Course: Math 1420 - Structure of Mathematical Systems **Fall 2006**

Instructor: Dr. Andrew Wilson
Office: Claxton 329B **Hours**: MWF 11:15 - 12:15; M 1:15 - 4:15, TR 9:30-11:00; Or by appointment.
Phone: (931) 221 - 7843 **Email**: wilsona@apsu.edu **Web**: http://www.apsu.edu/educ/mathed

Course Description: Topics include proportionality, the real number system, probability, data analysis, geometry, and measurement. Emphases are problem solving, multiplicative thinking, number sense, and communicating mathematics concepts with language, symbols, and concrete and pictorial representations. This course is reserved for students seeking elementary or middle school teaching licensure.

Prerequisite: A mathematical background equivalent to high school algebra I & II and geometry. Math 1410 is recommended.

Text: "Shapes and Measurement", "Measuring Uncertainty" and " Collecting, Representing and Interpreting Data" modules from *Reconceptualizing Mathematics*, San Diego State University (Available in Printing Services in the basement of the library)

University Goals: The course goals below are consistent with the following university goals:
(1) Skills of inquiry, abstract and logical thinking and critical analysis;
(2) The ability to understand and use numbers and statistics.

Course Goals: In this course, students should:
• Acquire an understanding of the significance of decimal representation of rational and irrational numbers and the classification of real numbers
• Acquire an increased understanding of percent and interest
• Become familiar with geometric terminology
• Learn techniques for geometric measurements
• Learn basic probability concepts and procedures
• Learn basic problem solving techniques in the context of rational numbers, interest and percentage, geometry and probability
• Acquire an increased understanding of the nature of mathematics
• Reinforce a positive attitude toward mathematics
• Gain an understanding of the appropriate use and interpretation of the language and symbols of mathematics
• Acquire increased understanding of the nature of mathematical equality
• Gain confidence in one's mathematical ability

Philosophy of the course: The philosophy of mathematics education that underlies the choice and instructional methods is consonant with the vision of mathematics education depicted in the 2000 NCTM document *Principles and Standards for School Mathematics*. We assume that students learn by constructing meaning for the concepts and symbolism they encounter as they actively engage in problem solving. Thus, as instructors we strive to create an environment in which pre-service teachers can explore mathematics. We also assume that not only are we teaching mathematics explicitly through our instruction but we are also implicitly providing a model for how one might approach teaching mathematics. Thus, we reflect on the pedagogy at two levels:

1) How well does the instruction help students, who are pre-service teachers, to learn mathematics; and
2) How well does the instruction prepare pre-service teachers, who are our students, to think about teaching mathematics?

Nature of Instruction:

As often as possible, concepts are approached from a problem solving viewpoint. Mathematical explorations involving materials (e.g. base ten blocks), calculators, and computer applications provide contexts for some of the concepts taught. Lecture and demonstrations are used when appropriate.

1. Time and experience are important elements in learning mathematics.
2. Mathematics should not be fragmented for purposes of instruction or evaluation.
3. Because this course emphasizes – among other things – being able to communicate about mathematics, tests in this course probably look different from other tests students have experienced.
4. Testing should provide a learning experience as well as a means for summative evaluation.

Class Attendance:

Regular and prompt class attendance is expected as an indication of commitment and professionalism. Being absent five days will constitute a mandatory failure or withdrawal, whichever is appropriate. Three tardies will count as one absence. Leaving early is also considered being tardy since class time is missed.

Disabilities:

Any student who has a condition that may affect his/her academic performance is encouraged to make an appointment with me or with the Coordinator of Disability Services who is located in Clement 140, telephone 221-6230, voice 221-6278; voice tty, to discuss this matter.

Withdrawal:

October 9, 2006 is the last day to drop the course with an automatic "W." November 9, 2006 is the last day to withdraw with a "W", "F", or "FA."

Policy on Minors:

Minors (any non-student under the age of 18) accompanying staff, faculty, students, or visitors on campus are not permitted in the classroom.

Academic and Classroom Conduct:

Students are expected to conduct themselves appropriately at all times. Academic and classroom misconduct will not be tolerated. Students must read the "Code of Student Conduct" in the new Student Handbook for an understanding of what will be expected of them within the academic setting.

Out-of-Class Requirements:

Assignments are given every day. Problems come from the textbook and from teacher-prepared handouts. Students are expected to read and interpret mathematical exposition. Students are expected to check the class web site between class periods for updates, information, corrections, etc…

Homework::

At the BEGINNING (first five minutes) of each of ten days, homework will be checked or collected. During this time, students should be comparing results and preparing any questions they have about homework. Each student will receive between zero and five points based upon the homework attempts. I expect to see something recorded for every question. If you have no idea how to work a problem, at least record the important information or write what you think you know. The lowest homework grade will count as extra credit. NO LATE HOMEWORK WILL BE ACCEPTED. Five minutes after class starts is considered late.

Homework Review:

Before each test, there will be a Homework Review assignment with problems that address the major ideas covered since the previous test. These problems will be presented at the board.

Presentations:

Every student will be expected to present at least two homework or homework review problems at the board, which will be worth up to 10 points (2 points for a correct solution; 2 points for correct notation and language; 2 points for style; and 4 points for a thorough and reasonable explanation.) Students may earn 2 extra points for each additional presentation.

Grading:

There will be 3 major tests and one comprehensive final exam. There will be one make-up test given at the end of the semester. Cell phones, pagers, and other such electronic devices should be turned off during class. Each interruption from such a device will result in a 2-point deduction.

Assessment	Points Each	Total Points
Homework (8)	5	40
Presentation (2)	10	20
Tests (3)	100	300
Final Exam	150	150
Total		510

A, [90%, 100%); B, [80%, 90%); C, [70%, 80%); D [60%, 70%); F [0%, 60%)

*The course schedule and procedures are subject to change in the event of extenuating circumstances.

A mid-term grade will be awarded for all students in this course. The grade awarded may not necessarily be based on 50% of the course requirements and may or may not differ from the final grade. Your mid-term grade will be posted on AP Web. The grade posted will be the first exam score.