

CSI-3105 Fall 2022
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: BrightSpace

Time & Location: This is an *in-person* course. No lecture will be recorded.

Monday 11:30 to 13:00 (CRX - C240)

Thursday 13:00 to 14:30 (CRX - C240)

Professor:

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Office Hours:	Thursday 14:30 to 16:00

Teaching Assistants:

Name: Saman Bazargani
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Name: Jinrong Guo
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Name: Saeed Odak
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Name: Frédéric Simard
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Office Hours: Friday 11:00 to 12:30

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 delivered on BrightSpace by the due date and time.
 - Deadline for Assignment 1: September 22, 2022 before 13:00.
 - Deadline for Assignment 2: October 6, 2022 before 13:00.
 - Deadline for Assignment 3: November 10, 2022 before 13:00.
- Online mini-tests: There will be three online mini-tests. You will have 30 minutes for each mini-test. You can decide when you want to write your mini-test ***within the time window allocated for it.***
 - Mini-Test 1: To be done directly in BrightSpace between Sept. 29, 2022 at 14h30 and Oct. 1, 2022 at 14h30.
 - Mini-Test 2: To be done directly in BrightSpace between Oct. 13, 2022 at 14h30 and Oct. 15, 2022 at 14h30.
 - Mini-Test 3: To be done directly in BrightSpace between Nov. 17, 2022 at 14h30 and Nov. 19, 2022 at 14h30.
- ***In-person*** midterms: There will be two ***in-person*** midterms. No documentation is authorized for the midterms.
 - Exam 1: October 17, 2022 from 11:30 to 12:50
 - Exam 2: November 21, 2022 from 11:30 to 12:50
- ***In-person*** final exam: There will be a 3 hour ***in-person*** final exam, scheduled in December. **The final exam will be a closed book exam. The final exam will cover all the material we cover this Fall.**

Cheating on assignments/mini-tests/exams 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>. No assignment, mini-test or exam marks will be reviewed more than 10 working days from the time it is marked. It is your responsibility to check the web site frequently and make sure that your marks are correctly recorded.

Marking Scheme:

Assignment 1:	0%
Assignment 2:	0%
Assignment 3:	0%
Mini-Test 1:	5%
Mini-Test 2:	5%
Mini-Test 3:	5%
Exam 1:	17.5%
Exam 2:	17.5%
Final exam:	50%
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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. Complexity classes P , NP and NP -complete
7. Lower bound arguments