CAS 701 Fall 2008

00 Preliminaries

William M. Farmer

Department of Computing and Software
McMaster University

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Instructor

- Dr. William M. Farmer
- Office: ITB 163
- Extension: 27039
- E-mail: wmfarmer@mcmaster.ca
- Web: http://imps.mcmaster.ca/wmfarmer/
- Office hours: by appointment

Mission

The mission of this course is to give students a graduate-level understanding of the logic and discrete mathematics that is needed for Software Engineering. The course will focus on the creation, use, and understanding of mathematical models. By the end of the course the student should:

1. Understand what the mathematics process is and how it is employed in software engineering.
2. Understand the logic principles underlying the mathematics process and embodied in first-order logic and simple type theory.
3. Understand the relationship between an axiomatic theory and its set of models.
4. Be able to read and write mathematical proofs.
5. Have a working knowledge of the discrete mathematics that is commonly used in software engineering.

Required Background

Students taking this course are expected to be familiar with:

1. Propositional and first-order logic.
2. Numbers, sets, functions, and relations.

Mechanics

- Course web site:

  `http://imps.mcmaster.ca/courses/CAS-701-08/`

- Recommended Textbook: K. H. Rosen, Discrete Mathematics and Its Applications, 6th Edition, McGraw-Hill, 2006. ISBN-13: 978-0073229720.
- Teaching assistant: Pablo Castro (`castropf@mcmaster.ca`)
  - Provide assistance with exercises
  - Mark exercises

Work Plan

- Lectures given by the instructor in class
- Five exercises outside of class
- One student presentation in class
- Midterm test during class time on Thursday, October 30
- Final exam during the final examination period

Academic Dishonesty

- Students are expected to exhibit honesty and use ethical behavior in all aspects of the learning process
- Academic dishonesty consists of misrepresentation by deception or by other fraudulent means
- Academic dishonesty includes:
  - Plagiarism
  - Copying
  - Improper collaboration
- Academic dishonesty can result in serious consequences
- Your work must be your own. Plagiarism and copying will not be tolerated!
- Students may be asked to defend their written work orally

Some Other Policy Statements

1. Significant study and reading outside of class is required.
2. The student is expected to ask questions during class.
3. A student may use calculators and his or her texts and notes during the midterm test and final exam.
4. Exercises may not be submitted late and the midterm test and final exam may not be taken later without prior approval from the instructor.
5. The instructor reserves the right to require a deferred final exam to be oral.
6. Suggestions on how to improve the course and the instructor's teaching methods are always welcomed.

Marking Scheme

Exercises (5)	25%
Presentation	10%
Midterm test	25%
Final exam	40%
Total	**100%**

Syllabus

00 Preliminaries
01 Introduction to Mathematics and Logic
02 Propositional Logic
03 Numbers, Sets, Functions, and Relations
04 Orders and Lattices
05 First-Order Logic
06 Equational Logic and Algebraic Reasoning
07 Recursion and Induction
08 Simple Type Theory
09 Temporal Logic and Model Checking (optional)