

University of Toronto
St. George Campus

**CSC238: Discrete Mathematics For
Computer Science**

CSC238
Fall 1999

Course Information

Instructor: James MacLean
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Office Hours: Tuesdays, 5–6pm, or by appointment
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Tutors:

Grzegorz Kondrak	(MP202, A–G)
Mohammad Mahdian	(MP118, Gr–Lu)
Yongmei Liu	(LM157, Ly–Shen)
Daniel Mayost	(LM155, Sho–Z)

Meeting times:

Lectures: Tuesday 7–9pm MP202
Tutorials: Tuesday 6pm

Course requirements: There will be 5 homework assignments, a midterm exam and a final exam.

Late homework policy: 20% will be deducted each day for two days (ending at 5pm each day), and 100% will be deducted thereafter.

Policy on collaboration in homework assignments: Limited collaboration in thinking through solutions to homework problems is allowed. 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. What you hand in must be your own work; 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 realise 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. If you have collaborated with others on homework, you must list their names on your homework. You will not be penalised for doing so; you may be penalised for not doing so. Violation of these rules constitutes a serious academic offence. In the past such violations have resulted in penalties ranging from receiving zero on the homework to suspension from the university.

Marking scheme:

Homework	40%
Midterm exam	20%
Final exam	40%

To pass this course you must get a grade of 35% or better on your final exam. All homeworks will be weighed equally.

Textbook: Custom-published lecture notes available at the bookstore.

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: CSC148 or equivalent; high-school mathematics.

Tentative Syllabus:

INDUCTION

- The principle of mathematical induction and its variants
- Recursive definitions, structural induction

PROGRAM CORRECTNESS

- Application of induction to correctness proofs of iterative and recursive algorithms

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
- Application to the design of digital circuits

PREDICATE LOGIC

- Syntax and semantics of the predicate calculus
- First-order equivalences
- Application to query languages for relational databases

REGULAR EXPRESSIONS AND FINITE STATE AUTOMATA

- Regular expressions
- Finite state automata (FSA)
- Equivalence of FSA and regular expressions
- Pumping Lemma and its applications

Course Calendar:

September 21	Assignment 1 handed out
October 5	Assignment 1 due and Assignment 2 handed out
October 19	Assignment 2 due
October 26	Midterm exam
October 26	Assignment 3 handed out
Friday, November 5	Last day to drop the course from academic record
November 9	Assignment 3 due and Assignment 4 handed out
November 23	Assignment 4 due and Assignment 5 handed out
December 7	Assignment 5 due, last class