CSC 236: Introduction to the Theory of Computation
Course Information

Instructor: Hector J. Levesque
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Meeting times:
Lectures: TR 1
Tutorials: R 10 (tutorials are as mandatory as the lectures)

Textbook: The textbook for the course is *Introduction to the Theory of Computation* by Vassos Hadzilacos, available at the campus bookstore. Also, lecture notes will be made available on the Web.

Course web page: `http://www.cs.toronto.edu/~hector/Courses/236W06/`
Check this site regularly for announcements, lecture notes, assignments, and other handouts.

Evaluation: There will be four homework assignments, six mini-quizzes (in the tutorials), a midterm test (in the tutorial), and a final exam, weighed as follows towards the final mark:

Homework	28%	($4 \times 7\%$)
Quizzes	18%	($6 \times 3\%$)
Midterm test	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 distributed electronically, but is due in hard copy form at the start of the tutorials. Homework 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 following Tuesday 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.

Policy on remarking homework assignments: Homework or a test written in pencil or erasable ink will not be remarked. A request for remarking should be directed to the teaching assistant who marked the work. The teaching assistant is only required to remark once – if you still believe your solution is correct, you may appeal to the instructor.

Course goals: Mathematics is the science of precise reasoning and, as such, provides an indispensable tool for computer science. This course is an introduction to the methodology and techniques of mathematics that are most useful to computer scientists.

Prerequisites: CSC 148/150 and CSC 165.

Tentative Syllabus:

- INDUCTION
  - The principle of mathematical induction and its variants
  - Recursive definitions, structural induction
- PROGRAM CORRECTNESS
  - Preconditions and postconditions
  - Correctness proofs for iterative programs
  - Correctness proofs for recursive programs
- RECURRENCES
  - Solution of recurrence equations
  - Application to the time complexity of divide-and-conquer algorithms
- PROPOSITIONAL LOGIC
  - Syntax and semantics of propositional calculus
  - Propositional equivalences
- PREDICATE LOGIC
  - Syntax and semantics of the predicate calculus
  - First-order equivalences
- REGULAR EXPRESSIONS AND FINITE STATE AUTOMATA
  - Formal languages
  - Regular expressions
  - Finite state automata (FSA)
  - Equivalence of FSA and regular expressions
  - Pumping Lemma and its applications

Rough Course Calendar:

January 10	First lecture
January 19	First tutorial and Assignment 1 handed out
February 9	Assignment 1 due and Assignment 2 handed out
February 20-24	Reading week, no classes
March 2	Midterm test, Assignment 2 due, and Assignment 3 handed out
March 12	Last day to drop the course without penalty
March 23	Assignment 3 due and Assignment 4 handed out
April 13	Last lecture and Assignment 4 due