

The Department of Mathematics Education
EMAT 4600/6600. J. Wilson

COURSE SYLLABUS
SPRING 2006

Course: EMAT 4600/6600 Problem Solving in Mathematics

Instructor:

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Office hours: I maintain an open door policy for office hours. I come to the office early each morning and if I am not tied up in a meeting or talking to another student I am available to you.

Prerequisites for EMAT 4600/6600: MATH 2210 or permission of the instructor.

Comment for Middle School Teachers. Middle school teachers have in the past been recommended for this course. It appears not to be a "good fit." Please talk with me and other students in the class before you panic and flee. We will work with you to make the course a positive experience.

Course Description

This course will concentrate on solving, or attempting solve, mathematics problems. How can one implement problems solving goals and activities in mathematics instruction without first becoming a problem solver?

The emphasis is on exploration of various mathematics contexts to learn mathematics, to pose problems and problem extensions, to solve problems, and to communicate mathematical demonstrations.

The problems will come from many sources and contexts. The primary ground rule is that the problem situations can be investigated with pre-calculus mathematics. We will use problem contexts to pose problems, explore mathematical relationships, examine the use of resources -- media, technology, references, or colleagues -- to engage in mathematics problem solving. Inquiry, investigation, exploration will be significant descriptors of what we want to accomplish.

Contextual Teaching and Learning (CTL)

This course and others will be part of the University of Georgia implementation of the concepts of Contextual Teaching and Learning (CTL). From the USOE Web Site on CTL, we have the following description:

Contextual teaching and learning is a conception of teaching and learning that helps teachers relate subject matter content to real world situations and motivates students to make connections between knowledge and its applications to their lives as family members, citizens, and workers and engage in the hard work that learning requires. Contextual teaching and learning strategies:

- emphasize problem-solving;
- recognize the need for teaching and learning to occur in a variety of contexts such as home, community, and work sites;
- teach students to monitor and direct their own learning so they become self-regulated learners;
- anchor teaching in students diverse life-contexts;
- encourage students to learn from each other and together; and
- employ authentic assessment.
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General Information about CTL

[**Mathematics Education Department CTL Site**](#)

[**USOE CTL Web Site**](#)

[**UGA CTL Site**](#)

See:

[**The mathematics of irrigation systems.**](#)

[**Geology surface mapping.**](#)

[**Pollution Cleanup**](#)

[**Golf Course Maintenance**](#)

[**Contextual Teaching and Learning \(CTL\) Report: North Georgia Hydro**](#)

Course Assignments

There is no textbook.

Course assignments and materials (especially problems sets) are mostly available on this Web Site

<http://jwilson.coe.uga.edu/EMT725/EMT725.html>.

Material will also be given via **handouts**, via **class demonstrations**, and via use of **references**. Occasionally, a problem or problem context will come up during the class discussions, either from class members or when the discussion jogs my memory of a repressed problem. Obviously, students are encouraged to locate appropriate problems from other materials of interest to them.

Using the Web Site, handouts, references, and ingenuity, each student will define and accumulate a mathematics **problem resource**. The resource may be a Web Site created by the student, or it may be a looseleaf notebook, or it may be some combination of media or other organization. The substance of the resource is the student's organization of problem material, solutions, comments, and instructional notes.

I will help you create a Web Site if you want it. However, a resource (notebook) can be assembled without any use of technology or the internet except to have access to the problems.

Objectives

To explore problem solving in mathematics as

- . . . a curricular goal
- . . . an instructional strategy
- . . . the essential core of mathematics
- . . . a process for doing mathematics

To develop a "can do" approach to mathematics problems solving.

To understand and describe mathematics problem solving as more process than product.

To become a mathematics problem solver.

To use technology to solve mathematics problems.

To use problem contexts to create mathematics demonstrations.

To use Contextual Teaching and Learning concepts.

To use problem solving to construct new ideas of mathematics for yourself.

To engage in mathematical investigations.

To engage in some independent investigations of mathematics topics from the secondary school curriculum or appropriate for that level.

To communicate mathematics ideas that arise from mathematics investigations.

To consider ways to **assess** problem solving performance.

Attendance

You are expected to attend class. (Why is it necessary in 2001 for faculty to have to make such a statement?) If you have to miss for reasons other than illness, see me prior to the absence. If you are ill, your first priority is your health and the health of others. See me afterward and we will work with you.

Absences without good reason is grounds for withdrawal from the course.

Grades and Requirements

Grading is a necessary part of what we do and it is my intention to base grades on performance in meeting the requirements of the course. This performance includes the following:

1. Attendance

2. Participation

-- working with others

-- class discussions

-- investigations

3. The "resource" or notebook

- Problems with solutions, comments for use in class, modifications of problems, extensions
- Some organization to the resource that makes sense

- A CTL section
- Notes

4. Final assignment.

This will be in lieu of a final examination and in large part will draw heavily from material you and I select from your resource.

These items do not have the security inherent in criteria on some set of examinations. I do not believe the usual "tests" are appropriate. Rather, with some discussion to understand what we are about, "tests" might, for example, be replaced by an open assignment for exploration.

Classroom

Most of our sessions in will be in Room 111/113. This room is equipped with a demonstration computer that I plan to use quite a bit. Computers in Room 111/113 and elsewhere will be available for our use. (Note: It is possible that you could avoid any use of a computer or a TI-81 calculator during this course, but why would you want to?)

UGA Academic Honesty [Policy](#)

The University of Georgia seeks to promote and ensure academic honesty and personal integrity among students and other members of the University Community. A policy on academic honesty has been developed to serve these goals. All members of the academic community are responsible for knowing the policy and procedures on academic honesty.