# ED 6639: Technology and the teaching and learning of mathematics

**Winter 2008**

**Classrooms**: Ed 4010
**Time**: Meetings on Tue 6:00 -9:00 pm
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**Intend:**

Recent curriculum changes in North America and, particularly, in Atlantic Canada (see *NCTM Curriculum and Evaluation Standards* and *Foundations for the Atlantic Canada Curriculum*) prompt mathematics educators, teachers, and curriculum developers to look at different ways of teaching and learning mathematics meaningfully. Among these ways is the use of technology in teaching and learning mathematics. NCTM recognizes technology as one of the principles for high quality teaching and learning of mathematics: technology enhances mathematics learning, supports effective teaching of mathematics, and influences what mathematics is taught.

The intend of this course is to provide experiences for students to reflect on the influence of technology in the teaching, learning and content of mathematics. We will try to cover a variety of technologies such as hand held and graphing calculator, some computer mathematics software, spreadsheets, and communication tools.

There is no expectations about students' entering experience and familiarity with technological tools, other than interest and openness to learn them. During the course you are encouraged to learn new for you pieces of technology and apply this knowledge to **create** an activity or assessment for your future use in the mathematics classroom. You are also encouraged to search and **adopt** potentially useful activities from the Internet.

In order to create or adopt a technology based activity we need to study some examples and principles of **evaluation and judgement** about what constitutes a *good mathematical activity* as well as principles of **how to incorporate** use of technology in traditional teaching of mathematics. The following reading resources will be available for you to copy:

1. Hershkowitz R. et al (2002) *Mathematics curriculum development for computerized environment: a designer-researcher-teacher-learner activity.* In: Lyn D. English (Ed.) Handbook in International Research in Mathematics Education. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.

2. Mariotti, M.A. (2002). *The influence of technological advances on students' mathematics learning.* In: Lyn D. English (Ed.) Handbook in International Research in Mathematics Education. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.

3. Yerushalmy, M. et al *Flux in school algebra curricular change, graphing technology, and research on student learning and teacher knowledge.* In: Lyn D. English (Ed.) Handbook in International Research in Mathematics Education. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.

4. Bottino, R. M. et al *Advanced technology and learning environments: their relationships with the arithmetic problem-solving domain.* In: Lyn D. English (Ed.) Handbook in International Research in Mathematics Education. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.

**Course Assignments and evaluation:**

1. **Critical reading and analysis of the four research articles** (above)..... 20%

The template for analyzing the logic of an article will be given in class. For each paper you are expected to read it and be prepared for an in class discussion. I will also ask you to submit up to 4 double-spaced pages of your analysis of the paper and some of your ideas on the topic of the paper. The due dates are **Jan 22, 29, Feb 5 and 12**.

2. **Building items for your teaching portfolio with technological tools** ..... 40%

For this part your are expected to create or adopt four mathematical activities or assessment items using technological tools of your choice (e.g. graphing calculators, excel, geometry software, etc). For each of your item explain how it benefits from using technology. Explain mathematical ideas to be learned and have teacher's notes for in-class implementation. **Please discuss with me mathematical topics and technological tools you are going to use before Feb 15**. You can **submit** your activities as you have them ready any time before the **end of March**. You can use some of them in your presentation in March.

3. **One hour presentation** with elements of teaching mathematics with technology..... 20%

The presentations will take place in March. The presentation is your opportunity to share with others what did you learn, create, adopt, found interesting in the Internet etc during the first two months of the course. You are expected to prepare a handout on your presentation to be distributed in class.

4. **Research paper** about using technology in teaching mathematics ..... 20%

The paper of about 10 double-spaced pages including references is due before **April 8**. You are invited to explore a topic of your interest along the lines of elements of technology and mathematics. The topic can be as diverse as calculators in testing, or it could focus on a concrete piece of technological manipulatives in teaching a concrete mathematical idea. Please follow the same template for writing your paper as you used for critical reading.