

COMP-4433: Algorithm Design and Analysis (Winter 2025, Lakehead University)

Course Information Sheet

Professor: **Xing Tan (Ph.D.)**
Email: *xing.tan@lakeheadu.ca*

TA: **TBD**

1 TIMES

| | Day | Time | Location |
|--------------|----------|------------------|------------------|
| 1 | Tuesday | 8:30pm - 10:00am | Lecture (OA2006) |
| 2 | Thursday | 8:30pm - 10:00am | Lecture (OA2006) |
| Office Hours | tbd | tbd | tbd |

2 General Course Description

Design of algorithms and analysis of required time and space resources for execution. Lower bounds for resource requirements. Problems in arithmetic, order statistics, set manipulation, string matching, graph theory. Polynomial time, P, and non-deterministic polynomial time, NP, computable algorithms. NP complete problems.

3 Grading

- **Attendance 10%**
- **Assignments 15%**
 - Assignment One (Due date Feb. 6th, 5%, before class)
 - Assignment Two (Due date Mar. 6th, 5%, before class)
 - Assignment Three (Due date Apr. 3rd, 5%, before class)
- **Midterm 30% (Date: Feb. 13th)**
- **Final 45% (Date: TBD)**

4 Late Policy

Late assignments will NOT be accepted. A make-up midterm will NOT be provided. If you miss the assignments or midterm for medical reasons (with valid document provided), the weight will be added to the weight of the final exam. The final exam is to be held during the university examination period. Exact date is to be announced. It is your responsibility writing the exam at the announced time and exam room.

5 Textbook

- (major reference) Cormen, Leiserson, Rivest, and Stein, *Introduction to Algorithms*, 4th Edition, MIT Press (Amazon.ca Price: \$174.89)

6 Course Outline (tentative)

1. Introduction, math Review, algorithm analysis basics
2. Sorting algorithms
3. Midterm (**Feb. 13th**)
4. Graph Theory: basics and representations, shortest-path algorithms, minimum-spanning-tree algorithms
5. Complexity Theory: P, NP, NP-completeness, polytime reduction
6. Optional topics: greedy algorithms, dynamical programming, approximate algorithms, randomized algorithms

7 Course Policies

Students are referred to the departmental course pages with official policies and directions regarding exam deferrals, special accommodations etc.

8 On Academic Honesty

The instructor has been requested to employ a variety of measures, tools and heuristics to identify possible breaches of academic integrity, and to immediately bring identified cases to the attention of the department's administration for further investigation and consideration of the full range of disciplinary measures. Possible penalties for violating academic honesty policies may include zero on the test or assignment without an option to rewrite, failure in the course, a permanent grade of record, and/or a transcript notation. Subsequent violations may result in suspension or expulsion from the University. By taking this course and participating in its evaluation activities, you confirm that you have read and understood the above and that you will at all times adhere to the academic honesty rules and policies laid by the instructor, the Department and the University Senate's Academic Integrity Policy.