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Course Outline for MATH 65B

ELEMENTARY ALGEBRA B

Effective: Fall 2009

I. CATALOG DESCRIPTION:
MATH 65B — ELEMENTARY ALGEBRA B — 2.50 units

Concepts covered in the second half of Mathematics 65 Elementary Algebra, including: integer exponents; operations with polynomial expressions; factoring techniques; quadratic equations and modeling with quadratic equations; and an introduction to rational expressions. May not receive credit if Mathematics 65 or 65Y have been completed.

2.50 Units Lecture

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

Grading Methods:
Pass/No Pass

Discipline:

	MIN
Lecture Hours:	45.00
No Unit Value Lab	18.00
Total Hours:	63.00

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:

A. Perform operations with real numbers;
B. Identify properties of real numbers;
C. Simplify algebraic expressions;
D. Translate a verbal statement into an algebraic expression;
E. Solve linear equations in one variable;
F. Solve a formula for a specified variable;
G. Solve and graph a linear inequality in one variable and express the solution using correct interval or set notation;
H. Develop and graph linear equations in two variables using various methods;
I. Apply concepts of slopes and rates of change;
J. Develop and describe basic linear models;
K. Solve systems of linear equations in two variables by graphing;
L. Solve systems of linear equations in two variables by either the elimination or the substitution methods;
M. Solve linear inequalities in two variables and systems of linear inequalities in two variables;
N. Apply the rules for integer exponents;
O. Write numbers and perform computations using scientific notation;
P. Simplify, add, subtract, multiply and divide polynomial expressions;
Q. Employ factoring techniques, including the difference of two squares and the sum and difference of two cubes, to factor polynomials completely;
R. Solve quadratic and polynomial equations by factoring;
S. Simplify rational expressions;
T. Multiply and divide rational expressions;
U. Add and subtract rational expressions with like denominators;
V. Apply algebraic methods to represent, analyze and solve applied problems involving linear and quadratic equations.

V. CONTENT:
A. Integer Exponents
1. Exponent rules

2. Scientific notation

B. Polynomials
   1. Classification
   2. Simplification and evaluation
   3. Operations with polynomials: addition, subtraction, multiplication, division
   4. Special products

C. 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

D. Solving Quadratic and Higher Degree Polynomials by Factoring

E. Applications of Quadratic Equations

F. Introduction to Rational Expressions
   1. Simplification
   2. Undefined expressions
   3. Multiplication and division with rational expressions
   4. Addition and subtraction with like denominators

VI. METHODS OF INSTRUCTION:
   A. **Lecture** -
   B. Assigned readings in the text
   C. Web-based tutorials
   D. Group and individual activities in class
   E. **Lab** - assignments
   F. Homework

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: Divide the class into small groups (3-4 students). Give each group a polynomial to factor. The group presents their solution on the board and explains the factoring strategy used to solve the proble

VIII. EVALUATION:
   A. **Methods**
      1. Exams/Tests
      2. Quizzes
      3. Projects
      4. Group Projects
      5. Home Work
      6. Lab Activities
      7. Other:
         a. Methods
            1. Examinations (in-class)
            2. Comprehensive final examination
            3. Laboratory assignments
            4. Any of all of the following at the discretion of the instructor
               a. Homework
               b. Quizzes (announced or unannounced, in-class or take home)
               c. Collaborative group activities
               d. Projects

   B. **Frequency**
      1. Frequency
         a. Recommend minimum of three exams plus the final
         b. Homework should be assigned for each section covered
         c. Recommend minimum of seven laboratory assignments over the semester
         d. Number of quizzes and collaborative activities are at the discretion of the instructor

IX. TYPICAL TEXTS:
   1. Rockswold, Gary K., and Terry A. Krieger *Beginning and Intermediate Algebra*. 2nd ed., Pearson/Addison-Wesley, 2009.
   2. Blitzer, Robert *Introductory & Intermediate Algebra.* 3rd ed., Pearson/Prentice-Hall, 2009.
   3. Tussy, Alan S., and R. David Gustafson *Elementary Algebra*. 4th ed., Brooks/Cole, 2009.

X. OTHER MATERIALS REQUIRED OF STUDENTS:
   A. Scientific calculator