



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**ELEMENTARY ALGEBRA
EBM4405 3 Credit Hours**

Student Level:

College Preparatory

Catalog Description:

EBM4405 - ELEMENTARY ALGEBRA (3 hrs)

The student will learn variables, properties of real numbers, polynomials, solving linear and quadratic equations, and graphing linear equations.

Prerequisite:

A qualifying score on the mathematics placement assessment. This course does not fulfill AS, AA, AAS, or AGS math degree or certificate requirement.

Controlling Purpose:

This course is designed to introduce the student to the basic concepts of algebra. Students correctly enrolled in this course and completing the course with an A, B, or C should usually plan to take MTH4421 College Algebra with Review or MTH4410 Intermediate Algebra.

Learner Outcomes:

Students completing this course with an A, B, or C should be able to simplify many algebraic expressions, solve single variable equations, graph straight lines on the rectangular coordinate plane, and make applications of algebra to solving elementary real life problems.

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.

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.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							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.

EQUATIONS AND INEQUALITIES IN ONE VARIABLE

Outcomes: Students will set up and solve equations of the form $ax + b = c$, $ax + b < c$, and $ax + b > c$ and translate application problems into equations and inequalities and solve.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Determine if a number is a solution of an equation.
							Use the addition property of equality to solve linear equations.
							Use the multiplication property of equality to solve linear equations.
							Apply the addition and the multiplication properties of equality to solve linear equations.
							Combine like terms and apply the distributive property to solve linear equations.
							Solve a linear equation with the variable on both sides of the equation.
							Use linear equations to solve problems.
							Use the least common denominator to solve a linear equation containing fractions.
							Solve a linear equation containing decimals.
							Classify linear equations as identity, conditional, or contradiction.
							Use linear equations to solve problems.
							Evaluate a formula.
							Solve a formula for a variable.
							Translate English phrases to algebraic expressions and equations.
							Build models for solving direct translation problems.
							Model and solve direct translation problems from business involving percent.
							Set up and solve complementary and supplementary angle problems.
							Set up and solve angles of a triangle problems.
							Use geometry formulas to solve problems.
							Set up and solve uniform motion problems.
							Graph inequalities on the real number line.
							Use interval notation.
							Solve linear inequalities using properties of inequalities.

INTRODUCTION TO GRAPHING AND EQUATIONS OF LINES

Outcomes: Students will master the basic concepts of using ordered pairs of data, graphing on the x-y coordinate plane, and manipulating 2-variable equations.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Plot points in the rectangular coordinate system.
						Determine if an ordered pair satisfies an equation.
						Create a table of values that satisfies an equation.
						Graph a line by plotting points.
						Graph a line using intercepts.
						Graph vertical and horizontal lines.
						Find the slope of a line given two points.
						Find the slope of vertical and horizontal lines.
						Graph a line using its slope and a point on the line.
						Work with applications of slope.
						Use the slope-intercept form to identify the slope and y-intercept of a line.
						Graph a line whose equation is in slope-intercept form.
						Graph a line whose equation is in the form $Ax + By = C$.
						Find the equation of a line given its slope and y-intercept.
						Work with linear models in slope-intercept form.
						Find the equation of a line given a point and a slope.
						Find the equation of a line given two points.
						Determine whether two lines are parallel.
						Find the equation of a line parallel to a given line.
						Determine whether two lines are perpendicular.
						Find the equation of a line perpendicular to a given line.

EXPONENTS AND POLYNOMIALS

Outcomes: Students will perform the four basic operations on polynomials.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Define and determine the degrees of monomials and polynomials.
							Simplify polynomials by combining like terms.
							Evaluate polynomials.
							Simplify exponential expressions using the product rule and power rule.
							Simplify exponential expressions containing products.
							Multiply a monomial by a monomial.
							Multiply a polynomial by a monomial.
							Multiply two binomials using the distributive property and the FOIL method.
							Multiply the sum and difference of two terms.
							Square a binomial.
							Multiply a polynomial by a polynomial.
							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.
							Divide a polynomial by a monomial.
							Divide a polynomial by a binomial.
							Convert decimal notation to scientific notation.
							Convert scientific notation to decimal notation.
							Use scientific notation to multiply and divide.

FACTORING POLYNOMIALS

Outcomes: Students will factor polynomials.

A	B	C	D	F	N	
						Specific Competencies Demonstrate the ability to:
						Find the greatest common factor of 2 or more expressions.
						Factor out the greatest common factor in polynomials.
						Factor polynomials by grouping.
						Factor trinomials of the form: $x^2 + bx + c$.
						Factor out the GCF, then factor $x^2 + bx + c$.
						Factor trinomials of the form: $ax^2 + bx + c$.
						Factor perfect square trinomials.
						Factor the difference of two squares.
						Factor the sum or difference of two cubes.
						Factor polynomials completely.
						Solve quadratic equations using the zero-product property.
						Solve polynomial equations of degree three or higher using the zero-product property.
						Model and solve problems involving quadratic equations.
						Model and solve problems using the Pythagorean Theorem.

RATIONAL EXPRESSIONS AND EQUATIONS

Outcomes: Students will be able to simplify rational expressions and solve equations with rational expressions.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Evaluate a rational expression.
							Determine undefined values of a rational expression.
							Simplify rational expressions.
							Multiply rational expressions.
							Divide rational expressions.
							Add and subtract rational expressions with a common denominator.
							Add and subtract rational expressions with opposite denominators.
							Find the least common denominator of two or more rational expressions.
							Use the LCD to write equivalent rational expressions.
							Add and subtract rational expressions with unlike denominators.
							Solve equations containing rational expressions.
							Model and solve ratio and proportion problems.
							Model and solve problems with similar figures.

ROOTS AND RADICALS

Outcomes: The student will be able to simplify radical expressions and solve equations with radical 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.

QUADRATIC EQUATIONS

Outcomes: Students will solve quadratic equations and application problems involving Quadratic equations.

A	B	C	D	F	N		Specific Competencies Demonstrate the ability to:
							Solve quadratic equations using the quadratic formula.

Projects Required:

None.

Text Book:

Contact the Bookstore for current textbook information.

Materials/Equipment needed:

Scientific calculator is required. A Graphing calculator is highly recommended.

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:

Based on classroom occupancy

Course Timeframe:

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.