

COMP 251 Data Structures and Algorithms.

WINTER 2010

Tuesday-Thursday 2:30-4:00 pm ENGTR 1080

Lectured by Prof. Claude Crépeau
Office: McConnell 110N, Phone: 398-4716

Summary :

Design and analysis of algorithms. Complexity of algorithms. Data structures. Introduction to graph algorithms and their analysis.
(3 Credit Hours)

Schedule Types: Lecture, Midterm Exam, Optional Tutorial

Prerequisites: either COMP 250 or COMP 203

Restriction: Not open to students who have taken or are taking COMP 252.
For students in the B.Eng. Program, credit will be given for only one of: COMP 431, COMP 251, COMP 360.

Restrictions:

May not be enrolled in one of the following Levels:

- Doctorate
- Masters & Grad Dips & Certs

May not be enrolled in one of the following Faculties:

- Faculty of Medicine
- Faculty of Law
- Centre for Continuing Ed
- Faculty of Dentistry

GRADING :

4 homework assignments : 40 %
Midterm exam : 10 %
Final exam : 50 %

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures

(see <http://www.mcgill.ca/integrity> for more information).

COURSE WEB PAGE:

<http://crypto.cs.mcgill.ca/~crepeau/COMP251/>

Mandatory textbook:

(available online from within McGill at

<http://library.books24x7.com/toc.asp?bookid=3444>)

Introduction to Algorithms, 3/e

By

Thomas H. Cormen,	Dartmouth College
Charles E. Leiserson,	Massachusetts Institute of Technology
Ronald L. Rivest,	Massachusetts Institute of Technology
Clifford Stein,	Columbia University

Contents:

* *Chapter 1: The Role of Algorithms in Computing*

* *Chapter 2: Getting Started*

* *Chapter 3: Growth of Functions*

Chapter 4: Recurrences

Chapter 5: Probabilistic Analysis and Randomized Algorithms

* *Chapter 6: Heapsort*

Chapter 7: Quicksort

Chapter 8: Sorting in Linear Time

Chapter 9: Medians and Order Statistics

* *Chapter 10: Elementary Data Structures*

Chapter 11: Hash Tables

* *Chapter 12: Binary Search Trees*

Chapter 13: Red-Black Trees

Chapter 14: Augmenting Data Structures

Chapter 15: Dynamic Programming

Chapter 16: Greedy Algorithms

Chapter 17: Amortized Analysis

Chapter 18: B-Trees

Chapter 19: Binomial Heaps

Chapter 20: Fibonacci Heaps

Chapter 21: Data Structures for Disjoint Sets

* *Chapter 22: Elementary Graph Algorithms*

Chapter 23: Minimum Spanning Trees

Chapter 24: Single-Source Shortest Paths

Chapter 25: All-Pairs Shortest Paths

Chapter 26: Maximum Flow

Chapter 28: Matrix Operations

Chapter 30: Polynomials and the FFT

Chapter 31: Number-Theoretic Algorithms

* *Appendix A: Appendix A - Summations*

* *Appendix B: Appendix B - Sets, Etc.*

* *Appendix C: Appendix C - Counting and Probability*

*The lectures for this course will be selected topics from the **bold chapters**. Maybe not all of them will be covered. Chapters marked with a star (*) will not be covered because you are expected to understand their content already. You may wish to read these chapters as reminders. Missing chapters will definitely not be covered.*