

CSC 330: LOGICAL SPECIFICATIONS

Course Information

Instructor: Hector J. Levesque

Office: Pratt 398E *Telephone:* 978-3618

Office hours: TBA

Email: hector@cs.toronto.edu

Tutors: TBA

Meeting times:

Lectures: TR 2

Tutorials: R 3 (tutorials are as mandatory as the lectures)

Textbook: There is no textbook for this course. Lecture notes will be made available on the Web.

Course web page: <http://www.cs.toronto.edu/~hector/Courses/330F05/>

Check this site regularly for announcements, lecture notes, assignments, and other handouts.

Evaluation: There will be five homework assignments, a midterm exam and a final exam, weighed as follows towards the final mark:

Homework	45% (10%, 10%, 10%, 10%, 5%)
Midterm exam	20%
Final exam	35%

To pass this course you *must* get a grade of 35% or better on your final exam.

Policy on late homework: Homework is due at the start of the tutorials, and will not be accepted late except for documented medical reasons or other emergencies. Once per term, however, you may hand in an assignment late with no documentation at the next lecture for a 30% penalty.

Policy on collaboration in homework assignments: Limited collaboration in thinking through solutions to homework problems is encouraged. No collaboration is allowed in writing up solutions. You may only collaborate with *up to two* other students; you may not collaborate with people who are not currently taking the course. Allowed forms of collaboration include brainstorming and discussing general approaches to the problems. After you are done with the talking, however, you must write up your solutions alone. Every sentence you write must be your own; if challenged, you must be able to reproduce and explain it by yourself. You may not check your solutions against those of other people, including those you collaborated with. If you realize that a solution you discussed with others is incorrect, you may alert them to that fact but you may not tell them what the correct solution is.

On the first page of each homework assignment you hand in, you must explicitly list all people with whom you discussed homework problems (even briefly), and which problems you discussed with each person. You will not be penalized for doing so; you may be penalized for not doing so. If you have discussed the homework with no one (except the professor or tutor), then write “*No outside discussion.*” Either way, the signed statement “*I have read and understood the policy concerning collaboration on homework assignments*” must also appear on the front page. Without these, your assignment will not be marked.

Violation of these rules constitutes a serious academic offense. In the past such violations have resulted in penalties ranging from receiving zero on the homework to suspension from the university.

Course goals: This course is an introduction to the methodology and techniques of symbolic logic that are most useful to computer scientists.

Prerequisites: CSC 236/238/240.

Tentative Syllabus:

- INTRODUCTION
 - Informal introduction to logical formulas
 - Expressing English queries and constraints as formulas
- TRUTH
 - What is a proof?
 - Syntax and semantics of first-order logical languages
 - The truth of quantified sentences
 - Finite and infinite domains
 - Proving formulas true or false in a structure
- QUERIES
 - Relational databases and queries
 - Safe queries
 - Using Prolog to evaluate queries
- ENTAILMENT
 - Logical entailment and equivalence
 - Proving entailment using structures
 - Proving non-entailment using counterexamples
 - Knowledge bases and entailment
- DERIVATIONS
 - Rules of inference
 - Formal derivations
 - Proving entailment using derivations
- SATISFIABILITY
 - Conversion to clausal form
 - Propositional SAT solvers
 - Resolution
- OTHER APPLICATIONS
 - Formal methods in software engineering
 - Model-checking for real-time systems

Rough Course Calendar:

September 13	First lecture
September 20	Assignment 1 handed out
October 4	Assignment 1 due and Assignment 2 handed out
October 18	Assignment 2 due and Assignment 3 handed out
October 25	Midterm exam (in class)
November 6	Last day to drop the course without penalty
November 8	Assignment 3 due and Assignment 4 handed out
November 29	Assignment 4 due and Assignment 5 handed out
December 8	Last lecture and Assignment 5 due