EMAT 4500/6500
Connections in Secondary Mathematics
Fall 2008

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"Two people must first contradict each other if they really wish to understand each other. Truth is the child of argument, not of fond affinity." – Gaston Bachelard, 1940

Office hours
By appointment; please email or call.
If you have a question or concern about the course or an assignment, please do not hesitate to contact us. You are welcome to stop by 105 Aderhold (the main Math Ed office) to see if we are available; however, if you call or email ahead of time we can work to coordinate our schedules with yours.

Course description
This course is about connections within mathematics itself and between mathematics and contexts outside it. The principal focus is on a deeper analysis of problems and concepts from high school mathematics. The goals of this course include deepening our own understanding of mathematical ideas and developing an understanding of the kinds of mathematical thinking we would like to see in high school students.

Course structure
The course will consist of in-class activities and discussions, written assignments, a midterm exam, and a final project. The assignments will include problem sets, research and reflective writing assignments that will allow us to explore several big ideas from high school mathematics. The final project is an exploration of a mathematical concept from the secondary curriculum.

Course topics (subject to change)
Our main focus will be on the mathematical process standards of problem solving, reasoning and proof, communication, connections, and representation. We will focus on mathematical processes within the contexts below:

- Real and complex numbers
- Number system structures
- Trigonometry
- Calculus

Required textbooks
National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author. (This is available from NCTM either online or in printed form. If you are an NCTM member, online access is free.)

Fendel, D., Resek, D., Alper, L., & Fraser, S. (2007). *Interactive Mathematics Program: High Dive*. Emeryville, CA: Key Curriculum Press. (We will be using this during the second

half of the semester. It is a stand-alone unit of the IMP curriculum, the last entry on the following page: http://www.keypress.com/x5480.xml#Stand-Alone%20Units)

Expectations

Attendance and participation are essential in this class, both for you to learn and so that others may benefit from your input. Attendance is expected because most of class time will be spent on group discussions and activities. The ideas and concepts presented cannot easily be transmitted through class notes. You are responsible for all announcements made in class even if you are not there. It is important that you arrive in a prompt and timely fashion. If you find it necessary to miss class due to illness or other emergency, please notify the instructor by email ahead of time or as soon as possible after class of the reason for the absence. A written assignment will be expected to partially compensate for missed class material. For every unexcused absence, your course grade will be docked two percentage points.

Cell phones should be turned off prior to class. If you may need to answer your cell phone due to an unusual situation, please notify the instructor and set your phone to vibrate prior to class. You should step outside the classroom to answer it.

All assignments are due at the beginning of class on the stated due date; a late assignment will receive a full letter-grade deduction for each day it is late. All assignments are to be completed in a professional manner. This includes proof-reading your assignments to ensure that you are communicating your ideas clearly. Some assignments will be submitted via WebCT; these will be indicated ahead of time with due dates and times clearly stated. For these assignments, WebCT will record the time at which the assignment was submitted. It is best not to wait until the very last minute to submit an assignment in case you may experience technical difficulties. Be sure to check to make sure your submission appears in WebCT before you log out of the program.

Class Participation

Your participation is very important to your learning in this class. In addition, your contributions to class discussions may help your classmates to learn important things about mathematics and about teaching. Thus, a significant part of your course grade is your class participation. This includes participating in both small group and whole class discussions by asking and answering questions, challenging your classmates' contributions, and offering explanations and clarifications during mathematical discussions. Completing the weekly reflections and participating in the interviews will also be reflected in this grade.

Interviews

One way that we would like to find out about you, what you know, and what you learn in the class is to talk to you. To that end, in lieu of an assignment in the first and last weeks of the semester, we will ask you to participate in individual interviews that will last at most an hour.

Weekly reflections

Each Thursday, you will be asked to write a short reaction to course activities and submit it via WebCT. Reflections will be due each Friday by 5 PM. We will post a question for you to answer or ask you to respond to a particular statement or activity. In addition to answering the questions, you should feel free to provide feedback about what you are learning or how the course could be improved. The completion of these reflections will be part of your class participation grade.

Problem sets
Part of the goal of this course is to learn to construct and recognize a good mathematical explanation. Solutions should be written in such a way that a classmate could understand your reasoning. That is, an answer alone will receive little credit, and an answer involving only symbols will be considered incomplete. Students are encouraged to collaborate when solving homework problems. However, each student is expected to write his or her solutions independently. Be careful to allow yourself enough time to think through the problem on your own as you write your solutions. Solutions may be typed or clearly hand written; unreadable work will not be graded, so if in doubt, use a computer. In general, these will be assigned on Thursdays and due the following Thursday.

Research and reflective assignments
All research and reflective assignments must be typed, double-spaced, in 12-pt font. These should be completed professionally, using appropriate software to insert mathematical symbols, equations, and graphs. As you complete these assignments, take note of the resources you are using, and give credit to these authors. Part of teaching is learning to adapt ideas and materials that are developed by someone else, and you should always cite the source of an idea, problem, or activity. Unless otherwise stated, you should work individually on these assignments. These assignments will include a process standards group assignment, a reflection on sessions attended at the GCTM Rock Eagle Mathematics Conference, an indirect measurement assignment, and various smaller assignments assigned throughout the semester.

Final project
The final project is an opportunity for you to explore a mathematical topic on your own in a way that is similar to how we explore mathematical ideas in class. The project will include conducting a concept analysis for a mathematical concept. More detail will be given as the course progresses.

Course materials

Mathematical Tools
At various points in the semester, you may need a ruler, protractor, compass, graphing calculator, and graph paper. While we will not use these during every class, you may find it helpful to bring them with you on a regular basis since it is difficult to predict precisely when you may find them useful. We will use other technological tools such as the TI-Nspire calculators and laptop computers equipped with mathematics software during some classes. These will be provided for your use during class.

Notebook
You may find it helpful to keep course materials in a notebook and bring this to class on a regular basis. We will often refer back to previously considered problems or activities as we work on other problems.

Readings and Handouts
Most readings and other course materials will be available on WebCT.

UGA resources
You will be asked to write about both mathematics and teaching in this course. You may find that you engage in more writing in this course than in many of your other courses. You are expected to complete this writing in a professional manner, using standard formats. In particular, you are expected to cite your sources using APA style. An online guide to APA style is available from the UGA library website (http://www.libs.uga.edu/ref/citation.html). Additional assistance

with writing is available from the UGA Writing Center (see http://www.english.uga.edu/writingcenter/home.html).

Memberships

We suggest that you join the National Council of Teachers of Mathematics (NCTM) and subscribe to the *Mathematics Teacher*. Student membership is $39, and you may join online at http://www.nctm.org. It is also a good idea to join the Georgia Council of Teachers of Mathematics (GCTM). See http://www.gctm.org. Student membership is free for juniors and seniors. We expect that you are already a member of University of Georgia's Mathematics Education Student Association (MESA). Membership dues are $5 for undergraduates and $10 for graduate students. MESA is an opportunity to interact with all members of the Department of Mathematics and Science Education on a more informal basis. See http://www.coe.uga.edu/mesa.

Academic Honesty

All students are responsible for knowing the University's policy on academic honesty as expressed in "A Culture of Honesty" and found on the website http://www.uga.edu/honesty/. *All academic work submitted in this course must be your own unless you have received my permission to collaborate and have properly acknowledged receiving assistance. It is my responsibility to uphold the University's academic honesty policy and report my belief of dishonesty to the Office of the Vice President for Instruction.*

Grading

Most assignments will be graded according to the following scale (which will be adapted according to the number of points for each assignment). This rubric may also be used for individual parts of an assignment (such as individual problems in a problem set). Please note that an A signifies exemplary work that goes beyond the basic requirements of an assignment.

- A Exemplary work demonstrating solid understanding and insight
- B Satisfactory work demonstrating understanding
- C Almost satisfactory work with insufficient detail or lacking a required element
- D Deficient work demonstrating little grasp of key ideas or lacking more than one required element
- F Failing work

The course grade will be calculated using the following weights.

Graded assignments	30%
Midterm exam	25%
Class participation	20%
Final project	25%

EMAT 6500 Credit

If you are taking this course for graduate credit, you will be asked to go above and beyond the undergraduate requirements for the course. Please set up a time to discuss this with Dr. Conner during the first week of the course. There are several ways in which this might be done. One possibility is to write a concept analysis for a concept within each major unit of the course. Another is to keep a learning journal in which you reflect on what and how you are learning after each class. You may suggest other possibilities for earning graduate credit in this class.

This syllabus is a flexible plan for the class and may change. Any changes will be discussed in class and announced as early as possible.