



Alabama Community College System

MTH 090

Basic Mathematics

Plan of Instruction

COURSE DESCRIPTION: The purpose of this course is to provide students with skills in basic mathematics. Minimum content includes whole numbers, integers, fractions, decimals, ratio and proportions, percents, and an introduction to algebra. Additional topics may include systems of measurement and basic geometry. At the conclusion of this course students are expected to be able to perform basic mathematical operations.

CREDIT HOURS

| | |
|---------------------|-----------|
| Theory Credit Hours | 2-4 hours |
| Lab Credit Hours | 0 hours |
| Total Credit Hours | 2-4 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) This course produces institutional, non-transferable credit only and will not satisfy the requirements for degrees and certificates.

PREREQUISITE COURSES

Appropriate mathematics placement score

CO-REQUISITE COURSES

As determined by college.

COMPETENCIES

- Perform mathematical operations using whole numbers.
- Perform mathematical operations using integers.
- Perform mathematical operations using fractions.
- Perform mathematical operations using decimals.
- Apply ratio and proportion to problem solving.
- Apply percents to problem solving.
- Apply basic concepts of algebra.

INSTRUCTOR NOTE: Module H – Systems and Measurement and Module I – Basic Geometry are optional modules. Instructors may teach these modules as they determine to be appropriate.

INSTRUCTIONAL GOALS

Cognitive – Students will develop knowledge to perform various mathematical operations.

Performance – There are no performance objectives directly associated with this course.

Affective – There are no affective objectives directly associated with this course.

STUDENT LEARNING OUTCOMES

| MODULE A – WHOLE NUMBERS | |
|--|-----------------------|
| COMPETENCY A1.0 - Perform mathematical operations using whole numbers. | |
| LEARNING OBJECTIVES | KSA Indicators |
| A1.1 Define terms associated with whole numbers. | 1 |
| A1.2 Determine place value for a given digit. | 2 |
| A1.3 Round whole numbers to a given place value. | 2 |
| A1.4 Convert between standard notation and expanded notation. | 2 |
| A1.5 Perform basic mathematical operations. | 2 |
| A1.6 Convert between exponential notation and expanded form. | 2 |
| A1.7 Evaluate exponential expressions. | 2 |
| A1.8 Simplify expressions using order of operations. | 2 |
| A1.9 Calculate simple averages. | 2 |
| A1.10 Solve application problems using operations with whole numbers. | 3 |
| MODULE A TOPICS | |
| <ul style="list-style-type: none"> • Terms and definitions • Place value • Rounding • Standard notation • Basic operation <ul style="list-style-type: none"> - Add - Subtract - Multiply - Divide - Estimations • Introduction to exponents • Order of operations • Averages • Applications | |

| MODULE B – INTEGERS | |
|--|-----------------------|
| COMPETENCY B1.0 – Perform mathematical operations using integers. | |
| LEARNING OBJECTIVES | KSA Indicators |
| B1.1 Define terms associated with integers. | 1 |
| B1.2 Determine relative order of integers. | 2 |
| B1.3 Determine absolute value of integers. | 2 |
| B1.4 Perform mathematical operations using integers. | 2 |
| B1.5 Simplify expressions involving integers using order of operations. | 2 |
| B1.6 Solve application problems involving integers. | 3 |
| MODULE B TOPICS <ul style="list-style-type: none"> • Terms and definitions • Compare and order • Absolute value • Basic operations • Order of operations • Applications | |

| MODULE C - FRACTIONS | |
|--|-----------------------|
| COMPETENCY C1.0 - Perform mathematical operations using fractions. | |
| LEARNING OBJECTIVES | KSA Indicators |
| C1.1 Define terms associated with fractions. | 1 |
| C1.2 Express a composite number as the product of its prime factors. | 2 |
| C1.3 Determine the least common multiple of a set of numbers. | 2 |
| C1.4 Apply rules of divisibility to determine factors. | 2 |
| C1.5 Determine relative order of fractions. | 2 |
| C1.6 Reduce fractions to the simplest or lowest form. | 2 |
| C1.7 Convert between improper fractions and mixed numbers. | 2 |
| C1.8 Perform mathematical operations using fractions and mixed numbers. | 2 |
| C1.9 Simplify expressions involving fractions using order of operations. | 2 |
| C1.10 Solve application problems involving fractions. | 3 |
| MODULE C OUTLINE <ul style="list-style-type: none"> • Terms and definitions • Prime factorization • Multiples and divisibility • Compare and order • Simplifying • Mixed numbers • Basic operations • Order of operations • Applications | |

| MODULE D - DECIMALS | |
|--|-----------------------|
| COMPETENCY D1.0 - Perform mathematical operations using decimals. | |
| LEARNING OBJECTIVES | KSA Indicators |
| D1.1 Define terms associated with decimals. | 1 |
| D1.2 Determine place value for a given digit. | 2 |
| D1.3 Determine relative order of decimals. | 2 |
| D1.4 Round a decimal to a given place value. | 2 |
| D1.5 Convert between fractions and decimals. | 2 |
| D1.6 Perform mathematical operations using decimals. | 2 |
| D1.7 Simplify expressions involving decimals using order of operations. | 2 |
| D1.8 Solve application problems involving decimals. | 3 |
| MODULE D TOPICS | |
| <ul style="list-style-type: none"> • Terms and definitions • Place value • Compare and order • Rounding • Converting fractions and decimals • Basic operations • Applications | |

| MODULE E – RATIO AND PROPORTION | |
|---|-----------------------|
| COMPETENCY E1.0 - Apply ratio and proportion to problem solving. | |
| LEARNING OBJECTIVES | KSA Indicators |
| E1.1 Define terms associated with ratio and proportion. | 1 |
| E1.2 Express ratios in various forms. | 2 |
| E1.3 Simplify ratios. | 2 |
| E1.4 Express the ratio of two different measures as a rate. | 2 |
| E1.5 Determine whether ratios form a proportion. | 2 |
| E1.6 Solve for the unknown in proportions. | 2 |
| E1.7 Solve application problems involving ratio and proportion. | 3 |
| MODULE E OUTLINE | |
| <ul style="list-style-type: none"> • Terms and definitions • Expressing ratios • Rates and unit fractions • Solving proportions • Applications | |

| MODULE F – PERCENTS | |
|--|-----------------------|
| COMPETENCY F1.0 – Apply percents to problem solving. | |
| LEARNING OBJECTIVES | KSA Indicators |
| F1.1 Define terms associated with percents. | 1 |
| F1.2 Convert among fractions, decimals, and percents. | 2 |
| F1.3 Solve problems involving percents. | 2 |
| F1.4 Solve application problems involving percents. | 3 |
| MODULE F TOPICS <ul style="list-style-type: none"> • Terms and definitions • Converting among fractions, decimals, and percents • Solving problems involving percents • Applications | |
| MODULE G – INTRODUCTION TO ALGEBRA | |
| COMPETENCY G1.0 – Apply basic concepts of algebra. | |
| LEARNING OBJECTIVES | KSA Indicators |
| G1.1 Define terms associated with algebra. | 1 |
| G1.2 Evaluate variable expressions. | 2 |
| G1.3 Simplify variable expressions. | 2 |
| G1.4 Solve one step equations. | 3 |
| MODULE G TOPICS <ul style="list-style-type: none"> • Terms and definitions • Variable expressions <ul style="list-style-type: none"> - Evaluate - Simplify • One step equations | |

| MODULE H – SYSTEMS OF MEASUREMENT | |
|---|-----------------------|
| COMPETENCY H1.0 – Apply systems of measurement. | |
| LEARNING OBJECTIVES | KSA Indicators |
| H1.1 Define terms associated with systems of measurement. | 1 |
| H1.2 Convert within customary system of measurement. | 2 |
| H1.3 Convert within metric system of measurement. | 2 |
| H1.4 Solve application problems involving systems of measurement. | 3 |
| MODULE H OUTLINE <ul style="list-style-type: none"> • Terms and definitions <ul style="list-style-type: none"> - Customary - Metric • Converting within systems • Applications | |

| MODULE I – BASIC GEOMETRY | |
|--|-----------------------|
| COMPETENCY I1.0 – Apply basic concepts of geometry. | |
| LEARNING OBJECTIVES | KSA Indicators |
| I1.1 Define terms associated with geometry. | 1 |
| I1.2 Find the area and perimeter of various geometric figures. | 2 |
| I1.3 Solve application problems involving geometry. | 3 |
| MODULE I OUTLINE <ul style="list-style-type: none"> • Terms and definitions • Area, perimeter, and circumference of geometric figures <ul style="list-style-type: none"> - Parallelograms - Triangles - Circles • Applications | |

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 | 10% | 80% | 10% | |
| Module B | 17% | 66% | 17% | |
| Module C | 10% | 80% | 10% | |
| Module D | 12% | 75% | 12% | |
| Module E | 14% | 71% | 14% | |
| Module F | 25% | 50% | 25% | |
| Module G | 25% | 50% | 25% | |
| Module H | 25% | 50% | 25% | |
| Module I | 33% | 33% | 33% | |

| Learner's Knowledge, Skills and Abilities | | |
|---|------------------------------------|--|
| Indicator | Key Terms | Description |
| 1 | Limited Knowledge and Proficiency | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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. |