

MATH 4644: Fall 2016

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Office Hours: Monday 2:00-5:00, Tuesday 10:00-noon T, or by appointment

Class Meeting: MW 11:15 AM-12:30 PM in Room 126 of the Math Emporium

Text: There is no textbook for this course. However, you will need to purchase a *TI-Nspire CX* with student software:

<https://education.ti.com/en/us/products/calculators/graphing-calculators/ti-nspire-cx-handheld/tabs/overview>

Miscellaneous: We will be using laptop computers in the MIPAC room. These machines require that you have a Virginia Tech wireless account. Make sure that your wireless account is working before our first class.

Course Description: The course is designed to help participants develop an appreciation for the power of computers, calculators, and other technological tools in mathematics education, an ability to select appropriate software, and knowledge and confidence to use technology in instruction. Course activities will provide students with a review of important secondary mathematical concepts, but more importantly, will help them become familiar with current issues in mathematics education, specifically those related to technology. Course participants will explore a range of computer software and calculator applications. They will become proficient with several software packages and learn how technology can help in solving specific mathematics problems and modeling mathematical situations. The main type of course activity will be solving mathematics problems using technology. We will explore mathematical problems using graphical hand-held devices (e.g., Nspire/Nspire CAS handhelds) as well as computer software (e.g., spreadsheets, dynamic geometry software, and computer algebra systems). Technology makes some mathematics more accessible. In fact, it is argued that it makes some previously unavailable concepts available for the first time. At the same time, some mathematics may become obsolete. Throughout the course, we will consider questions related to these claims:

- How does technology influence what mathematics should be taught?
- How does technology otherwise impact teaching?
- How does technology affect students' learning?
- How do technology-intensive mathematics classrooms differ from the classrooms in which we may have learned mathematics?

Class Participation and Attendance: Much of the success of this course depends on your level of interaction and participation throughout the semester. We will spend most of our class time working on problems and activities, sharing ideas, solution strategies, insights, and questions. During class sessions, your preparation for class (e.g. whether you completed assignments) and the quality of your participation in course activities will be assessed. Clearly, without being present, you cannot participate in the ways that are needed in this course. *Absences and excessive tardiness* will impact your final grade.

Teaching Portfolio (website): You will build an electronic portfolio to demonstrate understanding of effective use of technology in teaching mathematics. This portfolio should be organized around activities and lessons for various technologies and framed by your philosophy of teaching with technology. This portfolio will be the beginning to your Masters portfolio requirement that will highlight elements of the [10 INTASC Standards](#). Each completed assignment will address the [technology checklist](#) for licensure in VA.

Projects: Included in your portfolio will be two major projects, which will be graded separately. One will be a Calculus Project, which will focus on the use of technology for building students' understanding of the Fundamental Theorem of Calculus. The other will be a Statistics Project, which will include data collection and analysis in answering a problem of interest to you.

Blog: Each week, you will be asked to read an article or complete an activity that relates to using technology in the classroom. You will be required to blog about your understanding of the material. The blog will be used to formulate your philosophy on using technology in the mathematics classroom. You may set up a blog using the [Virginia Tech blog site](#), Google's [Blogger](#) or any other site you may be familiar with (I would need the link).

Grading: Class Participation/Blog 25%; Projects 50% (25% each); Portfolio 25%

Final Exam: In lieu of a final exam, you will each present highlights from your two project and your portfolio during the final week of classes. Your presentation will count as part of your portfolio grade.

Tentative Schedule

Week	Monday	Wednesday
1: Aug 22 & 24	Excel: Limits	Excel: Limits
2: Aug 29 & 31	GSP: Covariation	Geogebra: Rates of Change
3: Sept 7	No Class: Labor Day	FTC project draft 1 due
4: Sept 12 & 14	Desmos: Accumulating Rates	Desmos: Accumulating Rates
5: Sept 19 & 21	FTC project	FTC project draft 2 due
6: Sept 26 & 28	FTC project	FTC project
7: Oct 3 & 5	FTC project	Final FTC project due
8: Oct 10 & 12	Excel: Mean and Variance	TinkerPlots: Mean and Variance
9: Oct 17 & 19	TinkerPlots: Mean and Variance	Stats projects
10: Oct 24 & 26	Stats projects	Stats project draft 1 due
11: Oct 31 & Nov 2	Fathom: Statistics	Fathom: Statistics
12: Nov 7 & 9	Stats projects	Stats project draft 2 due
13: Nov 14 & 16	TI-Nspire	TI-Nspire
14: Nov 28 & 30	TI-Nspire	Final Statistics project due
15: Dec 5 & 7	Presentations	Presentations

