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Course Outline for MATH 107

PRE-ALGEBRA

Effective: Fall 2011

I. CATALOG DESCRIPTION:

MATH 107 — PRE-ALGEBRA — 4.00 units

This course is intended to serve as a bridge between arithmetic and Elementary Algebra. It includes a review of arithmetic, operations involving signed integers, fractions, and decimals, variables and variable expressions, simple linear equations and their graphs, percent and proportion, introduction to statistics, geometry and measurement, and application problems.

3.00 Units Lecture 1.00 Units Lab

Grading Methods:

Letter or P/NP

Discipline:

	MIN
Lecture Hours:	54.00
Lab Hours:	54.00
Total Hours:	108.00

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

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

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

- A. perform accurate computations with whole numbers, fractions and decimals, signed and unsigned, without using a calculator;
- B. simplify and evaluate variable expressions;
- C. demonstrate a knowledge of ratios, proportions and percentages and their application;
- D. demonstrate knowledge of geometric figures and their properties;
- E. demonstrate a knowledge of the English and metric units of length, area, volume, mass, temperature and time;
- F. solve linear equations involving multiple steps;
- G. analyze and construct graphs of data;
- H. construct graphs of linear equations in two variables in a rectangular coordinate system;
- I. calculate mean, median and mode from a set of data;
- J. apply the concepts learned to specific real-life applications, such as, simple interest, business and finance, restaurants, bank statements, etc.

V. CONTENT:

- A. The real numbering system
 - 1. Natural numbers and integers
 - 2. Addition, subtraction, multiplication and division of signed numbers
 - 3. Addition, subtraction, multiplication and division of fractions
 - 4. Addition, subtraction, multiplication and division of signed decimals
 - 5. Order of operations using signed numbers
- B. Properties of operations
 - a. Commutative law
 - b. Associative law
 - c. Distributive law
- C. Algebraic Expressions
 - 1. Evaluate
 - 2. Simplify using order of operations
- D. Linear equations in one variable
 - 1. Solve simple equations using the addition and multiplication property of equality
 - 2. Solve multi-step equations using the above, combining like terms and the distributive property
- E. Percent
 - 1. Ratio and proportion
 - 2. Solving percent problems with equations
 - 3. Application Problems: Example include but not limited to:
 - a. Percentages: Compute sales price or amount of a sales tax
 - b. Rate: use unit pricing to determine the best buy
- F. Geometric figures and formulas

1. Perimeters
 2. Area
 3. Volume
 4. Triangles: Similar and Right
 5. Pythagorean Theorem and square roots
 6. Application Problems: Example include, but are not limited to:
 - a. Similar triangles, for example, measuring the height of a tree
 - b. Solving for the unknown length given a right triangle situation
 - c. Computing the cost of building a home or carpeting a room
- G. The English and metric systems
1. Length
 2. Area
 3. Volume
 4. Mass
 5. Time
 6. Temperature
- H. Statistics and graphing
1. Mean, median and mode
 2. Interpret graphs
- I. Linear Equations in Two Variables
1. Solutions of linear equations in two variables
 2. Table of Solutions
 3. Graphing by point-plotting

VI. METHODS OF INSTRUCTION:

- A. Lectures and Tutorials
- B. Classroom or small group discussion
- C. Computer assisted instruction (e.g., ALEKS or My Math Lab)
- D. Collaborative exercises on designated content
- E. Laboratory activities

VII. TYPICAL ASSIGNMENTS:

- A. Lab Activities/Computer Assisted Instruction
 1. Find a partner in the class and measure your heights two ways, one with a tape measure and two using similar triangle and shadows.
 2. Take an initial personalized interactive assessment of your skills on the computer using an appropriate computer software program.
 3. Practice simplifying algebraic expressions and continue to take the computer assessment on this topic until mastered.
- B. Homework-typical problems
 1. A wedding-cake recipe requires 12 cups of shortening. Being calorie conscious, the wedding couple decides to reduce the shortening by $3\frac{5}{8}$ cups and replace it with prune puree. How many cups of shortening are used in the new recipe?
 2. Evaluate $a + (b-a)^2$, for $a = 6$ and $b = 4$.
 3. The population of a town increased by 3500 to 4200. Find the percentage of increase in population.
 4. Solve $9(x - 4) + 13 = 4x + 12$.
- C. Collaborative learning exercises collected at the end of class
 1. A piece of land, to be used as a park, has been donated to the school. You are a member of the Student Design Committee, which will be responsible for the layout and design of the park. Use the diagram of the part on page 2 to make your plans as you work with the committee to answer the questions in Part I. Part II will be the final report from the design committee.
 2. Complete the "Just State the Facts" worksheet on adding and multiplying mixed numbers.

VIII. EVALUATION:

- A. **Methods**
- B. **Frequency**
 1. Four or more exams
 2. Comprehensive final exam
 3. Group work weekly
 4. Homework collected regularly and graded for accuracy and completeness

IX. TYPICAL TEXTS:

1. Hutchison, D., Bergman, B., and Baratto, S. (2010). *Prealgebra, Media Enhanced Edition* (3rd ed.). New York, NY: McGraw Hill.
2. Bittinger, M., Ellenbogen, D., and Johnson, M. (2008). *Prealgebra* (5th ed.). Boston, MA: Addison Wesley.
3. Bach, D. and Leitner, P. (2006). *PreAlgebra-Mathematics for a Variable World* (3rd ed.). New York, NY: McGraw Hill.

X. OTHER MATERIALS REQUIRED OF STUDENTS: