

School of Computer Science  
University of Guelph

## CIS\*3490 The Analysis and Design of Algorithms

Winter 2018

### Instructor

Fangju Wang, 205 JD MacLachlan, X52939, fjwang@uoguelph.ca

### Advising Hours

Tuesday 12:00-1:00pm

Friday 3:30-5:00pm

### Teaching Assistants

Akshay Chada, Daniel Gabric, Mitra Kaviani, ta3490@socs.uoguelph.ca, TA advising hours: TBA.

### Calendar Description

The design and analysis of efficient computer algorithms are studied. Topics which will be studied include: standard methodologies, asymptotic behaviour, optimality, lower bounds, implementation considerations, graph algorithms, matrix computations (e.g. Strassen's method), NP-completeness.

### Course Objective and Topics

The objective of this course is to teach theory and techniques for designing and analyzing computer algorithms. The design techniques include divide-and-conquer, decrease-and-conquer, transform-and-conquer, dynamic programming, greedy techniques, iterative improvement, and backtracking. We discuss algorithms designed for manipulating data structures of lists, matrices, trees, graphs, etc. and for solving other problems. We also study mathematical methods for analyzing non-recursive and recursive algorithms, and discuss the problems of NP-completeness.

### Textbook:

- A. Levitin, *Introduction to the Design and Analysis of Algorithms* (3rd Edition), Pearson Education Inc, 2012.

The textbook is **required**. Lectures will closely follow the book contents. Assignments will include questions in the book.

### Course Moodle Page URL

<http://moodle.socs.uoguelph.ca/>

## Lab Schedule

|         |   |         |   |         |   |
|---------|---|---------|---|---------|---|
| Week of |   | Week of |   | Week of |   |
| Jan 8   | N | Feb 5   | Y | Mar 5   | Y |
| Jan 15  | Y | Feb 12  | N | Mar 12  | N |
| Jan 22  | Y | Feb 19  | N | Mar 19  | Y |
| Jan 29  | Y | Feb 26  | Y | Mar 26  | Y |

**Y** – labs in the week; **N** – no labs in the week.

## Assignments and Examinations

- Four assignments:  $7\% + 8\% + 8\% + 7\% = 30\%$
- Midterm examination: 20%
- Final examination: 50%

The **late policy** for assignments is: **NO** late assignment will be accepted.

## Evaluation Schedule

- Final examination: Wednesday, April 11, 2018 (07:00PM – 09:00PM)
- Midterm examination: Friday, March 2, 2018 (02:30PM – 03:20PM).
- Assignment **due** dates:
  - Assignment 1: Monday, January 29, 2018
  - Assignment 2: Monday, February 12, 2018
  - Assignment 3: Monday, March 12, 2018
  - Assignment 4: Monday, April 2, 2018

## Note:

- All assignments must be completed individually.
- All cases of **academic misconduct** are handled by the College Dean, in conjunction with the School Director. For details please see related pages in the *University of Guelph Undergraduate Calendar 2017-2018*.
- Requests for academic consideration because of illness or of a compassionate nature must be made in writing and accompanied by certification whenever possible.
- To appeal a mark of an assignment or the midterm examination you must do so within ten business days after it is returned.