COURSE SYLLABUS: MATHEMATICS for ELEMENTARY TEACHERS

MATH-231   Fall 2008 CREDITS: 3

INSTRUCTOR: _____   PHONE: 293-2011   E-Mail: _____

OFFICE:_____   OFFICE HOURS: TBA   FINAL: See WVU Schedule of Final Exams

PREREQUISITES: Math 126 or Math 124

TEXTs: Musser, Burger and Peterson. (2008). Mathematics for Elementary Teachers.. New York: John Wiley & Sons, INC. , 8th edition

GRADES:

1)   There will be three announced tests (100 points each) and one comprehensive final (200 points) during the semester. The tests are closed book and closed notebook.

2)   There will be several in-class and take- home assignments/quizzes during the semester - usually one or two per week with group work often required. Upon completion, each assignment/quiz is turned in and graded. **These may not be made up or done in advance.**

3)   There will be weekly in class laboratory assignments. Upon completion, each *TEAM* assignment is turned in and graded. Ten percent of each laboratory grade is given for working cooperatively. All in class laboratory scores will be averaged for a possible total of 100 points. **Students not present during the normally scheduled lab session must attend the make up session to receive credit for the lab in question**.

4)   Some of the points on laboratory assignments and group assignments are awarded for the student's ability to communicate about mathematics and work with others.   Points will be deducted from individually completed "group" assignments as well as from late assignments. Assignments may only be turned in during class time. Late assignments will only be accepted the next class meeting with a 10 percent of the grade deducted.

5)   Each individual instructor will assign work to be graded worth up to 100 points. An individual instructor may include points for attendance, additional homework problems, reports... One assignment for these points will be to develop a 5 to 7 page report. This assignment will be discussed in class. A **hard copy (no emails)** of the 5-7 page report is due by the last day of class and will not be accepted late. Each instructor will hand out during the first week of class a description of how these 100 points may be earned.

6)   Consistent with WVU guidelines, students absent from regularly scheduled examinations or laboratories because of authorized University activities will have the opportunity to take them at an alternate time.   A make-up time is scheduled during lab during the last week of the semester for those who contact the instructor _before_ the absence. Any other make up work will be at the discretion of the instructor.

7)   If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services. (293-6700)

8)   West Virginia is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, gender, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

9)   This course has been certified as part of WVU's Liberal Studies Program, Math and Natural Sciences (cluster C). The course will focus in part on developing your ability to communicate effectively, understand alternative views and cultures, and use quantitative and scientific knowledge accurately.

GRADE SCALE:

720 - 800 points	A	
640- 719.9 points	B	
560 - 639.9 points	C	
480 - 559.9 points	D	
0 - 479.9 points	F	

ASSIGNMENTS: Homework will be assigned throughout the semester. All homework is not collected or graded.

CONTENT: Course content will contain topics from problem solving; sets, functions, and logic; introductory geometry; constructions and similarity; concepts on measurement; and motion geometry and tessellations. Applications of mathematics using algebra and geometry will be connected with activities on computer software such as *Derive* and *Geometer's Sketchpad* and Java Applets. The graphics calculator will be used when appropriate during lecture sessions.

COURSE CONTENT WILL BE SELECTED FROM THE FOLLOWING TOPICS:

1. Introduction to Problem Solving
    a. The Problem-Solving Process and Strategies
    b. Three Additional Strategies
2. Sets, Whole Numbers, and Numeration
    a. Sets as a Basis for Whole Numbers
3. Elementary Logic
4. Rational Numbers and Real Numbers, with an Introduction to Algebra
    a. The Rational Numbers
    b. The Real Numbers
    c. Functions and Their Graphs
5. Geometric Shapes
    a. Recognizing Geometric Shapes and Definitions
    b. Analyzing shapes
    c. Properties of Geometric Shapes: Lines and Angles
    d. Regular Polygons and Tessellations
    e. Describing Three-Dimensional Shapes
6. Measurement
    a. Measurement with Nonstandard and Standard units
    b. Length and Area
    c. Surface Area
    d. Volume
7. Geometry Using Triangle Congruence and Similarity
    a. Congruence of Triangles
    b. Similarity of Triangles
    c. Basic Euclidean Constructions
    d. Additional Euclidean Constructions
    e. Geometric Problem Solving Using Triangle Congruence and Similarity
8. Geometry Using Coordinates
    a. Distance and Slope in the Coordinate Plane
    b. Equations and Coordinates
    c. Geometric Problem Solving Using Coordinates
9. Geometry Using Transformations
    a. Transformations
    b. Congruence and Similarity using Transformations
    d. Geometric Problem Solving Using Transformations

COURSE OBJECTIVES:

1. Solve a given word problem involving two or more operations with real numbers.
2. Perform arithmetic operations involving fractions, mixed numbers, and/or decimals.
3. Solve problems involving the use of percent.
4. Solve problems involving the use of ratio and proportion.
5. Identify and/or use the appropriate formula to solve a given problem.
6. Define given geometric terms.
7. Distinguish between inductive and deductive reasoning.
8. Identify the relationships of points, lines, planes, and angles.
9. Identify the relationships of rays and segments.
10. Identify types of angles.
11. Identify types of polygons.
12. Apply the principles of congruence and similarity to solve problems involving polygons.
13. Apply the principles of ratio and proportion to solve problems involving similarity of plane figures.
14. Apply the properties of polygons in formal proofs.
15. Calculate the measurements (including area) of various polygons.
16. Calculate the area or circumference of a given circle.
17. Solve problems involving angles and/or arcs of circles.
18. Identify the graph of a given quadratic equation.

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CATALOGUE DESCRIPTION: Techniques of arithmetic computation derived from the properties of the real number system, logic, informal geometry, and the metric system.

TEACHING METHODOLOGY: This course will be taught using the lecture/discussion method and cooperative/collaborative group method during appropriate sessions. A computer laboratory will be used for technology based learning. The use of graphing calculators will be promoted during lectures.

OUTLINE OF COURSE CONTENT: **(tentative due to course revisions in progress)**

Week	Book Sections	Lab
1	Course Introduction, Problem Solving	No Lab
2	Problem Solving	Lab 1: Tower of Hanoi - (Derive)
3	Sets and Logic	Lab 2: Baby Sitting - (Derive)
4	Logic	Lab 3: Shock of Discovery - (Geometry applet)
5	Real Numbers, **Test 1**	Lab 4: Replicators - (7th grade applet)
6	Topics from Algebra	Lab 5: Garden - Example I in lab (Math 231 applet) Garden - Example 2 - **homework** (Math 231 applet)
7	Topics from Algebra	Lab 6: Box - (Geometry applet) Triangular numbers - **homework** (7th grade applet)
8	Geometric Shapes	Lab 7: Polygon Area - (7th grade applet)
9	Geometric Shapes	Lab 8: Constant Area - (Algebra I applet)
10	Measurement, **Test 2**	Lab 9: Circle Diameter - (Algebra I applet)
11	Measurement	Lab 10:Circle Area - (Algebra I applet) Sectors of Circles - **homework** (7th grade applet)
12	Congruence	Lab 11:Pythagorean Area - in lab (7th grade applet) Pythagorean Theorem - **homework** (7th grade applet)
13	Similarity	Lab 12: Properties of Similar Polygons - Proportions in lab (7th grade applet) Properties of Similar Polygons - Perimeter and Area - **homework** (7th grade applet)
14	Constructions, **Test 3**	Lab 13: Intro to Sketchpad and Euler Line (Sketchpad)
15	Geometry Using Transformations Final Paper due the last day of class	Make - Up Labs and Tests