COSC 3P03: Design and Analysis of Algorithms

- Instructor: Ke Qiu
- Time and Location: Monday and Wednesday, 4:00-5:30 PM. AS 204.
- Office Hours, MCJ 306: (a) Thursday: 10:30 am-12:30 pm. (b) By appointment.

General Objectives

This is a course on the design and analysis of computer algorithms. It will include the following topics: lower and upper bounds for algorithms and problems, solving recurrences, advanced data structures, algorithm design techniques (divide and conquer, greedy algorithms, and dynamic programming)., and an introduction to NP-completeness. The algorithms covered include algorithms for sorting and searching, graphs, strings, and various combinatorial optimizations.

Learning Outcomes

Content

1. Understand that some problems have no algorithmic solution
2. Recognize problems have certain lower bounds
3. Describe major algorithm design techniques

Skills

4. Use and solve recurrences for recursive algorithms
5. Design, analyze, compare and explain algorithms.
6. Classify problems and apply appropriate algorithm design techniques.
7. Classify problems into complexity classes and perform polynomial reduction.

Values

8. Recognize the relationship between real-life problems and classical/combinatorial problems or their combinations

Recommended Textbook

Introduction to Algorithms, McGraw-Hill,
1st Ed., T. Cormen, C. Leiserson, and R. Rivest.
2nd Ed., T. Cormen, C. Leiserson, R. Rivest, and C. Stein.

Exams

One in-class midterm test: Oct. 30, Wednesday, One final exam.

Assignments

There will be a total of four (4) assignments. **No late assignment will be accepted.**

You may discuss assignments with your fellow students. But, please remember not to share solutions. The work you submit must be your own.

Cheating

Cheating and plagiarism as defined in the Academic Integrity section of the Calendar is strictly prohibited. *Cheating in any form will not be tolerated and will be dealt with severely.* A mark of 0 will be given to the offending assignment/exam. A second offence will result in a failing grade for the course. In both cases, the incident will be reported to the department and the registrar's office.

Marking Scheme

The marking scheme is as follows: 30% Assignments + 25% Midterm tests + 45% Final, or 30% Assignments + 10% Midterm + 60% Final, whichever is greater.