



**COWLEY COLLEGE  
& Area Vocational Technical School**

**COURSE PROCEDURE FOR**

<p><b>ELEMENTARY ALGEBRA WITH REVIEW EBM4404      3 Credit Hours</b></p>
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**Student Level:**

College Preparatory

**Catalog Description:**

**EBM4404 ELEMENTARY ALGEBRA WITH REVIEW (5 hrs)**

This course is designed to provide a thorough study in the arithmetic of whole numbers, fractions with elementary applications in consumer math and measurement and introduce students to the basic concepts of algebra. Students correctly enrolled in this course and completing the course with an A, B, or C should plan to take MTH4410 Intermediate Algebra before taking MTH4420 College Algebra. This course does not fulfill AS, AA, AAS, or AGS math degree requirement.

**Prerequisites:**

None

**Controlling Purpose:**

This course is designed to provide a thorough study in the arithmetic of whole numbers, fractions with elementary applications in consumer math and measurement and introduce students to the basic concepts of algebra. Students correctly enrolled in this course and completing the course with an A, B, or C should plan to take MATH 4410 Intermediate Algebra before taking MATH 4420 College Algebra.

**Learner Outcomes:**

Students who complete this course with a grade of A, B, or C should have sufficient background to simplify many algebraic expressions, solve single variable equations, graph straight lines on the rectangular coordinate plane and make application 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.

## UNIT 1: WHOLE NUMBERS

Outcomes: The student will be able to successfully perform basic operations using whole numbers.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Recognize order relations between whole numbers.
						Recognize place value.
						Perform rounding.
						Use applications and statistical graphs.
						Perform addition of whole numbers.
						Perform subtraction of whole numbers.
						Set up and solve application and formula problems.
						Perform multiplication of whole numbers.
						Recognize exponents.
						Perform division of whole numbers.
						Write factors and prime factorization.
						Set up and solve application and formula problems.
						Solve equations.
						Use applications and formulas.
						<b><i>Apply the rules for The Order of Operations Agreement.</i></b>
						<b><i>Evaluate exponential expressions.</i></b>
						<b><i>Evaluate algebraic expressions.</i></b>
						Identify like terms and unlike terms.
						Use the distributive property.
						Simplify algebraic expressions by combining like terms.

## UNIT 2: Integers and Introduction to Solving Equations

Outcomes: Students will be able to perform operations on integers and learn to evaluate and simplify expressions using the properties of real numbers. The student will be able to solve equations containing variables.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Order integers on the number line.
						Find opposites.
						Find absolute value.
						Set up and solve application problems.
						Add integers.
						Subtract integers.
						Set up and solve application and formula problems.
						Multiply integers.
						Divide integers.
						Set up and solve application problems.
						Solve equations.
						Set up and solve application and formula problems.
						Use The Order of Operations Agreement.
						Classify numbers.
						<b><i>Plot points on the real number line.</i></b>
						<b><i>Compute the absolute value of a real number.</i></b>
						<b><i>Add, subtract, multiply, and divide integers with like signs and with different signs.</i></b>
						Graph inequalities on the real number line.
						Use interval notation.

### UNIT 3: Solving Equations and Problem Solving

Outcomes: Students will set up and solve equations of the form  $ax + b = c$  or  $ax + b = cx + d$  and translate application problems into equations and solve.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve a linear equation with the variable on both sides of the equation.
						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.
						<b><i>Apply the addition and the multiplication properties of equality to solve linear equations.</i></b>
						Combine like terms and apply the distributive property to solve linear equations.
						Use linear equations to solve problems.
						Use interval notation.

## UNIT 4: Fractions and Mixed Numbers

Outcomes: Upon completion of this unit, the student will be able to compute fraction problems involving addition, subtraction, multiplication, and division, and solve algebraic equations containing fractions.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Find the least common multiple.
						Find the greatest common factor.
						Solve application problems.
						Recognize and write proper fractions, improper fractions, and mixed numbers.
						Write equivalent fractions.
						Use order relations between two fractions.
						Solve application problems.
						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.
						Use the least common denominator to solve a linear equation containing fractions.
						Solve equations.
						Solve application problems.
						Simplify numbers with exponents.
						Simplify complex fractions.
						Use The Order of Operations Agreement.

## UNIT 5: Decimals

Outcomes: Upon completion of the unit, the student will be able to compute decimal problems involving addition, subtraction, multiplication, and division, and solve algebraic equations containing decimals.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve a linear equation containing decimals.
						Recognize place value.
						Recognize order relations between decimals.
						Perform rounding.
						Set up and solve application problems.
						Perform addition and subtraction of decimals.
						Perform multiplication of decimals.
						Perform division of decimals.
						Make conversions between fractions and decimals.
						Set up and solve application and formula problems.
						Solve equations.
						Set up and solve application problems.
						Set up and solve application and formula problems.
						Real numbers and the real number line.
						Solve inequalities in one variable.
						Set up and solve application problems.

## UNIT 6: Ratio, Proportion, & Percent

Outcomes: Upon completion of this unit, the student will be able to compute percent and decimal problems involving multiplication and division.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						<b><i>Model and solve direct translation problems from business involving percent.</i></b>
						Write percents as decimals or fractions.
						Write fractions and decimals as percents.
						Set up and solve the basic percent equation.
						Set up and solve percent problems using proportions.
						Set up and solve application problems.
						Calculate the percent of increase and decrease.
						Calculate problems involving markup and discount.
						Set up and solve problems involving simple interest.



## UNIT 7: Graphs and Triangle Applications

Outcomes: Upon completion of this unit, the student will be able to compute problems involving descriptive statistics, understand Pythagorean Theorem, and solve problems containing congruent and similar triangles.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Frequency distributions
						Histograms
						Frequency polygons
						Find the mean, median and mode of a distribution.
						Interpret box-and-whiskers plots.
						Find the standard deviation of a distribution.
						Find the probability of simple events.
						The odds of an event.
						Find square roots of perfect squares.
						Find square roots of whole numbers.
						Solve problems using Square Roots and Pythagorean Theorem.
						Identify and solve problems with congruent & similar triangles.

## UNIT 8: Geometry and Measurement

Outcomes: Upon completion of this unit, the student will be able to compute problems involving perimeter, area, length and volume.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						<b><i>Set up and solve complementary and supplementary angle problems.</i></b>
						<b><i>Set up and solve angles of triangle problems.</i></b>
						<b><i>Use geometry formulas to solve problems.</i></b>
						Convert units in the metric system.
						Compare and simplify ratios and rates.
						Convert units in The U.S. Customary System of Measurement.
						Solve and set up application problems.
						Convert between the U.S. Customary System and the metric system.
						Set up and solve proportion problems.
						Set up and solve application problems.
						Solve problems involving lines and angles.
						Solve problems involving angles formed by intersecting lines.
						Solve problems involving the angles of a triangle.
						Find perimeter of a plane geometric figure.
						Find area of a plane geometric figure.
						Use the Pythagorean Theorem.
						Recognize similar triangles.
						Recognize congruent triangles.
						Find volume of a solid.
						Find surface area of a solid.

## UNIT 8: Geometry and Measurement

Outcomes: Upon completion of this unit, the student will be able to compute problems involving perimeter, area, length and volume.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Find perimeter of a composite plane figure.
						Find area of a composite plane figure.
						Find volume of a composite solid.
						Find surface area of a composite solid.

## UNIT 9: Equations, Inequalities, and Problem Solving

Outcomes: Upon completion of this unit, the student will be able to compute problems, set-up problems, translate problems and understand the problem-solving processes.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						<b><i>Solve a formula for a variable.</i></b>
						<b><i>Model and solve direct translation problems from business involving percent.</i></b>
						Evaluate a formula.
						Classify linear equations as identity, conditional, or contradiction.
						Use linear equations to solve problems.
						Translate English phrases to algebraic expressions and equations.
						Build models for solving direct translation problems.
						Solve direct translation problems involving percent.
						<b><i>Solve linear inequalities using properties of inequalities.</i></b>

## UNIT 10: 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.
						<b><i>Simplify polynomials by combining like terms.</i></b>
						Evaluate polynomials.
						Simplify exponential expressions using the product rule and power rule.
						Simplify exponential expressions containing products.
						<b><i>Multiply a monomial by a monomial.</i></b>
						<b><i>Multiply a polynomial by a monomial.</i></b>
						<b><i>Multiply two binomials using the distributive property and the FOIL method.</i></b>
						<b><i>Multiply the sum and difference of two terms.</i></b>
						Square a binomial.
						Multiply a polynomial by a polynomial.
						<b><i>Simplify exponential expressions using the quotient rule, quotient to a power rule, and using zero as an exponent.</i></b>
						<b><i>Simplify exponential expressions involving negative exponents.</i></b>
						<b><i>Simplify exponential expressions using the laws of exponents.</i></b>
						<b><i>Divide a polynomial by a monomial.</i></b>
						<b><i>Divide a polynomial by a binomial.</i></b>
						<b><i>Convert decimal notation to scientific notation.</i></b>
						<b><i>Convert scientific notation to decimal notation.</i></b>
						Use scientific notation to multiply and divide.

## UNIT 11: 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.
						<b><i>Factor out the greatest common factor in polynomials.</i></b>
						<b><i>Factor polynomials by grouping.</i></b>
						<b><i>Factor trinomials of the form: <math>x^2 + bx + c</math>.</i></b>
						Factor out the GCF, then factor $x^2 + bx + c$ .
						<b><i>Factor trinomials of the form: <math>ax^2 + bx + c</math>.</i></b>
						<b><i>Factor perfect square trinomials.</i></b>
						<b><i>Factor the difference of two squares.</i></b>
						Factor the sum or difference of two cubes.
						Factor polynomials completely.
						<b><i>Solve quadratic equations using the zero-product property.</i></b>
						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.

## UNIT 12: Rational Expressions

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.
						<b><i>Simplify rational expressions.</i></b>
						<b><i>Multiply rational expressions.</i></b>
						<b><i>Divide rational expressions.</i></b>
						<b><i>Add and subtract rational expressions with a common denominator.</i></b>
						<b><i>Add and subtract rational expressions with opposite denominators.</i></b>
						Find the least common denominator of two or more rational expressions.
						Use the LCD to write equivalent rational expressions.
						<b><i>Add and subtract rational expressions with unlike denominators.</i></b>
						Simplify a complex rational expression.
						Solve equations containing rational expressions.
						Solve for a variable in a rational equation.
						<b><i>Model and solve ratio and proportion problems.</i></b>
						Model and solve problems with similar figures.
						Model and solve work problems.
						<b><i>Model and solve uniform motion problems.</i></b>
						Model and solve direct variation problems.

### Unit 13: Graphing Equations and Inequalities

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:
						Model and solve inverse variation problems.
						<b><i>Plot points in the rectangular coordinate system.</i></b>
						Determine if an ordered pair satisfies an equation.
						Create a table of values that satisfies an equation.
						<b><i>Graph a line by plotting points.</i></b>
						<b><i>Graph a line using intercepts.</i></b>
						<b><i>Graph vertical and horizontal lines.</i></b>
						<b><i>Find the slope of a line given two points.</i></b>
						<b><i>Find the slope of vertical and horizontal lines.</i></b>
						<b><i>Graph a line using its slope and a point on the line.</i></b>
						Work with applications of slope.
						<b><i>Use the slope-intercept form to identify the slope and y-intercept of a line.</i></b>
						<b><i>Graph a line whose equation is in slope-intercept form.</i></b>
						Graph a line whose equation is in the form $Ax + By = C$ .
						<b><i>Find the equation of a line given its slope and y-intercept.</i></b>
						Work with linear models in slope-intercept form.
						<b><i>Find the equation of a line given a point and a slope.</i></b>
						Find the equation of a line given two points.
						Build linear models using the point-slope form of a line.

### Unit 13: Graphing Equations and Inequalities

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:
						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.
						Determine whether an ordered pair is a solution to a linear inequality.
						Graph linear inequalities in two variables.
						Solving problems involving linear inequalities in two variables.

### UNIT 15: 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:
						<b><i>Evaluate square roots.</i></b>
						Determine whether a square root is rational, irrational, or not a real number.
						Find square roots of variable expressions.
						Use the product rule to simplify square roots of constants.
						<b><i>Use the product rule to simplify square roots of variable expressions.</i></b>

#### Projects Required:

None



**Textbook:**

Contact Bookstore for current textbook.

**Materials/Equipment Required:**

Text, scientific calculator

- Calculators in this course are not permitted for the introductory objectives on real numbers, solving equations, and graphing linear functions. After those concepts have been introduced, scientific calculators are permitted. Graphing calculators are not recommended.

Other materials/equipment required will be outlined by the instructor in the course syllabus.

**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.

The learning outcomes and competencies detailed in this course meet, or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Project for this course, as sanctioned by the Kansas Board of Regents.

**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.