



University
of Windsor

Comp-2540
Data Structures and Algorithms
Winter 2025
COURSE SYLLABUS

SCHOOL OF COMPUTER SCIENCE

LAND ACKNOWLEDGEMENT

The School of Computer Science at the University of Windsor sits on the Traditional Territory of the Three Fires Confederacy of First Nations. We acknowledge that this is the beginning of our journey to understanding the Significance of the history of the Peoples of the Ojibway, the Odawa, and the Pottawatomie.

**TEACHING
TEAM:**

INSTRUCTOR: [PROFESSOR JIANGUO LU](#)






E-mail: jlu@uwindsor.ca

Office Location: 5112 Lambton Tower Office Hours: Monday/Wednesday 10:00-11:20

LAB INSTRUCTOR: Danial Ebrat, Email: ebrat@uwindsor.ca

GAS AND TAs:

- Saleh Sargolzaei sargolz@uwindsor.ca
- Kapilrajsinh Jadeja jadeja6@uwindsor.ca
- Shubham Malhotra malhot91@uwindsor.ca
- Mukesh Reddy Somireddy somiredk@uwindsor.ca
- Rocio Rueda ruedar@uwindsor.ca

<p>Jianguo Lu</p> 	<p>Danial Ebrat</p> 	<p>Kapilrajsinh Jadeja</p> 
<p>Rocio Rueda</p> 	<p>Mukesh Somireddy</p> 	<p>Saleh Sargolzaei</p> 

In addition to office hours provided for this course, the School of Computer Science also provides free tutoring services. Check the time and place at <https://tutor.myweb.cs.uwindsor.ca/>

**PRE-
REQUISITES:**

COMP-1410 and COMP-1000

No student is allowed to take a course more than two times without permission from the Dean.

LECTURES/LABS:

Class time: Monday/Wednesday 1:00-2:20

Labs: lab 51 (Monday 16:00-17:20), lab 52(Wednesday 16:00-17:20)

**COURSE
DESCRIPTION*:**

An introduction to the programming and analysis of linear and non-linear data structures and associated algorithms . Topics include the formal notion of an algorithm, elementary time and space complexity; linear lists (such as stacks, queues, linked structures.); non-linear lists (trees, binary trees); recursion; sorting techniques (such as heap sort, quick sort, merge sort, shell sort.); searching techniques (such as binary search, binary search trees, red-black trees, hashing.); algorithm design paradigms (such as divide-and-conquer, dynamic programming, greedy algorithms); and applications.

**LEARNING
OUTCOMES:**

At the end of the course, the successful student will know how to write efficient algorithms using appropriate data structures. More specifically, we will be able to

- Understand and use the fundamental data structures of computing, such as arrays, lists, stacks, queues, priority queues, maps, and trees.
- Understand the techniques for implementing those data structures. You can implement data structures from scratch, e.g. Heap data structure.
- Select proper data structures from language provided libraries when solving problems. For example, you will be able to know when to use array and when to use list
- Explain what is meant by an efficient algorithm using the asymptotic notation
- Give the time complexity of common algorithms in the big O notation. Know common complexity functions
- Write recursive programs and prove their time complexity using recurrence relation and substitution method
- Understand and apply basic algorithm design strategies, such as divide-and-conquer and dynamic programming
- Understand tree and graph terminologies. You can write and trace in-order, pre-order, and post-order tree traversal algorithms.
- Understand the implementation of operations in search trees and their time complexities; You can trace the insertion and deletion operations in binary search trees, 2-4 trees, and red-black trees.
- Understand basic graph algorithms such as graph traversing and shortest path algorithms. Connect the Greedy strategy with the Dijkstra algorithm.
- Modify inefficient algorithms to efficient ones.

**REQUIRED
TEXTBOOK:**

We will follow closely the textbook written by Goodrich et al.

- [Data Structures and Algorithms in Java](#), 6th Edition, by M. Goodrich and R. Tama (\$233.95 in Amazon.ca, but there are other options like used books)

In addition to the textbook, occasionally we will use materials from the following classic books:

- [Algorithms](#), by Robert Sedgewick, Kevin Wayne
- [Introduction to Algorithms](#), by Thomas Cormen et al., MIT Press.

**COURSE
EVALUATION:**

There will be two midterm exams, and one final exam. Midterms will be on January 29 and March 5 class time. You can keep track of the exam dates and assignment due dates using this [course calendar](#). In addition to the exams, there will be five lab assignments. The weights of evaluation components are tabulated below:

		Weight (%)	Total (%)	Date
Assignments	A1	4		Jan 20/22
	A2	4		Feb 3/5
	A3	4		Feb 24/26
	A4	4		March 10/12
	A5	4		March 24/26
			20	
Exams	Midterm 1	15		Jan 29
	Midterm 2	20		March 5
	Final	45		
			80	
Total			100	

Labs are designed to help you finish the lab assignments. There are five lab assignments that are due every other week. There will be 10 lab sessions. In each odd-numbered lab session (1, 3, 5, 7 and 9), the lab assignment will be explained, and students will start working on it. Lab assignments will be submitted in even-numbered lab sessions (2, 4, 6, 8 and 10). If you finish earlier, i.e., in the corresponding odd-numbered session, you can submit the lab at that time and do not have to come to the next session (the corresponding even-numbered lab).

GAs and TAs are available to help you with your assignments almost every day. On the assignment due date, normally GAs and TAs are busy with marking and helping with assignments. You may want to start the assignment early, so that you can have enough support and finish your assignment in time. The preferred programming language is Java.

**COURSE
SCHEDULE:**

Tentative Topics*

(The instructor may change the outline to accommodate student pace and understanding of the subject matter.)

- Week 1. Introduction, Array and Linked List
- Week 2. Algorithm Analysis. The big O notation. Time complexity of selection sort and insertion sort.
- Week 3. Divide-and-conquer algorithm design strategy, and its demonstration in merge sort.
- Week 4. Recursion and algorithm analysis of recursive programs
- Week 5. Recursion and the substitution method. Stacks and Queues.

Week 6.	Priority queues and Heaps, Heap sort
Week 7.	Trees, Midterm Exam.
Week 8.	Maps and Hash table
Week 9.	More on Sorting algorithms
Week 10.	Binary search trees, AVL trees, Red-black trees
Week 11.	Graph algorithms, graph traversal, shortest path.
Week 12.	Dynamic programming, Review

Winter 2025

IMPORTANT DATES:

Monday, January 6: First day of classes
 Sunday, January 19: Last day for late registration for Winter classes (to add classes)
 Monday, February 3: Winter financial drop date
 Saturday, February 15 – Sunday, February 23: Winter Reading Week
 Monday, February 17: Family Day (Statutory Holiday – University closed)
 Friday, February 21: University offices closed
 Sunday, March 16: Last day to voluntarily withdraw through regular drop method
 Friday, April 4: Last day of classes
 Monday, April 7 – Thursday, April 17: Final Exams
 Friday, April 18: Good Friday (Statutory Holiday – University closed)
 Monday, April 21: Alternate Exam Day

GRADING:

A numeric grade on a scale of 0 to 100 will be assigned (rounded integer).

Passing grade:

A minimum grade of 50% is required to pass this course (70% for grad courses). Your individual program may have higher requirements to maintain good standing; please consult your program requirements and plan accordingly. If you are registered in a course and do not attend or participate or write any evaluations will be assigned a grade of NR (No report). You must withdraw from the course if you do not wish to attend it; not showing up does not constitute withdrawal and will impact your academic record.

Voluntary withdrawal (dropping the course):

You may drop a course within the first 2 weeks add/drop period (1 week in case of 6-week courses) without it showing up on your academic record. Please check with the Registrar's office calendar on the important dates for withdrawing voluntarily from a course after the add/drop period should you feel you need to withdraw. It is strongly recommended that you seek academic advice from your instructor or an academic advisor prior to withdrawing from courses.

Absences due to medical or other extenuating circumstances:

Medical leaves, illness, death (in the family), and other difficult circumstances as determined in bylaw 54 are at times unavoidable and would interrupt your academic career. You must report any issues to the instructor as soon as possible prior to considering any academic accommodations. The instructor reserves the right to determine if an accommodation is merited and if the nature of the accommodation is related to the course evaluation. All requests for alternate considerations on medical grounds or other difficult matters must be made in writing (email) to the instructor along with supporting documents before the end of the course. No alternate accommodations will be considered after the end of the course.

Makeup and missed assessment policy:

If you miss a test, assignment, or other assessment in the course, you will receive a zero mark for the missed work. If you wish to have alternate considerations for a valid reason (as per Senate bylaw 54), you must inform the instructor in writing (email) as soon as possible, preferably before the assessment, and not later than seven calendar days. Considerations for any make-up or late submissions will be done on a case-by-case basis on compassionate grounds while maintaining fairness as much as possible. Alternate considerations will only be given to any missed assessment if the instructor is informed within seven calendar days after its due date. The instructor will refuse any unsubstantiated and late requests.

Grade appeal:

Informal reviews and appeals of the marks for assignments, midterm, exams and/or projects will be considered only if requested within 10 days after the release of the corresponding grades. After the 10 days, students will have to submit a formal appeal if they wish within 6 weeks. See Senate Bylaws 54 (Undergraduate Students) and Senate Bylaws 55 (Graduate Students) for more details on appealing grades.

Other Notes:

1. Undergraduate Students: (Please review Bylaw 54) The last seven calendar days prior to and including the last day of classes are free from any procedures for which a mark will be assigned. (Extensions on compassionate grounds are excluded). (In the case of six-week courses, the last three calendar days before the start of the examination period are free from any assessment procedures).

2. Unannounced quizzes/graded activities will be at most 5% of the final grade.
3. Participation marks in online courses will be at most 20% of the final grade.
4. The final exam schedule is announced by the Registrar's office, generally after the add/drop period, and students are expected to be available for the entire exam period and not make any prior travel plans, vacations, or other commitments until after the exam dates are announced. No alternate exam accommodations will be made on those grounds

SPTs:

The Student Perceptions of Teaching (SPTs) forms will be administered in the last two weeks of classes for courses 12-24 weeks in duration, in the last week of classes for courses 6-11 weeks in duration, or in the last two days of classes for courses of 5 or fewer weeks in duration. Students should be provided with up to 15 minutes at the beginning of a class to complete the SPTs online. [Senate Policy](#)

SUPPORT CONTACTS:

The School of Computer Science has a team of support staff and access to student academic advisors to assist you with any inquiries you may have about our courses and programs. Please use one of the following emails:

For CompSci undergraduate programs and advising, including IT certificate: csinfo@uwindsor.ca

For CS Tutors (free tutoring support for all CS undergrad courses): <http://tutor.cs.uwindsor.ca/>

For Computer Science Society: <https://css.uwindsor.ca/>

For CompSci graduate programs (MSc, MSc-AI stream, and PhD): csgradinfo@uwindsor.ca

For CompSci professional graduate programs (MAC/MAC-AI stream): macprogram@uwindsor.ca

For the office of the Director of the School of Computer Science: csdir@uwindsor.ca

For CompSci technical support: <https://help.cs.uwindsor.ca/>

For International Student Centre: <https://www.uwindsor.ca/international-student-centre/>

For Student Accessibility Services: <https://www.uwindsor.ca/studentaccessibility/>

For other general inquiries, <https://ask.uwindsor.ca/>

For Student counselling services (ext. 4616): <https://www.uwindsor.ca/studentcounselling/>

For Student health services (ext. 7002): <https://www.uwindsor.ca/studenthealthservices/>

For Student Peer Support Centre (ext. 4551): <https://www.uwindsor.ca/studentexperience/wellness/>

For USci Faculty of Science student support network: <https://www.uwindsor.ca/science/usci/>

Good2Talk provides free, 24/7, single-session professional counselling and referral by phone to post-secondary students in Ontario. Services are provided in English and French, with translation services available in 100+ languages.

- Call: 1-866-925-5454 (reach professional counsellors)
- Text: GOOD2TALKON to 686868 (reach trained volunteers)

STUDENT ACCOMMODATIONS:

Students with disability:

Students who require academic accommodations in this course due to a documented disability must contact an Advisor in Student Accessibility Services (SAS) to complete SAS Registration and receive the necessary Letters of Accommodation. After registering with SAS, you must present your Letter of Accommodation and discuss your needs with the course instructor as early in the term as possible. Please note that deadlines for the submission of documentation and completed forms to SAS are available on their website:

- <http://www.uwindsor.ca/studentaccessibility/>

Exam conflicts:

If you have a conflict with two exams at the same time, you will need to talk to both instructors and ask which one is willing to move your exam to a different day or time.

If you have a conflict with examinations due to the following reasons, view the [Office of Registrar Alternative Final Exam Policy](#):

- Conflict with religious conviction during the regularly scheduled time slot.
- Three or more final examinations in a 24-hour period.

Religious Observances:

Requests for accommodation of specific religious or spiritual observance must be presented to the instructor no later than 2 weeks prior to the conflict in question (in the case of final examinations within two weeks of the release of the examination schedule). In extenuating circumstances, this deadline may be extended. If the dates are not known well in advance because they are linked to other conditions, requests should be submitted as soon as possible in advance of the required observance. Timely requests will prevent difficulties in arranging constructive accommodations.

[religious accommodation for students.01mar2013.web ver.pdf \(uwindsor.ca\)](#)

**PRIVACY AND
COPYRIGHTS:**

Content confidentiality:

Lectures, examinations, quizzes, assignments, and projects given in this course are protected by copyright. Reproduction or dissemination of examinations or the contents or format of examinations/quizzes in any manner whatsoever (e.g., sharing content with other students or websites), without the express permission of the instructor is strictly prohibited. Students who violate this rule or engage in any other form of academic dishonesty will be subject to disciplinary action under [Senate Bylaw 31](#): Student Affairs and Integrity.

Recording of lectures:

Lectures and discussions can be recorded by requesting explicit permission from the instructor. Students planning to do so shall send a request (via email is sufficient) before the lecture is delivered. Students, however, are not allowed to post or share any recorded material to any other individual or party outside of this course.

See [Senate Policy on recording lectures](#).

**SAFETY,
ACADEMIC
INTEGRITY, AND
NON-ACADEMIC
MISCONDUCT:**

Equity, Diversity, and Inclusiveness (EDI)

This course, along with all its components such as lab sections are, without question, safe places for students of all races, genders, sexes, ages, sexual orientations, religions, disabilities, and socioeconomic statuses. Disrespectful attitude, sarcastic comments, offensive language, or language that could be translated as offensive and/or marginalize anyone are absolutely unacceptable. Immediate actions will be taken by the instructor to protect the safety and comfort of the students. An ethnically rich and diverse multi-cultural world should be celebrated in the classroom. The instructor, too, must treat every student equally and with the respect and compassion that all students deserve. Furthermore, UWindsor is committed to combatting sexual misconduct. All members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the [Sexual Misconduct Response & Prevention Office](#) so that the victim may be provided with appropriate resources and support options.

- <https://www.uwindsor.ca/sexual-assault/>
- For police/ambulance emergencies, call 911 (in Canada)
- For campus police, call 519-253-3000 ext. 4444 for emergency and 1234 for non-emergency issues.

Academic Integrity

Please refer to: <https://www.uwindsor.ca/academic-integrity/>

As defined in the University of Windsor's [Student Code of Conduct](#), plagiarism is the act of copying, reproducing or paraphrasing significant portions of one's own work, or someone else's published or unpublished material (from any source, including the internet), without proper acknowledgement, representing these as new or as one's own.

Tips and resources to help you prevent plagiarism:

https://www.uwindsor.ca/academic-integrity/sites/uwindsor.ca.academic-integrity/files/tips_for_preventing_plagiarism.pdf

The instructor will put a great deal of effort into helping students to understand and learn the material in the course. However, the instructor will not tolerate any form of cheating. The instructor will report any suspicion of academic integrity to the Director of the School of Computer Science. If sufficient evidence is available, the Director will begin a formal process according to the University Senate Bylaws which will lead to more review, a strict punishment if convicted, and a note on your permanent student record.

The following behaviours will be regarded as cheating:

- *Copying assignments or quizzes or presenting someone else's work as your own.*
- *Allowing another student to copy an assignment/project from you and present it as their own work; protect your own work and never share it with anyone!*
- *Copying from another student or any other unauthorized source during a test or exam.*
- *Falsifying your identity during the exam or having someone else assist or complete your assessment.*
- *Referring to notes, textbooks, and any unauthorized sources during a test or exam (unless otherwise stated).*
- *Speaking or communicating without permission during a test or exam.*
- *Not sitting in the pre-assigned seat during a test or exam.*
- *Communicating with another student in any way during a test or exam.*
- *Having unauthorized access to the exam/test paper prior to the exam/test.*
- *Explicitly asking a proctor for the answer to a question during an exam/test.*
- *Modifying answers after they have been marked.*
- *Any other behaviour which attempts unfairly to give you some advantage over other students during the grade-assessment process.*
- *Refusing to obey the instructions of the officer in charge of an examination.*

The list given above is not exhaustive. More examples are given in Appendix A, [Senate Bylaws 31](#) – Complete guidelines and procedures on the sanctions imposed by the university are also listed in Table A.1 of the [Senate Bylaws 31](#)

In this course any assessment that is deemed plagiarized or in violation of the academic integrity policy will NOT BE GRADED and receive a grade of ZERO unless a different ruling is provided by the adjudication committee formally reviewing the case.

Examples of sanctioning include: *(from Table A.1 in Appendix A of Bylaw 31)*

For first offence: mark reduction up to zero, censure 6-12 months; and for subsequent offence: suspension 4-24 months, censure up until graduation.

Plagiarism detection software:

Plagiarism-detection software *SafeAssign* will be used for all student assignments in this course. You will be advised how to submit your assignments. Note that students' assignments that are submitted to the plagiarism-detection software become part of the institutional database. This assists in protecting your intellectual property. However, you also have the right to request that your assignment(s) not be run through the student assignments database. If you choose to do so, that request must be communicated to the course instructor in writing at the beginning of the course. The instructor reserves the right to choose another plagiarism detection software and students will be notified once it is used.

Use of Generative AI (Artificial Intelligence) tools is prohibited:

In this course, use of any generative AI system (including, but not limited to ChatGPT, Claude, Jenni, Github Co-pilot, DaLL-E, and Midjourney) is considered an unauthorized aid that may provide an unearned advantage, and therefore may not be used in the creation of work submitted for grades or as part of any assignment in this class. Use of generative AI systems in graded assignments for this course is considered academic misconduct and may be subject to discipline under Bylaw 31: Academic Integrity.