.
							Graph functions involving cube roots.
							Solve radical equations containing one radical.
							Solve radical equations containing two radicals.
							Solve for a variable in a radical equation.
							Evaluate the square root of negative real numbers.
							Add or subtract complex numbers.
							Multiply complex numbers.
							Divide complex numbers.
							Evaluate the powers of i.

							QUADRATIC EQUATIONS AND FUNCTIONS
Outcomes: Upon completion of this unit, students will be able to solve quadratic equations and work application problems involving quadratic equations.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Solving quadratic equations using the square root property.
							Complete the square in one variable.
							Solve quadratic equations by completing the square.
							Solve problems using the Pythagorean Theorem.
							Solve quadratic equations using the quadratic formula.
							Model and solve problems involving quadratic equations.
							Solve equations that are quadratic in form.
							Graph quadratic functions of the form $f(x) = ax^2 + bx + c$.
							Use the distance formula.
							Use the midpoint formula.

Projects Required:
None

Textbook:
Contact Bookstore for current textbook.

Materials/Equipment Required:
Text, TI-83 or TI84 PLUS Graphic Calculator; the graphing calculator is required for this course.

Attendance Policy:
Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:
A minimum 40% of the course grade shall consist of proctored assessment(s) of which at least 20% of the course grade shall include a comprehensive departmental final exam.

Maximum class size:
15

Course Time Frame:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time, The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

402.00 Academic Code of Conduct
263.00 Student Appeal of Course Grades
403.00 Student Code of Conduct

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.