

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.

COMP-4800 Selected Topics in Software Engineering (Winter 2025)

School of Computer Science, University of Windsor

Lectures: Tu.Th. 1:00 – 2:20 (DH 361)
Instructor: Dr. J. Chen
Office: L.T. 8100
Telephone: 253-3000 ext. 3713
Office Hours: Tu.Th. 2:30 - 3:30 (refer to the course webpage for possible changes)
E-mail: xjchen@uwindsor.ca

- Comments to the course should be directed to the course instructor.
- Compared to e-mails and text messages, office hours should be used as primary method of communication.
- Only emails originated from a valid University of Windsor student account will be accepted from students wishing to contact the instructor. Student name, student ID, and course code should be provided in the email correspondence. The students are not allowed to spam with multiple or lengthy emails.
- If the feedback to the email inquiries is not received, the student should reach out the instructor during the office hours.

GA/TA Information

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

Course Overview

This course will be demanding both in terms of the theoretical foundations of software development and in terms of the complexity of the implementation of the software tools and applications. Major topics:

- Clustering with local and global optimization, and its procedure visualization.
- Development of complex and concurrent software applications using library API at a deeper level of software system architecture, with the proper cooperation and concurrency control among multiple threads.
- Implementation of web crawlers and application of graph theory to real-life web link graphs from Google.
- Formal specification of software requirements and the automata-theoretic approach to the formal verification of program correctness.

Time permitting, the students will also be introduced to the remote method invocation services, and the application of model checking techniques to the formal verification of the correctness of security protocols.

The instructor reserves the right to change the outline in response to the learning curve of the students. The topics described above are tentative and the depth and the order of the presentation are subject to change at the discretion of the instructor according to the learning pace of the students.

Some References and On-line Resources

1. Anil K. Jain. Data clustering: 50 years beyond K-means. *Pattern Recognition Letters* 31 (2010) 651–666. Elsevier. Cost: \$0
2. GTK+ library API. <https://docs.gtk.org/gtk4/>
3. Cairo Graphics User's Manual. <https://www.cairographics.org/manual/index.html>
4. ffmpeg sample code and documentation. <https://ffmpeg.org>
5. Core Audio documentation. <https://developer.apple.com/library/>
6. M. Ben-Ari. *Principles of Concurrent and Distributed Programming* (2nd edition). Addison-Wesley, 2006. ISBN 0-321-31283-X. Cost: \$227.47.
7. Amir Pnueli. The Temporal Logic of Programs. *Proceedings of the 18th Annual Symposium on Foundations of Computer Science*, 45-57. IEEE, 1977. Cost: \$0
8. Zohar Manna and Amir Pnueli. *Temporal Verification Diagrams*. *International Symposium on Theoretical Aspects of Computer Software*, Lecture Notes in Computer Science 789, Springer-Verlag, pp. 726-765, 1994. Cost: \$0
9. M.Y. Vardi. *An automata-theoretic approach to linear temporal logic*. In F. Moller and G. Birtwistle, editors, *Logics for Concurrency: Structure versus Automata*, volume 1043 of *Lecture Notes in Computer Science*, pages 238–266. Springer-Verlag, Berlin, 1996. Cost: \$0
10. Jessica Chen, Henry Milner, Ion Stoica, Jibin Zhan. Benchmark of Bitrate Adaptation in Video Streaming, *ACM Journal on Data and Information Quality*, 13(22), 1-24, 2021. Cost: \$0
11. Xiao Jun Chen, Giuseppe De Giacomo. Reasoning about nondeterministic and concurrent actions: A process algebra approach, *Artificial Intelligence* 107, 63-98, Elsevier, 1999. Cost: \$0
12. Xiao Jun Chen, Flavio Corradini, Roberto Gorrieri. A study on the specification and verification of performance properties. *International Conference on Algebraic Methodology and Software Technology*, Lecture Notes in Computer Science 1101, 306–320, Springer-Verlag, 1996. Cost: \$0
13. RMI on-line tutorial: <http://docs.oracle.com/javase/tutorial/rmi/index.html>
14. Gavin Lowe. Some New Attacks upon Security Protocols. *Proceedings of the 9th Computer Security Foundations Workshop*, pages 162-169. IEEE Computer Society Press, 1996. Cost: \$0
15. D. Dolev and A. Yao. On the Security of Public-Key Protocols. *IEEE Transactions on Information Theory*, 2(29), 1983. Cost: \$0

16. R. Corin, S. Etalle, and A. Saptawijaya. A logic for constraint-based security protocol analysis. In IEEE Symposium on Security and Privacy, 2006. Cost: \$0

Evaluation Scheme

class demo and presentation, home assignment	30%	
midterm	30%	Th. Feb. 27 (tentative)
final exam	40%	TBD

A numeric grade (rounded integer) on a scale of 0 to 100 will be assigned, and a minimum grade of 50% is required to pass this course.

Demo and presentations must be given by the due date in the class. Late penalty: -10% if it is given by the next lecture time; -20% for one week of delay. No demo or presentation will be allowed if it is delayed by more than one week. The weight of an assignment could be transferred to that of the final exam if there is a valid reason for not being able to complete it in time.

All home assignments must be uploaded to the Brightspace before they are due. No e-mail submission will be accepted. Late submissions will receive 10% deduction for up to 24 hours of delay, and 50% deduction for up to 3 days of delay. No assignments will be graded if they are received more than 3 days after the deadline. The weight of an assignment could be transferred to that of the final exam if there is a valid reason for not being able to complete it in time. Some home assignments are also required to have a class demo by the given due date.

Bonus points may be given to exceptional questions, good answers, extra work, etc. Bonus points can be used to reduce the weight of the final exam. For example, if a student received 5 bonus points, the weight of the final exam can be reduced to 35%, counting the other 5% with perfect score.

The exams will cover all material already introduced in the course.

There will be no make-up of the midterm test. The weight of a missed midterm could be transferred to that of the final exam if there is a valid reason for missing the test.

The make-up of the final exam will be scheduled for a student only if there is a valid reason for missing the exam.

No alternate considerations will be given to any missed assessment if the instructor is not informed within three calendar days after its due date. The instructor will refuse any unsubstantiated or late requests.

Generative AI tools

Students cannot use Generative AI tools (e.g., ChatGPT, Gemini) to produce assignments. Any submitted assignments must be the students' own work.

Appeals

Informal appeals of the points/marks for class demo and presentation and for assignments will be considered only if they are received within five days after the release of the corresponding points/marks. Informal appeals of the marks for midterm will be considered only if they are received before the last week of the lectures. Informal appeals of the marks for the final exam will be considered only if they are received before or during the office hours set up for the final exam review.

Content Confidentiality

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

Recording of Lectures

Interaction within the class is an essential part of the course and will be strongly encouraged. Paying respect to the privacy of the students, video recording of the lectures is generally not allowed. If permission to record a lecture is given to a student, the instructor will inform the class of the same before the lecture, and the student is not allowed to post or share any recorded material to any other individual or party outside this course. See [Senate Policy on recording lectures](#).

Learning Outcome

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

- analyze state-of-the-art software engineering methods and techniques
- combine emerging technologies with theoretical results in computer science related to software engineering concepts and techniques
- retrieve useful information from existing API
- search for suitable information from online documents, tutorials and from the theoretical results in computer science to solve practical problems
- develop correct implementations to satisfy given sets of software requirements
- select or develop supporting tools for software development
- express research results and ideas on software development using proper terminologies
- find suitable design solutions to given problems using any available theory in computer science and/or any language feature currently available
- recognize the importance of software engineering methods and techniques
- demonstrate ability for advanced study in foundations of software engineering and in methodologies of software development

Student Perceptions of Teaching

The Student Perceptions of Teaching (SPTs) forms will be administered in the last two weeks of classes. Students will be provided with up to 15 minutes at the beginning of a class to complete the SPTs online.

Support Contacts:

- 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 undergraduate programs and advising, including IT certificate: csinfo@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 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)

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)

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, the student must present the Letter of Accommodation and discuss the needs with the course instructor as early in the term as possible. Deadlines for the submission of documentation and completed forms to SAS are available at <http://www.uwindsor.ca/studentaccessibility/>

Academic Integrity

The following behaviors 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.
- 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).
- Not sitting at the pre-assigned seat during a test or exam.
- Communicating with another student in any way without permission 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 behavior 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](#).

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.

Complete guidelines and procedures on the sanctions imposed by the university are listed in Table A.1 of the [Senate Bylaws 31](#).

Equity, Diversity, and Inclusiveness (EDI)

This course is, without question, a safe place 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 will 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.