Department of Mathematics & Statistics
ConcordiaUniversity

> ## MAST 217
> Introduction to Mathematical Thinking
> *Winter 2015*

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Course Objectives: This courseis meant primarilyforstudentswho intend to pursue some concentration in mathematics or statistics at the university level.

The aim of this course is to introduce you to the work of mathematicians. Most math courses present the results of mathematicians' work; what we call mathematical results. In this course, we will focus on *how* mathematicians arrive at these results. In particular, we will consider the processes of conjecturing, solving, and proving.

List of topics: Some of the ideas that we will discuss include: what mathematical proofs are,different styles of mathematical proof, the difference between mathematical and everyday styles of argumentation, the roles of definitions, assumptions, examples and counter-examples in mathematical proof, and different problem solving techniques.

To illustrate these ideas we will consider mathematics that should be familiar to you (such as elementary notions about the real number system, geometry, and functions) and some mathematics that you might not be familiar with (such as the notions of equivalence relations, and cardinality).

Grading: The following grading scheme will be used:
- Homework/Assignments: 20%
- Four in-class quizzes: 40%
- Final examination: 40%

Note: There is no "100% final option" in this course. It is absolutely necessary to do the homework, assignments and quizzes.

Text: Primary sources:

- a set of *lecture notes* (which will include exercises) will be posted in the course's Moodle site;
- *handouts* with additional exercises and notes will be given in class or posted in the course's Moodle site.

Other references (these are in the library or can be borrowed from the instructor):

- *"Passage to abstract mathematics"* by Watkins and Meyer. Addison-Wesley.
- *"How to read and do proofs. An introduction to mathematical thought processes"*, by Sollow. Wiley & Sons.
- *"Mathematical Thinking, Problem Solving and Proofs"*, by D'Angelo and West. Prentice Hall.
- *"The Mathematical Method, A Transition to Advanced Mathematics"*, by Eisenberg. Prentice-Hall.
- *"Introduction to Mathematical Proofs – a transition"*, by Rober. CRC Press, Taylor and Francis Group.
- *"Mathematical Reasoning: Writing and Proof"*, by Sunstrom. Prentice-Hall.