

# COMP 251 Data Structures and Algorithms.

## FALL 2016

Monday-Wednesday 14:30-16:00 ENGMC 204

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.  
+ *MATH 240 (Discrete Structures 1)* is strongly recommended.

**Restrictions:** Not open to students who have taken or are taking COMP-252.

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
- Centre for Continuing Education
- 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:

### *Algorithm Design.*

By

Jon Kleinberg and Éva Tardos, Cornell University.

This is the main, required text for the course. It is available on-line <https://www.vitalsource.com/products/algorithm-design-jon-kleinberg-v9780133072525> and on reserve in the Schülich library.

## Contents:

**1 Introduction: Some Representative Problems**

**2 Basics of Algorithms Analysis**

**3 Graphs**

**4 Greedy Algorithms**

**5 Divide and Conquer**

**6 Dynamic Programming**

**7 Network Flow**

*8 NP and Computational Intractability*

*9 PSPACE: A Class of Problems Beyond NP*

*10 Extending the Limits of Tractability*

*11 Approximation Algorithms*

*12 Local Search*

**13 Randomized Algorithms**

*The lectures for this course will be selected topics from the **bold chapters**. Maybe not all of them will be covered. Italic chapters will definitely not be covered.*

A few extra topics will be selected from another book:

### ***Introduction to Algorithms, 3/e***

By

Thomas Cormen, Charles Leiserson, Ronald Rivest & Clifford Stein.

(available (for free) online from within McGill at

<http://library.books24x7.com/toc.aspx?bookid=49924> )