MAT 085 – Algebra Fundamentals
APPROVED COURSE SYLLABUS

Credits: Lecture: 3, **Lab**: 0

Pre-requisite(s): Placement Exam

Course Description: This course is designed to prepare students for college level mathematics. Topics include a review of fractions, decimals, and percents, followed by introductory levels of variable expressions, linear equations, polynomials, factoring, exponents, and graphing linear equations.

This course will not count toward graduation, will not earn college credit, and will not be used in QPA calculations.

Course Methodology: Instructor-led, self-paced, hybrid or online.

Required Course Material:

- Path to College Mathematics – this includes an electronic textbook, student resources, and all assignments and homework. This appears on your semester invoice as: includED Course Fee MAT.085. It is immediately available to you in the course in Brightspace.

- Scientific Calculator – Texas Instrument Model TI-30XIIS, which has basic arithmetic operations, exponents, fractions, logarithms, trigonometric functions, and radicals. It is available in the bookstore or any local department store.

Optional Printed Textbook: If you would like to purchase a loose-leaf copy of the electronic textbook, this is available at the College Bookstore in limited quantities. **Note**: this is identical in content to the electronic textbook in Brightspace.

- Elayn Martin-Gay. Path to College Mathematics, 1st ed. Boston: Prentice Hall, Pearson Education, 2017. ISBN 9780134659145

Supplementary Materials: None

Course Topics:

- Whole Numbers, Fractions, Decimals, Integers, and Percents

- Exponents
- Square Roots
- Variable Expressions
- Solving Linear Equations
- Graphing Linear Equations in Two Variables
- Polynomials (Add, Subtract, Multiply)
- GCF of a Polynomial
- Factor polynomial of form $x^2 + bx + c$
- Basic Geometry (Perimeter, Area, Volume)
- Ratio and Proportions
- Pythagorean Theorem and Similar Triangles

Expected Learning Outcomes:

After successfully completing this course, students should be able to:

(Unless otherwise indicated, the success rate for each outcome will be at 70% and assessment will be via homework, quizzes and exams.)

1. Perform basic operations of arithmetic on whole numbers, proper fractions, decimals, and integers.

2. Demonstrate knowledge of percent, ratio, and proportion:
- **a)** Convert among fractions, decimals, and percents.
- **b)** Given two quantities with like units, write a ratio in simplest form.
- **c)** Given a proportion, solve for the unknown.
- **d)** Given a sentence or application problem, set up a proportion and solve for the unknown.

3. Simplify and evaluate a variable expression.
- **a)** Use order of operations.
- **b)** Given replacement value for variable(s).
- **c)** Translate verbal phrases into mathematical expressions.

4. Solve triangle application problems:
- **a)** Use Pythagorean Theorem to find length of unknown side in a right triangle.
- **b)** Given similar triangles, find the ratio of corresponding sides and solve for unknown lengths.

5. Demonstrate knowledge of basic geometry:
- **a)** Given a two-dimensional plane figure, use a formula to calculate the perimeter and area of the figure.
- **b)** Given a three-dimensional plane figure, use a formula to calculate the volume of the figure.

6. Solve a linear equation:

a) Given a linear equation, solve for the variable.
b) Translate from verbal application problems to mathematical equation.

7. Demonstrate graphing skills:
a) Given a set of coordinates, graph the points on a Cartesian plane.
b) Given one coordinate of an ordered pair solution, find the unknown coordinate.
c) Graph a linear equation on the Cartesian plane by plotting points.

8. Simplify and evaluate exponential expressions by applying the laws of exponents:
a) Positive and negative exponents.
b) Product Rule.
c) Scientific Notation.

9. Perform basic operations with polynomials:
a) Add polynomials.
b) Subtract polynomials.
c) Multiply polynomials.

10. Factor an algebraic expression:
a) Given a polynomial, factor out the GCF (greatest common factor)
b) Trinomials of the form $x^2 + bx + c$

11. Evaluate and approximate square roots.

Student Evaluation:

Student assessment will be based on a combination of MyMathLab homework and three exams and a cumulative final. Quizzes and review assignments may be used at the discretion of the instructor. Administration of exams, based on the delivery mode of the course, will be as follows:

- If instructor-led, exams will be administered paper/pencil.
- If hybrid, self-paced, or online, the exams will be administered via MyMathLab.

At minimum of 80% of the grade should be based on closed book, closed notes exams and/or quizzes. No extra credit will be given to any student. No exams or quizzes will be re-administered to any student.

Grading:

Letter Grade: The student's final grade will be determined using the following grading percentage:

- 90%-100% = "A"
- 80% - 89% = "B"
- 70% - 79% = "C"
- Below 70% = "F"

College Preparatory courses have unique policies regarding grading and attendance. These policies do not apply to college-level courses.

In-Progress (IP) Grade: This grade is reserved for students enrolled in a College Preparatory course and determined using the following criteria:

- Student has attended at least 80% of the classes in their entirety
- Student's semester ending percentage is between 60% and 69.9%

Attendance:

Attendance is critical for success in the developmental classes. Students must attend **80 percent** of scheduled college prep classes.

In a 15-week MWF class, this permits a maximum of nine absences; in a 15-week TH class, six absences, and in a one-day-a-week class, three absences. *There is no distinction between excused and unexcused absences*.

Note: If self-paced, hybrid, or online – Once all required assignments and quizzes have been successfully completed, attendance is no longer required.

Students who wish to appeal a failing grade due to excessive absences should follow the academic grievance guidelines outlined in the Pennsylvania Highlands catalog.

Course Outline:

All learning outcomes will be covered. However, your instructor may deviate from timeline suggested. Advance notice will be provided by your instructor if changes are made to this schedule.

WEEK #	TOPIC
1	Class information: • Course site • Syllabus and Addendum • Student Handbook • College Catalog Pre-test Assessment MyMathLab information: • Instructions for using MyMathLab (including handout with Course ID) • Overview of MyMathLab resources Diagnostic Placement completed by students via MyMathLab. If self-paced, hybrid or online, it will be completed in class. If face-to-face, students will complete outside of class. Results will self-populate individualized study-plan for each student. <u>PreAlgebra Review</u> R.1 Fractions and Mixed Numbers R.2 Decimals R.3 Percents, Decimals, and Fractions
2	<u>Review of Real Numbers</u>: 1.2 Symbols and Sets of Numbers 1.3 Exponents, Order of Operations, Variable Expressions, and Equations 1.4 Operations on Real Numbers and Evaluating Square Roots
3	<u>Equations, Inequalities, and Problem Solving</u> 2.1 Simplifying Algebraic Expressions 2.2 Addition and Multiplication Properties of Equality
4	2.3 Solving Linear Equations
5	Review for Test **TEST on Chapters 1 and 2**
6	<u>Graphing</u> 3.1 Graphing Linear Equations

7	Review for Test **Test on Chapter 3**
8	<u>Exponents and Polynomials</u> 4.1 Exponents 4.2 Polynomial Functions and Adding and Subtracting Polynomials (Objective 1 – Define Polynomial, Objective 3 – Combine like terms, Objective 4 – Add and Subtract Polynomial)
9	4.3 Multiplying Polynomials 4.5 Negative Exponents and Scientific Notation (Objective 3 and 4 – Write and convert numbers from scientific notation to standard form.)
10	<u>Factoring Polynomials</u> 5.1 GCF and Factor by Grouping (objective 1, 2, 3 only) 5.2 Factoring Trinomials of the Form $x^2 + bx + c$
11	5.2 Factoring Trinomials ($x^2 + bx + c$) – con't
12	Review for Test **TEST on Chapters 4 and 5**
13	<u>Geometry and Measurement</u> 6.2 Perimeter, Area, and Volume 5.7 The Pythagorean Theorem (obj 1 only – Pythagorean Theorem)
14	<u>Appendices</u> C. Ratio D. Proportion and Problem Solving (Similar Triangles)
15	Review for Cumulative Final **Cumulative Final**