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Course Outline for MATH 110B

ELEMENTARY ALGEBRA B

Effective: Fall 2018

I. CATALOG DESCRIPTION:

MATH 110B — ELEMENTARY ALGEBRA B — 2.00 units

Concepts covered in the second half of Elementary Algebra, including: real numbers and their properties; algebraic expressions; integer exponents; operations with polynomial expressions; linear and quadratic equations; linear inequalities and set notation; graphs of linear equations and inequalities; slope; systems of linear equations and inequalities; and modeling with linear and quadratic equations. May not receive credit if Mathematics 65 or 65Y have been completed.

2.00 Units Lecture

Prerequisite

MATH 110A - Elementary Algebra A
with a minimum grade of C

Grading Methods:

Letter or P/NP

Discipline:

- Mathematics

	<u>MIN</u>
Lecture Hours:	36.00
No Unit Value Lab	18.00
Total Hours:	54.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

- A. MATH110A

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

- Solve systems of linear equations in two variables by one of the following methods: graphing, elimination or substitution;
- Solve linear inequalities in two variables and systems of linear inequalities in two variables;
- Apply the rules for integer exponents;
- Write numbers and perform computations using scientific notation;
- Factor polynomials completely;
- Solve polynomial and quadratic equations;
- Solve, justify, and interpret the solution in the context of a modeling problem.

V. CONTENT:

- Systems of Linear Equations in Two Variables
 - Types of solutions and solution terminology
 - Methods of solution
 - Graphing
 - Substitution
 - Elimination
 - Applications of linear systems
- Linear Inequalities in Two Variables and Systems of Linear Inequalities
- Integer Exponents
 - Exponent rules
 - Scientific notation
- Polynomials
 - Classification
 - Simplification and evaluation
 - Operations with polynomials: addition, subtraction, multiplication, division
 - Special products
- Factoring Polynomials

1. Common factors
2. Factoring by grouping
3. Trinomials
4. Factoring formulas
 - a. Difference of two squares
 - b. Perfect square trinomials
 - c. Sum of two cubes
 - d. Difference of two cubes
5. General factoring strategy
- F. Solving Quadratic and Higher Degree Polynomials by Factoring
- G. Applications of Quadratic Equations

VI. METHODS OF INSTRUCTION:

- A. **Discussion** -
- B. **Classroom Activity** -
- C. **Lab** - assignments
- D. Any of the following at the discretion of the instructor: 1. Individual problem solving 2. Group work 3. Student presentations
- E. **Lecture** -
- F. **Individualized Instruction** -

VII. TYPICAL ASSIGNMENTS:

- A. Homework
 1. Problems from the text should be assigned for each section covered. The number of problems assigned may vary from section to section and from instructor to instructor, but the homework assignments should include a sufficient number and variety of problems to develop both skill and conceptual understanding. A typical assignment should take an average student 1 to 2 hours for each hour in class.
 2. The majority of the problems assigned should be those for which answers are readily available (e.g., from the answer appendix in the text), so that students may obtain immediate feedback on their work.
 3. Homework assignments may include reading the text. Students may be asked to read sections in advance of the lecture and then to re-read them after the lecture, to reinforce important concepts and skills. An instructor may require written work in conjunction with the reading assignments (e.g., have students complete a Q & A sheet related to the assigned reading).
- B. Laboratory
 1. Lab assignments can be used to reinforce fundamental concepts and skills or to explore certain concepts in more depth than is possible in-class. They may be designated for individual or group work. Lab assignments are completed in the Open Math Lab where students have access to assistance with the assignments.
 2. Sample lab assignment: To reinforce concepts related to exponent rules and scientific notation, students complete exercises in which they verbalize and practice using exponent rules. They then apply exponent rules to perform computations using scientific notation. Examples given utilize real-world data such as the radius of the galaxy in light years or the mass of E-coli bacteria.
- C. In-Class
 1. Collaborative learning, done in small groups of 2-4 students, can be used to introduce new concepts, build skills, or teach problem solving. Students may be asked to present their results on the board.
 2. Sample collaborative learning assignment: To introduce systems of linear equations and illustrate the three possible types of solutions, first divide the class into thirds, then ask each third to break-up into smaller groups. Have one-third of the class graph a system of linear equations with a unique solution; have one-third of the class graph a system of parallel lines (no solution); and have one-third graph a system of two identical lines (infinite number of solutions). In each third, give one of the groups a transparency with a graphing grid and have them draw their solution on the grid. Use the overhead projector to show the three types of solutions.

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Group Projects
4. Class Work
5. Home Work
6. Lab Activities
7. Other:

Comprehensive final examination covering all of Math 65A + Math 65B

B. **Frequency**

1. Recommend minimum of four exams plus the cumulative final
2. Recommend frequent quizzes or graded homework, to provide regular feedback to the student regarding mastery of concepts.
3. Homework should be assigned for each section covered
4. Recommend minimum of eight laboratory assignments over the semester
5. Time should be allowed in class for students to apply the concepts being covered. This can be done individually, in groups or as part of projects.
6. Number of quizzes and collaborative activities are at the discretion of the instructor

IX. TYPICAL TEXTS:

1. Rockswold, G., and T. Krieger. *Beginning and Intermediate Algebra*. 4th ed., Pearson, 2018.
2. Blitzer, R.. *Introductory & Intermediate Algebra*. 5th ed., Pearson, 2017.
3. Tussy, A., and D Koenig. *Introductory Algebra*. 5th ed., Cengage, 2015.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Scientific calculator