

School of Computer Science  
University of Guelph

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

Winter 2017

### Instructor

Fangju Wang, J.D. MacLachlan 205, X52939, fjwang@uoguelph.ca

### Advisory Hours

Tuesday 2:30-3:30pm

Friday 1:00-2:20pm

### Teaching Assistant

Daniel Gabric, Evan Sala, ta3490@socs.uoguelph.ca, advisory 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 by using the techniques for manipulating data structures of lists, matrices, trees, graphs, etc. and for solving other problems. We also discuss mathematical methods for analyzing non-recursive and recursive algorithms, and address 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/>

## Labs

There are no regular labs.

## Assignments and Examinations

- Four assignments:  $10\% + 10\% + 10\% + 10\% = 45\%$
- Midterm examination: 20%
- Final examination: 40%

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

## Evaluation Schedule

- Final examination: Monday, April 24, 2017 (14:30 – 16:30).
- Midterm examination: Friday, February 17, 2017 (14:30 – 15:20).
- Assignment **due** dates:
  - Assignment 1: January 30, 2017
  - Assignment 2: February 13, 2017
  - Assignment 3: March 13, 2017
  - Assignment 4: April 3, 2017

## 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 2016-2017*.
- 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.