CSI-3105 Fall 2019
Design and Analysis of Algorithms
(3,0,0) 3 cr.

Course Description: Analysis of algorithms: worst-case analysis, complexity analysis, asymptotic notations and basic complexity classes. Algorithm design techniques: brute force, divide and conquer, dynamic programming, greedy, backtracking. Computational complexity of problems: lower bound arguments, the classes P, NP, NP-complete, dealing with NP-complete problems.

Prerequisites: CSI 2110, CSI 2101 or for honors mathematics students: CSI 2110, (MAT 2141 or MAT 2143).

Course Web Page: `http://cglab.ca/~jdecaruf/CSI3105.html`

Time & Location:

Tuesday 10:00 to 11:30	(MRT - 218)
Thursday 8:30 to 10:00	(MRT - 218)

Professor:

Name:	Jean-Lou De Carufel
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Office Hours:	TBA

Teaching Assistant:

Name:	TBA
Email address:	TBA
Office Hours:	TBA

Textbook:
Suggested reading.

- Sanjoy Dasgupta, Christos H. Papadimitriou and Umesh Vazirani. Algorithms. McGraw-Hill Education, 2006.

Other references.

- Gilles Brassard and Paul Bratley. Fundamentals of Algorithmics. Pearson, 1995.
- Thomas Cormen, Charles Leiserson, Ronald Rivest and Clifford Stein. Introduction to Algorithms (third edition). The MIT Press, 2009.
- Anany Levitin. Introduction to the Design and Analysis of Algorithms (third edition). Pearson, 2012.

Course Evaluation:
Assignments: There will be 3 assignments. The assignments are to be handed in directly to the professor by the due date and time. Assignments which are late by at most one day will lose 10%. Assignments received 24 hours or more after the due date and time will receive a grade of 0. Cheating on assignments will not be tolerated. For a full description of the current academic fraud regulations, please follow: `https://www.uottawa.ca/administration-and-governance/academic-regulation-14-other-important-information`. Once an assignment or the midterm is marked, I will announce in class that it is ready for pickup (to be picked up during office hours). No assignment or test marks will be reviewed more than 10 working days from the time they are available for pickup. It is your responsibility to check the web site frequently and make sure that your marks are correctly recorded.

Closed book exams: There will be two closed book exams during regular class hours. The first exam will take place on October 8, 2019 from 10:00 to 11:20. The second exam will take place on November 12, 2019 from 10:00 to 11:20. There will be a closed book 3 hour final exam scheduled in December.

Marking Scheme:

Assignment 1:	5%
Assignment 2:	5%
Assignment 3:	5%
Exam 1:	17.5%
Exam 2:	17.5%
Final exam:	50%
Total:	100%

Course Outline:

1. Introduction
2. The Divide and Conquer Approach
3. Graph algorithms
4. The Greedy Approach
5. The Dynamic Programming Approach
6. Lower bound arguments, the classes P, NP and NP-complete