

**MATH 2590 -  
Thinking  
Mathematically I**

Professor: Mike Zabrocki  
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Office: TEL 2028  
Office hours: Monday 4-6pm and Tuesday 3-5pm  
Textbook: Thinking Mathematically by Mason, et. al.

Course description (from the calendar copy): The main objectives of this course include providing opportunities for students to achieve success in thinking mathematically and to reflect on the learning and practice of mathematics. Intended primarily, but not exclusively, for Education students in the PJ and JI streams. Prerequisite: Successful completion of at least 24 credits or permission of the course director. Note: This course is not open to any student who has taken or is taking another university mathematics course unless permission of the course coordinator is obtained. NCR Note: This course may not be taken for credit by any student who has taken SC/MATH 1580 3.00 prior to Fall 2009: NCR Note: This course may not be taken for credit by any student who has taken AS/SC/MATH 1580 3.00.

We will explore the meaning of "Thinking Mathematically" with several components of this course. First, we will explore some problem solving following the book "Thinking Mathematically" by Mason, et. al. The techniques developed in this book to attack 'easy-to-state hard-to-solve' problems are a good demonstration of the 'art' of mathematics. Solutions develop over a process of understanding the problem, followed by writing and explaining to express to others why your answer is correct. The other main component of this course will be to show places in everyday life where mathematics is used in technology, art and science to use as a starting point to discuss mathematics in the classroom. This will be sort of 'A Mathematician Reads the Newspaper' (John Allen Paulos) but with other types of topics.

Grades: The grade for this course will be broken down into three main components. Attendance is mandatory and your class participation is required. I will partially measure this by taking attendance and your overall grade will be marked down if you are not in class. Each evening course covers 3 hours and should you miss two courses this would consist of a significant amount of material.

Projects: 40%  
Journals: 30%  
Assignments:  
30%

Descriptions components are listed below and more details will be provided in class.

Journals (ongoing, final version December 7): This will be your record of the problems that you work on in class and your progress on them. You should obtain a bound notebook

that you plan to hand in at the end of the term (because I will be unable to evaluate ongoing assignments). You should divide this notebook into sections where you write about the problems that you are assigned and work on for this class. Your journal will be evaluated at the end of the course and I will ask you to hand it in on December 7. The journal should: (1) show that you made progress and solved all or most of the problems you were assigned (2) demonstrate how you arrived at your solutions by the examples you did and ideas that you pursued, (3) list resources (including fellow students) you consulted (4) at the end of the problem, provide a summary which explains the answer to the question to someone that does not know what the problem is about (5) your entries should consist of writing which is clear and grammatically correct (6) explains the most general statement you can make about the question (e.g. if the question is to explain something about an  $8 \times 8$  grid, don't just tell me what the answer is for an  $8 \times 8$  case, I want to know what happens for an  $n \times n$  checkerboard for any positive integer  $n$ ) (7) a complete solution should go beyond simply copying what we did in class since I will expect you to do work on these problems at home and extend beyond what we did together.

Assignments (ongoing, roughly every other week): These will consist of a small set of problems that I will give you in relation to the topic under discussion. Usually these few questions will develop after our discussions and will require you to learn some mathematics and hopefully the assignments will make it easier to see the relationship between the applications of mathematics and our topic.

Projects (topic title and description due Oct 5, written versions due Nov 2, final audio version due Nov 23): This component will consist of an oral and written report that will be submitted either alone or in pairs. To make this project out of the ordinary, I want it to be submitted as a podcast and the written component will be the script. This should be accompanied by mathematics exercises that ideally ties math concepts to the topic of your report. I will ask you to explore a mathematical aspect of world around us. Discussions in class will be similar to the type of problems that I would like you to explore.

The web page for this class has the most up to date information and additional material and can be found at:

<http://garsia.math.yorku.ca/~zabrocki/math2590f10/>