

COMP-2540 Fall 2024
Data Structures and Algorithms

Lectures:

Sec 01: Tue/Thu 8:30am - 9:50am HK 140
Sec 02: Mon/Wed 11:30am - 12:50pm Chrysler G125

Labs:

Sec. 51 Mon 2:30pm - 3:50pm Erie Hall 3119
Sec. 52 Wed 2:30pm – 3:50pm Erie Hall 3119
Sec. 53 Mon 4:00pm – 5:20pm Erie Hall 3119
Sec. 54 Wed 5:30pm – 6:50pm Erie Hall 3119
Sec. 55 Wed 5:30pm – 6:50pm Erie Hall 3119
Sec. 56 Fri 11:30am – 12:50pm West Library 305C
Sec. 57 Tue 11:30am – 12:50pm West Library 305C

* Labs start on Monday September 16

Instructor: Dr. Luis Rueda – Office: LT 8110
lrueda@uwindsor.ca / 519-253-3000 ext.3002

Office hours: Tue 10:00am - 11:00am (LT 8110)
Wed 2:00pm - 4:00pm (LT 8110)
Thu 10:00am – 12:00pm (LT 8110)



University
of Windsor

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.

Note: Only email originating from a valid University of Windsor student account will be accepted from students wishing to contact the instructor or use the Brightspace email tool within the course site. Please include your full name, student ID and related course section in your correspondence. Do not spam with multiple or lengthy emails. Should you not receive timely feedback to your inquiries reach out during office hours directly, or in the event of no response contact the CS office at csinfo@uwindsor.ca for support to access the instructor.

*The course outline that is available after the end of second week of semester will be deemed correct and official. *

Never used Microsoft Teams before?

Download the free MS-Teams client for your device and login using your UWindsor account (uwid). You can send me a direct chat to lrueda@uwindsor.ca. It is a simple messenger type application allowing you to do chat, voice and video conferences with your prof and fellow students.

[Getting Started - Students | Information Technology Services \(uwindsor.ca\)](#)

Teaching Assistants

Please refer to the Brightspace for the TA/GA contact information and updated office hours.

The teaching assistants (GAs and TAs) will hold regular weekly office hours dedicated to help students. It is highly recommended that you take advantage of this resource by seeking interactive assistance towards understanding the course materials and guidance for completing the homework. Graders are also accessible to review your graded work and help make corrections or fix grading errors.

If you are facing difficulties in the course, please contact the instructor or the teaching assistant. You are expected to spend sufficient time to complete all the readings and the assigned work.

If you are not able to get hold of the teaching assistant during posted office hours, or do not get timely response from them please report the matter promptly to the course instructor with the situation details.

Similarly, if you identify an exceptional assistant who goes above and beyond, please inform the instructor and consider nominating the person for related university/faculty awards for their commitment.

The School of Computer Science provides free tutoring services for all Undergraduate Students

[Home Page – CS Current CS Current Students \(uwindsor.ca\)](#)

Course description

An introduction to the programming and analysis of linear and non-linear internal (main store) 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.

Prerequisites: COMP-1000 and COMP-1410. Restricted to Computer Science students or permission of the School of Computer Science)

Learning Outcomes

At the end of the course, the successful student will know and be able to:

- Define and explain the notion of an algorithm
- Explain what is meant by an efficient algorithm
- Analyze the time-complexity of an algorithm
- Discuss and assess a research paper of moderate difficulty in the area of algorithm design
- Prepare a small research project
- Reproduce and apply tools as design paradigms and data structures for designing efficient algorithms
- Analyze a problem and draw upon appropriate tools to solve real problems
- Formulate ingenious ways of solving problems
- Use algorithms learnt in lectures in lab sessions to solve interesting problems
- Apply concepts and choose appropriate techniques to specific problem domains
- Design improved and beautiful algorithms
- Formulate ingenious ways of solving problems

The above list is a summary. For a precise and detailed list of the learning outcomes refer to:

<https://ctl2.uwindsor.ca/cuma/public/courses/pdf/ed9be813-6efd-4cec-a506-38a703ff0b5a>

Evaluation

5 Lab Assignments	35% (7% each)
1 Midterm	25%
1 Final Exam	40%

Exam/test dates (tentative)

Midterm: Friday November 1, 2:00pm to 4:00pm

Lab assignments: Sep 23-27, Oct 7-11, Oct 28 - Nov 1, Nov 11-15, Nov 25-29

Final: TBA

Labs

- Attending all labs is required (all students must register in one lab section).
- Labs will start on September 15.
- There will be 10 lab sessions and 5 assignments. 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.
- Submission of the assignment will take place **in person** in even-numbered lab sessions (2, 4, 6, 8 and 10).
- Assignments will be marked **in the lab**. No submissions via email or other electronic means will be accepted. Appeals about the marks missing will be accepted only within 10 days of the submission. See the Grade appeal section below.
- Each lab assignment is worth 7% of the course grade.
- The preferred programming language is Java. However, students can use a programming language of their choice, provided the required tasks are accomplished.

Textbook

Data Structures and Algorithms in Java, 6th Edition, by M. Goodrich and R. Tamassia, Wiley, 2014

The following books are also useful for the course:

1. Algorithm Design and Applications by M. Goodrich and R. Tamassia, Wiley, 2015.
2. Data Structures and Algorithm Analysis in Java, 3rd Edition, Mark Allen Weiss, Addison-Wesley, 2012.
3. Data Structures and Algorithms in Python, by M. Goodrich and R. Tamassia, Wiley, 2013.
4. Introduction to Algorithms, 3rd. Edition, by Thomas Cormen et al., MIT Press, 2009.
5. Algorithm Design, by Jon Kleinberg and Eva Tardos, Addison Wesley, 2005.

Grading

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

Passing grade:

A minimum grade of 50% is required to pass this course. Your individual program, however, may have higher requirements to maintain good standing. You should check the 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 accommodation is merited and the nature of the accommodation 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 **within seven days** of the assignment deadline or examination date. No alternate accommodation 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 due to 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 **no 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. No alternate considerations will be given to any missed assessment if the instructor is not informed within seven calendar days after its due date. The instructor will refuse any unsubstantiated and late requests.
- In the exceptional case that a student misses a midterm test for a valid reason, i.e. supported by appropriate documentation (see below), the mark for that test will be carried over to the final. In case of a Doctor's note, the student must submit a Student Medical Certificate signed by a Medical

Doctor and the note must specifically state that the student was incapable of writing the exam on the day of the test.

- If the final exam is missed (for a valid reason), a makeup exam will be arranged on the next available date scheduled by the School of Computer Science, or the next term the course is offered.
- No extensions to the lab assignments will be allowed, and no make-ups will be considered. If a student misses a lab assignment, the corresponding mark will be carried over to the next lab(s) or final exam accordingly.

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-day period 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 about grades.

Other Notes:

1.A. 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 six weeks courses, the last three calendar days before the start of the examination period are free from any assessment procedures).

1.B. Unannounced quizzes/graded activities will not exceed 5% of the final grade.

1.C. Participation marks in online courses will not exceed 20% of the final grade.

2. The final exam schedule is announced by the Registrar's office, normally 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 exams accommodations will be made on those grounds.

3. No forms of assessment shall be scheduled or made-due on days identified as break days such as reading weeks, holidays, or days that the University is officially closed.

Tentative Class Schedule*

Week	Topics
1	Introduction - Algorithm Analysis
2	Algorithm Analysis – Stacks
3	Queues – Linked Lists
4	Recursion
5	Priority queues – Sorting
6	Sorting - Trees
7	Heap sort – Radix sort
8	Divide and conquer
9	Hash tables – Binary search trees
10	AVL trees - Red-black trees
11	Splay trees - Dynamic programming
12	Greedy approaches – Selection - Review

*The instructor reserves the right to change the topics to accommodate student pace and understanding of the subject matter.

* Students are advised that the schedule and topics described above are tentative and that the material and/or depth and order of presentation are subject to change at the discretion of the instructor and student pace.

* This course assumes the student will allocate a significant amount of independent study and time spent on reading and researching materials as needed. Students are strongly encouraged to ensure sufficient time needed to succeed in this course.

Important Dates

Thursday, September 5: First day of classes
Wednesday, September 18: Last day for late registration for Fall classes (to add classes)
Thursday, October 3: Fall financial drop date
Saturday, October 12 – Sunday, October 20: Fall Reading Week
Monday, October 14: Thanksgiving Day (Statutory Holiday – University closed)
Wednesday, November 13: Last day to voluntarily withdraw from Fall classes (to drop classes)
Wednesday, December 4: Last day of classes
Saturday, December 7 – Wednesday, December 18: Fall Final Exams
Thursday, December 19: Alternate Exam Day

Student Perception of Teaching (SPT)

SPT will be administered during the last 2 weeks of classes. The SPT Form will be used for collecting information on students' views of instructors and courses, as per [Senate policy](#).

Support Contacts

The School of Computer Science has a team of support staff and access to student academic advisors to assist you through 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/>

Need help?

[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)

[Wellness Together Canada](#) provides free, 24/7 professional mental health and substance use counselling by phone to anyone in Canada and Canadians abroad. Service is provided in English and French, with translation services available by request.

- Call: 1-866-585-0445 (reach professional counsellors)
- Text: WELLNESS to 686868 (reach trained volunteers)

Academic Accommodations for Students

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 \(uwindsor.ca\)](#)

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.](#)

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. A disrespectful attitude, sarcastic comments, offensive language, or language that could be translated as offensive and/or marginalize anyone are 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 appropriate resources and support options.

- <https://www.uwindsor.ca/sexual-assault/>
- For police/ambulance emergency 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 plagiarism. 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 plagiarism:

- *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 at 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.*
- *Any work submitted using generative AI tools (see the corresponding statement at the end of this section).*

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.

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 Copilot, DaLL-E, and Mdiourney) is considered an unauthorized aid that may provide an unearned advantage, and therefore may not be used in writing the code used for solving some parts or all of any assignment in this class. Students are advised that AI Content Detector Tools shall be used to identify AI-generated content. If found or detected, the use of generative AI systems in graded assignments for this course will be considered academic misconduct and may be subject to disciplinary procedures under Bylaw 31: Academic Integrity.