

**Ryerson University
Department of Mathematics**

**MTH714 –Logic and Computability
Fall 2008**

1. BASIC INFORMATION

INSTRUCTOR: Dejan Delic

OFFICE: ENG 228

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OFFICE HOURS: Tue 11-12, Wed 3-4

METHOD OF POSTING GRADES: final marks will be communicated by the Registrar's Office in December

COURSE WEBPAGE: <http://www.math.ryerson.ca/~ddelic/mth714/mth714.html>. [It will be assumed that students are familiar with the current content of the Webpage].

2. COURSE DESCRIPTION

CALENDAR COURSE DESCRIPTION: Propositional and predicate calculus, first order theories, models and review of semantics of logic, resolution proof, completeness, consistency, independence, undecidability. Logic programming (Prolog). Effective computability, evidence for Church's Thesis. Review of Turing machines, reducibility, halting problem, Rice's theorem, decidability of various formal language problems. [Other topics may also be covered]

PREREQUISITES: MTH110.

FOCUS AND OBJECTIVES: applications of mathematical logic in the theory of programming languages and theory of computability.

TOPICS: see the outline with the list of recommended homework questions. Some topics will be covered in handouts which will be made available on the course web-site in due time.

REQUIRED TEXT: *Mathematical Logic for Computer Science* (2nd Ed.) by Mordechai Ben-Ari (ISBN 1-852-33319-7).

OPTIONAL TEXTS: *Logic for Computer Scientists* by Uwe Schöning (ISBN 0-817-63453-3) , *Logic for Mathematics and Computer Science* by Stanley N. Burris (ISBN 0-132-85974-2), or *Logic, Programming, and Prolog* (2nd Ed.) by Ulf Nilsson and Jan Maluszynski (the last text is currently out of print but is available in the PDF format at <http://www.ida.liu.se/~ulfni/lpp>.)

SOFTWARE: In this course we will introduce a programming language, Prolog, which has various implementations. The version presented in the textbook is based on the SWI Prolog implementation, which is free and available to download from <http://www.swi-prolog.org>.

TEACHING METHOD: 3 hours of lectures + 1 hour of lab tutorials per week

3. EVALUATION:

- 25% Term work (assignments)
- 30% Midterm (1.5 hours) week of October 20 (tentatively)
- 45% Final Exam (3 hrs) during the examination period

TERM WORK: Term work consists of two or three assignments, distributed during class to be handed in at a later date (about 2-3 weeks working time). The problems are meant to be challenging and may require the use of a computer for their solutions. The assignments may be done in groups of up to two people. A group hands in one completed assignment with the names, student numbers and signatures of the group members, the signatures testifying to the fact that all group members have participated equitably in the completion of the assignment. Since you are given plenty of time to do them, later papers are marked down 20% per day late. Your solutions are expected to be accurate, complete and well-written. Points are awarded based on these criteria. Messy, unreadable, hard-to-follow solutions will be awarded little or no points.

MIDTERM AND FINAL EXAM: You will also be allowed one 8.5x11 sheet of notes (two-sided) for the midterm test and for the final exam.

NOTE:

- 1) You must bring a Ryerson Photo ID to the midterm or the final exam.
- 2) There will be **no** supplemental exam.
- 3) For grade assignment and academic misconduct policies, refer to the 2008/2009 undergraduate calendar and relevant Web-pages (please read the documents
<http://www.ryerson.ca/senate/policies/pol60.pdf>, <http://www.ryerson.ca/senate/policies/pol134.pdf>
and <http://www.ryerson.ca/senate/policies/pol135.pdf> carefully)

MISSED TERM EVALUATIONS or FINAL EXAM:

- 1) Students who cannot be present at a test or exam due to illness must contact the instructor on or before their first day back at school. You must also submit a *Ryerson-approved medical form* filled out by your physician stating, among other things, that you were too ill to attend school on the day of the evaluation and giving the expected duration of incapacitation (blank forms can be obtained from departmental offices, or downloaded from the Web – <http://www.ryerson.ca/rr/medical.htm>). Besides illness, only *extremely serious circumstances, properly documented* will be considered as valid.
- 2) Religious observance must be formally requested (i.e. with *proper forms submitted*; see www.ryerson.ca/senate/policies/pol150.pdf) within the first two weeks of classes.
- 3) Access Centre accommodation requests must be received *no later than a week* prior to a test or an exam.
- 4) If proper documentation is not received *within reasonable time* (generally, that means within 3 *working days* upon return to classes) the mark for the missed evaluation will be *zero*.

RE-MARKING OF TESTS:

- 1) Any oversight in the marking must be shown to the instructor *within ten working days* after the test has been returned.
- 2) If a test is submitted for re-marking, the *whole* test may be remarked.