

The University of Western Ontario
Department of Computer Science
CS 209 b: Applied Logic for Computer Science
Winter 2008

Course Description

This course presents an introduction to mathematical logic with an emphasis on topics which arise from current research and practice in Computer Science. The course is mathematical in nature. It will not involve computer work. Topics to be covered may include (not necessarily in this order):

- formal systems;
- the language of propositional logic;
- the language of predicate logic;
- translating natural-language statements into the language of formal logic;
- solving logical puzzles;
- formal deduction, proof theory, and proof techniques;
- application of logic to the design of computer circuits;
- application of logic to the control of large systems;
- application of logic to software specification;
- model construction;
- logic programming;
- non-classical logic.

Pre-requisites

See the Academic Calendar for details. The Academic Calendar is available at

<http://www.registrar.uwo.ca/calendars/>.

Without the pre-requisites or written permission of the department or the Dean, students' registrations will be removed from this course. This decision cannot be appealed. Fees will not be adjusted for students dropped from the course for failing to meet the requirements.

Literature

There is no mandatory textbook for this course. Students should take notes in class and work from these.

The instructor's notes will be made available electronically on the course website. Be advised that these are copies of the lecture overheads, not complete course notes, and are not a substitute for attending lectures. Moreover, these notes may contain errors which had not been discovered at the time when the notes were posted on the web.

There are quite a few books on mathematical logic in the library. They may be relevant to certain parts of the course and, for those, they could be useful background reading. There is, however, no book that would actually get close to covering the entire course.

For the core material, the instructor's preparation relies in part on the following book:

L. Zhongwan: *Mathematical Logic for Computer Science*. World Scientific, Singapore, 1989. This is an excellent book on the topic which, however, is a bit difficult to read.

Students who look for an alternative approach to the field might want to use the following books as supplementary reading:

J. Rubin: *Mathematical Logic, Applications and Theory*. Saunders College Publishing, Philadelphia, 1990.

P. G. Hinman: *Fundamentals of Mathematical Logic*. A. K. Peters, Wellesley, Mass., 2005. The approach taken in the course is, however, quite different from that in these books.

Students who take books out of the library for this course are urged not to keep them for longer than a few days so that fellow students can also gain access.

Additional literature is listed in the course notes.

Course Website

The address of the course website is

<http://www.csd.uwo.ca/courses/CS209b>

(observe the upper and lower cases). Course material will be posted there. It is the students' responsibility to check for information there on a regular basis.

Schedule of Lectures

The course hours – Monday and Wednesday, 11:30–13:10 in P&AB 34 – will be used for lectures or laboratory sessions as needed. In particular, there will be very few laboratory sessions in the first three weeks with their number increasing towards the end of the term. Laboratory sessions will typically involve review work or, possibly, in-class solving of problems by students.

Classes start on 7 January, 2008.

There will be no final examination. Instead, there will be short weekly tests (of up to 30 minutes) in class, starting in the week of 14 January, 2008. The last one of these will be given in the week of 31 March, 2008. These tests will be given in the Wednesday class and may cover any material of the course covered until and including the preceding Monday class.

The week of 25–29 February is study/conference week. There will be no classes during that week. Students should use the week to catch up with the course, work on exercises and study for the midterm test.

There will be one mid-term test on Monday, 3 March, 2008, 11:30 to 13:10, in class. There will be none of the regular in-class short tests in that week. As this information may still change, students should verify date, time and location a few days prior to the test.

According to university policy, no special make-up tests will be available save for exceptional reasons (see the Calendar for the rules).

Students missing a test should see the instructor or the the TA with the usual written documentation. Requests for exceptions must be made in writing; email will not be accepted as a substitute in such cases.

There will be no marked assignments; however, exercise sheets will be handed out usually every Monday to assist students in their preparation.

The *rules about scholastic offences* and about *penalties* as printed in the Academic Calendar apply. This information is available at

<http://www.registrar.uwo.ca/calendars/>.

Unfamiliarity with these rules or their meaning will not be considered a valid excuse.

Student Evaluation

The 10 weekly tests are worth 7.5% each, amounting to a total of 75%. The midterm test is worth 25%.

All computations of marks will be performed in such a way, that rounding errors do not affect the outcome. The final mark will be rounded to one digit after the decimal point using standard rules.

All students are expected to attend all classes. Attendance records may be taken at random times. A student found to be missing a significant number of classes without acceptable reasons (see the Calendar for these) risks being denied a passing grade.

Exam Rules

All tests are *open-book*.

Marking and Re-Marking

When marked, tests will carry the initials of the person who marked them. In case of questions regarding the marking, students should first see the person who marked the paper. If the questions cannot be resolved at this stage, the instructor should be consulted.

For re-marking the following rules apply, and students are expected to accept and follow these rules:

- Students need to indicate the items of concern in writing.
- Test will be remarked completely, not just single questions.
- All requests for re-marking need to be submitted within a week of when the mark was available, excepting special circumstances.

All requests for re-marking must be made in writing; email will not be accepted as a substitute.

Communication

All requests regarding special exemptions, absence, re-marking etc. must be communicated in writing (that is, on paper), dated and signed and must include information as to how the student can be reached (not just an email address). For these purposes, email will not be accepted.

Announcements concerning the course material may sometimes be made by computer mail. Similarly, questions concerning the course material can be asked and will be answered by mail. The mail address of the course is

`cs209@csd.uwo.ca`.

Do not use the *personal* email addresses of the instructor or the teaching assistants, as your email is not likely to be read there.

Instructor

The course will be taught by Dr. Helmut Jürgensen. Office hours: Monday 10:30–11:20, office: MC 28A-3.

Further Information

Additional information will be given in class or on the course web pages.

There will be TA/CAs helping with this course. They will be introduced in class. They will also have regular office hours for consulting which will be announced in class.

30 December, 2007