

Mathematics 5344
Mathematics-specific Technologies
Summer 2014

Instructor: Dr J. Epperson

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Office: PKH 423

Class Meetings: June 2-6, 7:30-9:20; June 9-18, 5:30-9:20 in PKH 305 or PKH 313 (Computer Lab)

Office Hours: By appointment

Course Goals:

- ❑ To explore software and other technology that can be used in mathematics teaching;
- ❑ To strengthen familiarity with technology that may be used in today's mathematics classrooms;
- ❑ To develop and experience lessons incorporating the use of technology; and
- ❑ To increase competence with currently available technology as a vehicle for increasing the ability to navigate and evaluate future technology developments.

Overview: We will spend approximately five meetings of the semester on GeoGebra, two using the graphing calculator/CBR/CBL, and five meetings using *Mathematica* and freeware from the internet. We will meet each day in the computer lab (PKH 313) unless otherwise directed to meet in PKH 305 on a given day. The course will depend heavily on group interaction and collaboration in the lab.

Materials:

- ❑ Software: GeoGebra (freeware available at: www.geogebra.org)
- ❑ USB flash drive for saving work done in the computer lab.
- ❑ TI83-Plus or TI84 calculator

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Details About the Course

Final Project:

You are to develop a lesson, with accompanying lesson plan and materials, which is enhanced by or grounded in the use of the mathematics-specific technologies used or presented during this course. The written portion of the project consists of the lesson plan, accompanying electronic files, and a two page reflection on the Math 5344 course. You will also prepare a 15-minute video presentation to highlight and illustrate the use of mathematics-specific technologies in your lesson. The written portion and accompanying files are due on June 23rd. The 15-minute video is due June 23rd. You will need to upload it to YouTube and send me the link. You will receive more detailed instructions in a separate handout.

Midterm Projects:

Two mathematical teaching problems will be assigned for which you will use a prescribed technology to demonstrate. These will be handed in as files in your individual Dropbox folder that I have shared with you. An accompanying type-written explanation and justification of the mathematics knowledge and technology commands used in your demonstration is also required for each problem. Use of copyrighted materials can be used for “inspiration” but the work submitted must be your own original work and cite any sources used.

Classwork/Homework/Quizzes:

Several times during the course, classwork or portions of classwork may be collected. For example, the instructor may ask you to upload classwork files to the individual Dropbox folder created for you. It is important to keep good records of your work during class as short quizzes may be given based upon classwork. In addition, homework involving short reviews, demonstrations, or explorations freeware may be assigned.

A few research and practitioner articles on technology use in the classroom may be assigned as well as short in-class presentations with a partner or individually. For each article assigned a two-page summary and reflection will be collected and graded.

Class Participation:

Much of our class time will rely upon your actively participating in group or partner discussions. Thus, your class participation grade will rely upon your attendance and your actively engaging in class/group discussions.

Grades:

Midterm Project 1	30%
Midterm Project 2	15%
Classwork/Homework	15%
Class participation	10%
Final Project	30%

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TOPICS: Additional topics covered will be drawn from the following (subject to refinement or modification by the instructor to take into account interests, backgrounds, resource availability, logistics, scheduling/sequencing issues, and balance between depth and breadth):

* Overview: the “Technology Principle” of the NCTM Principles and Standards for School Mathematics (2000, pp. 24-27); a brief summary can be found at <http://www.nctm.org/standards/content.aspx?id=26809>

* Internet (applets, calculators, manipulatives, simulations, etc.)

- illuminations.nctm.org/
- nlvm.usu.edu/en/nav/vlibrary.html
- www.shodor.org/interactivate/tools/

* Graphing Calculators (e.g., TI-84 Plus) and/or GC-based laboratories (CBL-2, CBR), sensors or probes;

- education.ti.com/educationportal/
- www.calculator.com
- www.shodor.org/interactivate/activities/sketcher/index.html
- www.shodor.org/interactivate/activities/flydata/index.html
- education.ti.com/educationportal/sites/US/nonProductMulti/nspire_cas.html
- www.vernier.com/mb1/labpro.html
- resources and downloads for APPS, see:
- http://education.ti.com/educationportal/sites/US/nonProductMulti/apps_latest.html?bid=5
- Guidebooks (User Manuals) and Apps (Applications), etc. available at <http://education.ti.com/educationportal/sites/US/sectionHome/download.html>
- for a computer to “emulate” your calculator: www.ticalc.org/programming/emulators/
- also, check out GraphCalc in Bell Hall lab
- check out the “Technology Tips” article in the August 2004 Mathematics Teacher

* DGS: Dynamic Geometry Software (e.g., Geometer’s Sketchpad (GSP), Cabri-Geometry)

- www.keypress.com/sketchpad/
- education.ti.com/educationportal/sites/US/productDetail/us_cabrijr_83_84.html
- www.geom.uiuc.edu/software/tilings/TilingSoftware.html

* CAS: Computer Algebra System (software with symbolic manipulation capability, such as Mathematica, Maple, MathCad, Derive; calculators such as TI-89, TI-92, Voyage 200)

- www.wolfram.com/
- <http://demonstrations.wolfram.com/>
- en.wikipedia.org/wiki/List_of_computer_algebra_systems
- en.wikipedia.org/wiki/Computer_algebra_system

* various other sources of freeware from the internet

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Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located down the hallway. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Student responsibility primarily rests with informing faculty **at the beginning of the semester and in providing authorized documentation through designated administrative channels.**

If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated.

Academic Integrity: Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:
I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Grade Replacement and Grade Exclusion Policies: These policies are described in detail in the University catalog and can also be founded online at http://www.uta.edu/catalog/content/general/academic_regulations.aspx#10 (scroll about half way down the page).

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Student Disruption: The University reserves the right to impose disciplinary action for an infraction of University policies. For example, engagement in conduct, alone or with others, intended to obstruct, disrupt, or interfere with, or which in fact obstructs, disrupts, or interferes with, any function or activity sponsored, authorized by or participated in by the University.

Drop for Non-Payment of Tuition: If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Course Schedule *

Date	Topic or Activity
June 2	1st Day Handouts; Overview of Course; GeoGebra Introduction
June 3	GeoGebra: Geometry
June 4	GeoGebra: Algebra
June 5	CENSUS DATE GeoGebra: Animations
June 6	GeoGebra: Lesson Development
June 9	GeoGebra: Lesson Development/Graphing Calculator
June 10	Graphing Calculator, CBR, CBL
June 11	Mathematica Introduction
June 12	Mathematica: Conics
June 13	Mathematica: Parameterizations
June 16	Mathematica: Series and Animations
June 17	Mathematica/Freeware Explorations
June 18	Virtual Class (Skype): Final Project DUE (in Dropbox) by June 23 rd .

* *As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Dr. James A. M. Epperson*