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Course Outline for MATH 55A

INTERMEDIATE ALGEBRA A

Effective: Fall 2009

I. CATALOG DESCRIPTION:

MATH 55A — INTERMEDIATE ALGEBRA A — 2.50 units

Concepts covered in the first half of Mathematics 55 Intermediate Algebra, including: An introduction to functions; linear and absolute value functions; absolute value equations and inequalities; compound linear inequalities; rational expressions, functions and equations; radical expressions, functions and equations; rational exponents; and complex numbers. Multiple representations, applications and modeling with functions are emphasized throughout. May not receive credit if Mathematics 55 or 55X have been completed.

2.50 Units Lecture

Prerequisite

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

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

Grading Methods:

Letter or P/NP

Discipline:

	<u>MIN</u>
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. MATH110
- B. MATH110B

IV. MEASURABLE OBJECTIVES:

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

- A. Determine whether or not an equation, table or graph represents a function;
- B. Use function notation;
- C. Given a function, determine the domain and range and express them in interval notation;
- D. Sketch the graphs of linear, absolute value, rational, and radical functions;
- E. Solve compound inequalities, sketch the graph of the solution and use appropriate set and interval notation to express the solution;
- F. Solve absolute value equations and inequalities and, where appropriate, sketch the graph of the solution and use set or interval notation to express the solution;
- G. Simplify, add, subtract, multiply and divide rational expressions;
- H. Solve rational equations;
- I. Write radical expressions with rational exponents;
- J. Simplify, add, subtract, multiply and divide radical expressions;
- K. Simplify, add, subtract, multiply and divide expressions with rational exponents;
- L. Solve equations involving radicals;
- M. Add, subtract, multiply and divide complex numbers;
- N. Develop and use equations or function models to analyze and solve applied problems involving linear, rational, or radical expressions.

V. CONTENT:

- A. Functions

1. Definition
2. Representations of functions
 - a. Verbal
 - b. Symbolic
 - c. Numerical
 - d. Graphical
3. Identifying a function
4. Domain and range
 - a. Interval notation
5. Types of Functions
 - a. Linear functions
 - b. Absolute value functions
 - c. Polynomial functions
 - d. Rational functions
 - e. Radical functions
 - f. Operations with functions
- B. Linear Functions
 1. Representations
 2. Domain and range
 3. Linear models
 4. Midpoint formula
- C. Compound Linear Inequalities
 1. Solving
 2. Union and intersection
 3. Number line
 4. Interval notation
- D. Absolute Value Functions
 1. Representations
 2. Domain and range
 3. Absolute value equations
 4. Absolute value inequalities
- E. Review of Factoring Techniques
- F. Rational Expressions
 1. Review
 - a. Simplification
 - b. Undefined expressions
 - c. Multiplication and division with rational expressions
 - d. Addition and subtraction with like denominators
 2. Addition and subtraction with unlike denominators
 3. Simplification of complex fractions
- G. Rational Equations
 1. Solving
 2. Applications
- H. Proportions and variation
- I. Radical Functions
 1. Radical notation
 2. Simplifying radicals
 3. Addition, subtraction, multiplication and division of radical expressions
 4. Rational exponents
 5. Radical functions
 - a. Square root functions
 - b. Cube root functions
 - c. Power functions
 - d. Representations
 - e. Domain and range
 - f. Equations involving radicals
 - g. The Distance Formula
- J. Complex Numbers
 1. Definition
 2. Complex conjugates
 3. Addition, subtraction, multiplication and division with complex numbers
 4. Powers of i

VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. Homework
- C. Assigned readings in the text
- D. **Internships** - assignments
- E. Web-based tutorials
- F. Group and individual activities in class

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: Students explore concepts related to rational functions, their graphs and asymptotes by completing a series of problems that develop these concepts. The assignment uses realistic rational models to give meaning to the concept of asymptote. 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: Using multiple representations (tabular, graphical and algebraic), students explore translations of the square root and cube root functions and the effect of translation on the graphs of the functions and their domains and ranges. Technology may be used to enhance students' conceptual understanding.

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 *Intermediate Algebra*. 4th ed., Brooks/Cole, 2008.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Scientific calculator