



The University of Georgia

Department of Mathematics Education  
EMAT 4680/6680, J. Wilson

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## COURSE SYLLABUS

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Last modified on **August 18, 2005**

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(Statement required by the University)

*A course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.*

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**Course: EMAT 4680/6680 Technology and Secondary School 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 (usually 7:30 to 8:00) and if I am not tied up in a meeting or talking to another student I am available to you.

**Prerequisites for EMAT 4680/6680:** MATH 2210. If you have not studied inferential and differential calculus, discuss the situation with me.

## Objectives

- To become familiar with and operational with using technology tools in doing mathematics.
- To solve mathematics problems using application software.
- To create mathematics demonstrations using application software.
- To construct new ideas of mathematics for yourself using application software.
- To engage in mathematical investigations using software applications.
- 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 applications on the MacIntosh.
- To communicate mathematics ideas using various technology tools.
- To facilitate mathematics investigations and communication about mathematics investigations using general tools such as word processing, paint and draw programs, spreadsheets, and

the Internet.

## Course Description.

This course will concentrate on using various software applications to solve mathematics problems, to organize pedagogical demonstrations, and to set up problem explorations. Students on campus will use application software owned by the Department of Mathematics Education and will carry out the course using primarily MacIntosh computers. All materials for the course are maintained by an Internet Web page site and students will create and use web documents in the course. Students off campus who have access to their own server have an option put their web productions on their own server and link to the course page.

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 following software will be used:

## Graphing Calculator 3.5

**Graphing Calculator 3.5** is the new version of a computer program, Graphing Calculator, that comes bundled with PowerPC computers. It is available on all machines in our laboratory in Room 111/113. Version 3.5 will graph relations (implicit functions) as well as functions, and can be used for parametric equations, polar equations, 3D graphs, and more. See <http://www.pacifict.com>. A Windows version of Graphing Calculator 3.5 is also available. It is available for purchase from the web site for either Macintosh Power PC computers or Windows computers. See also <Http://www.nucalc.com/studentdiscount.html> for

information on purchasing this product as a student. (Scan your student ID to get \$40 price)

[Click here](#) to open a sample Graphing Calculator 3.5 file (.gcf)

## Geometer's Sketchpad.

GSP is a dynamic geometric construction package with features that include construction tools, measurement tools transformation tools, and animation tools. Geometer's Sketchpad is published by [Key Curriculum Press](#). We are using version 4.06. Version 4.06 has many features not available in Version 3.0 and does some tasks differently. GSP is available for both Macintosh and Windows and files transfer from one platform to the other. See the web site for information on purchase of a student version for approximately \$40. It is also available at the UGa Bookstore.

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To see a GSP example [click here](#). Then double-click on "Animate."

For a GSP with a Script Tool example [click here](#). When the script screen opens in GSP, open a new sketch and select two points, as instructed, to "play" the script.

Patterns formed by concentric pentagons rotating in opposite ways are shown in [Pentamotion](#).

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## Excel

Excel is a second generation spreadsheet program that allows creation and manipulation of a data array and the immediate graphing of selected subsets of the array. It is a

part of MicroSoft Office that is widely used on both Windows and MacIntosh platforms.

## **xFunction**

xFunction is a freeware program for graphing functions, displaying information on functions, and other utilities.

## **Tool programs for word processing and drawing.**

It is useful to be able to go from any application program to present output within a discussion and to print that discussion on the printed page. Microsoft Word is one of several word processing programs available. Various "paint" programs provide useful drawing capabilities.

## **PageMill 3.0.**

Pagemill is one of many utility programs available for creating HTML documents for Web sites. It is our choice for the computers in Room 111/113. Other such utilities, such as Microsoft Word, Netscape Composer, or Clarisworks can be used. Any HTML editor will be okay.

## **Dreamweaver MX**

Another utility program for creating and editing web pages.

## **Netscape 7.2 or Internet Explorer 5.2**

Browser software for reading internet files. Netscape also has an embedded program for html page editing (Netscape Composer).

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## Project InterMath.

Project [InterMath](#) is a National Science Foundation supported project to introduce mathematics technology to middle school mathematics teachers and help them improve their mathematics background. It implements a similar instructional philosophy to this course but at the middle school level. Visit this website to see a huge selection of mathematics investigations in algebra, number, geometry, and statistics. See also the [Interactive Mathematics Dictionary](#).

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## A note on EMAT 4690/6690.

EMAT 4690/6690 is a follow-up course to EMAT 4680/6680 offered usually Spring semester and it is an extension of EMAT 4680/6680 in two senses. First it allows more advanced use of these software packages as well as other applications. Second, it emphasizes the development of *units* of material (e.g. sequences of lessons) that might be used with secondary school students.

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## Course Assignments

There is no textbook.

The class will use fully ethernet networked computers in Room 111/113. All assignments will be given and turned in via the Web Site at <<http://jwilson.coe.uga.edu>> or placed on the student's own web server and linked to this Web Site. We will have access to and learn to use various network tools.

For those who can not resist killing off a few trees, there is a printer . . .

## **Time on computers**

You can not expect to accomplish what you should from this course without time on the computers that is in addition to the time we have in class. The usual expectation of 2 hours study outside of class for every hour in class is probably a minimum. There are several MacIntosh laboratories available in this building and across campus.

## **A note on computers**

We are scheduled to hold this class in Room 111/113 with a laboratory of Macintosh G4 and Macintosh G5 computers. There are some additional Macintosh G4

computers in Room 105m, Room 228, Room 615, and in the EMAT office area.

In general, the application programs we will use in this class will run on any of the Macintosh computers except the oldest machines. There are distinctions such as operating systems and hard disk drives that have to be accounted for. If you have your own Mac, or access to one, I will help you get set up to run these programs on it (if it is possible)

Most Macs today run with operating system 9.2.2, 10.2.8, 10.3.9, or 10.4.x. In general, as operating systems have improved over time, most people move to the newest system. Our machines in Room 111/113 use System 10.3.5 or 10.4.x.

Most of our software is also available for Windows machines. The functionality of some other Windows software is similar to what we use. Certainly the Windows environment could be used for implementing this course. Students can work at home on a Windows computer and transport to these Rm 111/113 machines via removable media (e.g. CD disks or USB thumb drives) or the network. It is also possible to set up FTP access to the server so that your web productions can be implemented from a remote site. Expect to experience a few hang-ups but it will work. Further, software or hardware with similar functionality is available on many hand-held devices. You would need Windows versions of GSP and Graphing Calculator 3.5 on your computer to fully implement this 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

on the computer  
working with others  
class discussions  
investigations

3. Write-ups

4. Final Projects

I think # 1 and # 2 are rather obvious. We will have repeated opportunities to discuss #3 and # 4. But for the terminally anxious. . .

**A.** There will be 13 **Assignments**. These are guides or suggestions for explorations and participation arranged around a variety of topics. There will be a "**Write-up**" for each assignments except Assignment 0.

No. You do not need to "hand in" each assignment. You do not even have to do them. It is hard to imagine how you could benefit from the class if you avoid them. . . .

**B.** Each person will develop a personal Web Page for the course.

C. There will be a set of "Write-up" projects. These are the "homework" for the course. The Write-ups will be prepared as an HTML documents (i.e. a Web Page document) and linked to your personal web page.

D. The Final Projects are in lieu of a final examination, will take considerably longer than an examination, and is due on the day of our scheduled final examination.

E. [What is a WRITE-UP?](#)

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### UGA Academic Honesty [Policy](#)

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