

Coffeyville Community College

#MATH-105

COURSE SYLLABUS

FOR

COLLEGE ALGEBRA

Zach Binder

Instructor

COURSE NUMBER: MATH-105 **COURSE TITLE:** College Algebra
CREDIT HOURS: 3
INSTRUCTOR: Zach Binder
OFFICE LOCATION: Math/Science Office Area
OFFICE PHONE: 620-251-7700 ext. 2049
OFFICE HOURS: As posted on the office door
PREREQUISITE(S): A minimum score of 45 on the Algebra Test of the COMPASS or credit in Intermediate Algebra.

REQUIRED TEXT AND MATERIALS: College Algebra, 9th Edition by Lial/Hornsby/Schneider

COURSE DESCRIPTION: Topics included in the course are quadratic equations, ratio, proportion and variation, complex numbers, determinants, and elimination theory and inequalities.

EXPECTED LEARNER OUTCOMES:

1. Students will understand the basic rules of Algebraic Expressions.
2. Students will solve given linear and quadratic equations.
3. Students will understand linear and quadratic relations and functions.
4. Students will understand exponential and logarithmic functions.
5. Students will solve given systems of equations.
6. Students will understand elementary probability and statistics.

LEARNING TASKS & ACTIVITIES:

Unit I, Chapter 1
Unit II, Chapter 2
Unit III, Chapter 3
Unit IV, Chapter 5
Unit V, Chapter 6
Unit VI, Chapter 8

**ASSESSMENT OF
OUTCOMES:**

The semester grade will be determined by tests (65%) and homework (35%) as shown in the following table.

90 - 100% = A

80 - 89% = B

70 - 79% = C

60 - 69% = D

0 - 59% = F

TESTING:

1. Students demonstrate the required behavior on written examinations over the objectives.
2. No "retest" examinations will be given.
3. Exams are to be taken at the time specified.

HOMEWORK:

1. Homework will be assigned to help the student learn the objectives.
2. Homework is due at the time specified by the instructor. Late homework will not be accepted.

**ATTENDANCE
POLICY:**

Students are expected to attend all classes.

**STUDENT
CONDUCT:**

1. Behavior that interferes with the learning process will not be tolerated.
2. Dishonest work will result in an F for the course.

COMPETENCIES:

UNIT I

The student will understand the basic rules of algebraic expressions.

1. Define:
 - a. Naturals
 - b. Wholes
 - c. Integers
 - d. Rationals
 - e. Irrationals
 - f. Reals
 2. Given a number identify the sets from objective 1 to which the number belongs
 3. Define:
 - a. a^n where $a \in R, n \in N$
 - b. a^{-n} where $a \in R, a \neq 0, n \in N$
 - c. a^0 where $a \in R$
 - d. $\sqrt[n]{a}$ where $a \in R, n \in N$
 - e. $a^{\frac{m}{n}}$ where $a \in R, \frac{m}{n} \in Q$
 4. State and prove the exponent rules for natural number exponents
 5. Simplify given exponent phrases
 6. List the properties of real numbers by name and symbolic representation
 7. Given a statement list the properties of real numbers being illustrated
 8. Simplify a given statement using properties of real numbers
 9. Define polynomial
 10. Perform operations on given polynomials
 11. Factor a given polynomial
 12. Define the addition, subtraction, multiplication, and division of rational expressions
 13. Perform operations on given rational expressions
 14. State and prove the Rules for Radicals.
 15. Simplify a given phrase containing radicals
 16. List the components of a Logic Structure
 17. State the Binomial Theorem
- TEXT: Chapter 1

UNIT II

The student will solve given linear and quadratic equations.

1. Define:
 - a. linear equation in one variable

- b. complex numbers
 - c. quadratic equation in one variable
 - 2. Solve a given linear equation
 - 3. Perform operations on complex numbers
 - 4. State and prove the quadratic formula
 - 5. Solve a given quadratic equation
 - 6. Work word problems using the above concepts
- TEXT: Chapter 2

UNIT III

The student will understand linear and quadratic relations and functions.

- 1. Define
 - a. Relation
 - b. Function
 - c. Linear Relation
 - d. Quadratic Function
 - e. Slope
 - 2. State that the graph of a
 - a. linear relation is a straight line
 - b. quadratic relation is a parabola
 - 3. State and prove: If $y = mx + b$ then m is the slope and b is the y intercept
 - 4. Graph a line given information about it
 - 5. Find the slope of a line given information about it
 - 6. Write the equation of a line given information about it
 - 7. State and prove:
 - a. If $y = a(x - h)^2 + k$ then the vertex is (h, k)
 - b. If $y = ax^2 + bx + c$ then the x coordinate of the vertex is $\frac{-b}{2a}$
 - 8. Write the equation of a parabola given information about it
 - 9. Given the equation of a parabola find the vertex and graph it
 - 10. Work word problems using the above concepts
- TEXT: Chapter 3

UNIT IV

The student will understand exponential and logarithmic functions.

- 1. Define exponential function
- 2. Evaluate given:
 - a. exponential expressions
 - b. exponential functions
- 3. Graph given exponential functions
- 4. Solve given exponential equations
- 5. Define logarithmic function
- 6. State and prove the seven properties of logarithms

7. Given an exponential equation write the corresponding logarithmic equation
8. Given a logarithmic equation write the corresponding exponential equation
9. Evaluate given logarithmic expressions
10. Simplify given log statements using objective 6
11. State and prove that $\log_a x = \frac{\log_b x}{\log_b a}$
12. Solve given logarithmic equations
13. Work word problems using the above concepts
TEXT: Chapter 5

UNIT V

The student will solve given systems of equations.

1. Solve Systems of linear equations using:
 - a. substitution
 - b. addition
 - c. Gauss-Jordan
 - d. Cramer's Rule
2. Define
 - a. matrix
 - b. determinant
3. Find the determinant of a given matrix
4. Solve given linear programming problems
TEXT: 6

UNIT VI

The student will understand elementary probability and statistics.

1. Define
 - a. Pascal's Triangle
 - b. $n!$
 - c. $l!$
 - d. $o!$
 - e. $\binom{n}{r}$
2. State the Binomial Theorem
3. Expand a given expression of the form $(x + y)^n$ using objective 2
4. Find the r^{th} term of a given binomial expansion
5. State the fundamental principle of counting
6. Define:

- a. independent events
 - b. $p(n, r)$
7. Find the number of ways a given event can occur
8. Evaluate:
- a. $p(n, r)$
 - b. $\binom{n}{r}$
9. Define probability of Event E.
10. State:
- a. $P(E \cup F) = P(E) + P(F) - P(E \cap F)$
 - b. Five properties of probabilities
11. Find the probability that a given event will occur
TEXT: Chapter 8