Alabama Community College System

MTH 100

Intermediate College Algebra

Plan of Instruction

COURSE DESCRIPTION: This course provides a study of algebraic concepts such as laws of exponents, polynomial operations, factoring polynomials, radical and rational expressions and equations, and quadratic equations. Functions and relations are introduced and graphed. This course does not apply toward the general core requirement for mathematics.

CREDIT HOURS

- Theory Credit Hours 3 hours
- Lab Credit Hours 0 hours
- Total Credit Hours 3 hours

NOTE: Theory credit hours are a 1:1 contact to credit ratio. Colleges may schedule lab hours as 3:1 and/or 2:1 contact to credit ratio. Clinical hours are 3:1 contact to credit ratio. (Ref Board Policy 705.01)

PREREQUISITE COURSE

MTH 098 Elementary Algebra or appropriate mathematics placement score

CO-REQUISITE COURSE

MTH 099 Support for Intermediate College Algebra

COMPETENCIES

- Solve problems involving exponents and polynomials.
- Factor polynomials.
- Solve or simplify problems related to rational expressions.
- Solve or simplify problems related to radical expressions.
- Solve quadratic equations.
- Evaluate basic algebraic functions.

INSTRUCTIONAL GOALS

- **Cognitive** – Comprehend principles and concepts related to college algebra.
- **Psychomotor** – There are no psychomotor goals associated with this course.
- **Affective** – There are no affective goals associated with this course.

Condition Statement: Topics in the modules in this course represent minimal expectations for students. Unless otherwise indicated, evaluation of student's attainment of objectives is based on knowledge gained from this course. The modules do not have to be taught in the order presented in this outline.

STUDENT LEARNING OUTCOMES

MODULE A – Exponents And Polynomials	
COMPETENCY A1 - Solve problems involving exponents and polynomials.	
LEARNING OBJECTIVES	**KSA Indicators**
A1.1 Use the laws of integral exponents to simplify expressions.	2
A1.2 Convert between decimal notation and scientific notation.	2
A1.3 Define terms associated with polynomials.	1
A1.4 Complete basic operations with polynomials.	2

MODULE A OUTLINE

- Laws of integral exponents
- Scientific notation
- Basic operations with polynomials
  - Add
  - Subtract
  - Multiply
    - Special products
  - Divide

MODULE B – Factoring Polynomials	
COMPETENCY B1 - Factor polynomials.	
LEARNING OBJECTIVES	**KSA Indicators**
B1.1 Define terms associated with factoring.	1
B1.2 Factor polynomials using the greatest common factor.	2
B1.3 Factor polynomials by grouping.	2
B1.4 Factor trinomials.	2
B1.5 Factor special products.	2
B1.6 Factor a sum or difference of cubes.	3

MODULE B OUTLINE

- Greatest common factor
- Grouping
- Difference of Squares
- Trinomials
  - Leading coefficient of 1
  - Leading coefficient other than 1
  - Perfect square trinomials
- Sum or difference of cubes

MODULE C – Rational Expressions And Equations	
COMPETENCY C1 – Simplify or solve problems related to rational expressions.	
LEARNING OBJECTIVES	**KSA Indicators**
C1.1 Identify any restricted values of a rational expression.	3
C1.2 Simplify rational expressions.	3
C1.3 Simplify complex fractions.	3
C1.4 Solve rational equations.	3
C1.5 Solve applications involving rational equations.	3

MODULE C OUTLINE

- Restricted values
- Simplify
- Complex fractions
- Equations
- Applications

MODULE D – Radical Expressions And Equations	
COMPETENCY D1 – Simplify or solve problems related to radical expressions.	
LEARNING OBJECTIVES	**KSA Indicators**
D1.1 Simplify radical expressions.	3
D1.2 Complete arithmetic operations involving radical expressions.	3
D1.3 Solve radical equations.	3
D1.4 Convert between radical form and rational exponent form.	3

MODULE D OUTLINE

- Simplify
- Multiply
- Divide
- Add
- Subtract
- Equations
- Rational exponents

MODULE E – Quadratic Equations	
COMPETENCY E1 – Solve quadratic equations.	
LEARNING OBJECTIVES	**KSA Indicators**
E1.1 Solve quadratic equations using factoring.	3
E1.2 Solve quadratic equations using the quadratic formula.	3
E1.3 Solve applications involving quadratic equations.	3
MODULE E OUTLINE • Factoring • Quadratic Formula	

MODULE F – Introduction to Functions	
COMPETENCY F1 – Evaluate basic algebra functions.	
LEARNING OBJECTIVES	**KSA Indicators**
F1.1 Define the vocabulary associated with algebraic functions.	1
F1.2 Use function notation to calculate function values.	2
F1.3 Graph linear functions.	3
F1.4 Determine the domain and range of a given function.	3
F1.5 Apply the vertical line test to determine if a graph represents a function.	3
F1.6 Evaluate a function using the order of operations.	3
MODULE F OUTLINE • Function notation • Graphing linear functions • Domain • Range • Vertical line test • Evaluating functions	

LEARNING OUTCOMES TABLE OF SPECIFICATIONS

The table below identifies the percentage of learning objectives for each module. **Instructors should develop sufficient numbers of test items at the appropriate level of evaluation.**

	Limited Knowledge and Proficiency	Moderate Knowledge and Proficiency	Advanced Knowledge and Proficiency	Superior Knowledge and Proficiency
KSA	1	2	3	4
Module A	25%	75%		
Module B	17%	66%	17%	
Module C			100%	
Module D			100%	
Module E			100%	
Module F	17%	17%	66%	

Learner's Knowledge, Skills and Abilities		
Indicator	**Key Terms**	**Description**
1	Limited Knowledge and Proficiency	• Recognize basic information about the subject including terms and nomenclature. • Students must demonstrate ability to **recall information** such as facts, terminology or rules related to information previously taught. • **Performs simple parts** of the competency. Student requires close supervision when performing the competency.
2	Moderate Knowledge and Proficiency	• Distinguish relationships between general principles and facts. Adopts prescribed methodologies and concepts. • Students must **demonstrate understanding of multiple facts and principles** and their relationships, and differentiate between elements of information. Students state ideal sequence for performing task. • **Performs most parts** of the competency **with** instructor assistance as appropriate.
3	Advanced Knowledge and Proficiency	• Examines conditions, findings, or other relevant data to select an appropriate response. • The ability **to determine why and when** a particular response is appropriate **and predict anticipated outcomes**. • Students demonstrate their ability to seek additional information and incorporate new findings into the conclusion and justify their answers. • **Performs all parts** of the competency **without** instructor assistance.
4	Superior Knowledge and Proficiency	• Assessing conditions, findings, data, and relevant theory to formulate appropriate responses and develop procedures for situation resolution. Involves **higher levels of cognitive reasoning.** • Requires students to formulate connections between relevant ideas and observations. • Students apply judgments to the value of alternatives and select the most appropriate response. • Can instruct others how to do the competency. • **Performs competency quickly and accurately.**
A	Affective Objective	• Describes learning objectives that emphasize a feeling tone, an emotion, or a degree of acceptance or rejection. • Objectives vary from simple attention to selected phenomena to complex but internally consistent qualities of character and conscience. • Expressed as interests, attitudes, appreciations, values, and emotional sets or biases.