

**CS 4459b/CS 9644b: Selected Topics on Scalable and Robust
Distributed Systems
Western University
Course Outline – Winter 2026**

1. General Course Information

Course Information

CS 4459b/CS 9644b: Selected Topics on Scalable and Robust Distributed Systems

Monday: 12:30-2:30,

Wednesday: 2:30-3:30

Prerequisite Requirements

Prerequisite(s): 0.5 course from: Computer Science 3305A/B, Computer Science 3357A/B, Electrical Computer Engineering 4436A/B, Software Engineering 3313 A/B, Software Engineering 3314 A/B

Unless you have either the prerequisites for this course or written special permission from the Department of Computer Science to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

2. Instructional Team

Instructor

Name: Muhamed Alarbi

Office Hours - TBA

E-mail: malarbi@uwo.ca

TAs:

Name: Joud El-Shawa

E-mail: jelshawa@uwo.ca

Name: Omair Ahmad

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When contacting the instructor/TA by email please put in the subject line **CS 4459/CS 9644**

3. Course Description

This course presents fundamental concepts related to the design and implementation of distributed systems. The course teaches the abstractions, design and algorithms that enable the development of scalable and robust distributed systems. Topics include inter-process communication, clocks, replication, data consistency models, consistent hashing, and failure handling.

On successful completion of this course, students shall be able to:

- understand the core concepts and mechanisms needed to develop distributed systems.
- understand how network and server failures impact the design of reliable distributed systems.
- understand design tradeoffs.
- understand the application of the core concepts and mechanism in state-of-the-art systems.
- develop distributed applications, by gaining practical experience through a series of programming assignments.

4. Course Materials

Textbook: [Maarten Van Steen and Andrew Tanenbaum, Distributed Systems: Principles and Paradigms, 4th Edition](#)

To get a **free digital copy** please use the link above:

<https://www.distributed-systems.net/index.php/books/ds4/>

Additional references specific to a topic will be provided in lecture notes.

Lecture Notes

Lecture material will be made available in prior to class through OWL Brightspace:

<https://westernu.brightspace.com/>

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class. If students need assistance with the course Brightspace site, they can seek support on the [OWL Brightspace Help page](#). Alternatively, students can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800

Other

There may be use of online tools.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

| | |
|-------------------|----------------|
| Orientation Quiz: | 2% |
| Participation: | 8% |
| Assignments: | 50% |
| Two Tests: | 40% (20% each) |

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the tests, at least 40% in the assignments.
- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in tests, and at least **50% across all non-test assessments (assignments, orientation quiz, and participation)**.

Participation:

Your participation grade will be determined by your attendance (recorded via iClicker) in-class and participating in the in-class activities and iClicker quizzes/polls. This will be graded as a pass or fail for each lecture.

Up to five (5) lectures can be missed without penalty. After missing 5 lectures, you will be required to contact your academic counsellor to request accommodations or you will receive a grade of zero for participation for the missed lecture.

To obtain these participation marks you must be physically present in-class and have your own device capable of using iClicker. Any attempt to circumvent the participation system or earn a passing participation grade without attending class is an academic offence and will result in an overall participation grade of zero and the offence being reported to the Dean's Office.

Tests

The dates for the tests are below:

- **Midterm 1:** February 9 during class
- **Midterm 2:** March 23 during class

There will be no makeup midterm test, except for students requesting a special test for religious reasons. These students must have notified the course instructor and filed documentation at least two weeks prior to the midterm. If you miss either test for any other reason, follow the procedure for Academic Consideration. If your request is approved, **the midterm 2 will be reweighted to include the weight of midterm 1.**

Assignments

- Assignments will be made available on Brightspace. Students are responsible for checking the course web page on a regular basis. Submission instructions will be provided for each assignment

There will be four assignments (worth 50% of the final mark) with the following breakdown:

| Assignment | Due Date (Tentative) | Expected Load | Weight |
|------------|----------------------|---------------|--------|
| 1 | January 30 | Easy | 8% |
| 2 | February 27 | Medium | 12% |
| 3 | March 13 | High | 14% |
| 4 | April 9 | High | 16% |

- All assignments are due by 11:55 PM (electronically) of the due date. Late assignments may be handed in, but with a penalty of 5% a day. Saturday and Sunday together count as one day. Assignments more than 4 days late will not be accepted. If an assignment has to be cancelled by the instructors for any reason, the remaining assignments will be re-weighted to add up to 50%.
- For the last assignment, **graduate students** will be asked for additional work.
- To guard against the possibility of lost assignments and errors in recording marks, students are advised to retain all assignments that are handed back to them, as well as disk copies of all materials they hand in, at least until final marks for the course are posted.

6. **Late Coupons** A late coupon can be used for an additional day beyond the due date. The weekend counts as one day. However, assignments more than 4 days late will not be accepted. You do not need the permission of the instructor to use a late coupon and you may use more than one late coupon for an assignment.

- Each student will be given four (4) “late coupons” in total for the semester that may be used to submit an assignment one day late per coupon (up to a maximum of 4 days late per assignment).
- Late coupons will not be replenished. For example, if you use 3 late coupons on Assignment 1, you will only have 1 left for the remainder of the course.
- Late coupons will be applied automatically when an assignment is submitted late and tracked in the OWL gradebook.
- Each late coupon is valid for a 24 hour period only. For example, if an assignment is due on September 1st at 11:55 pm and the student submits on September 1st at 11:56 pm this would require one late coupon, as would any submission between September 1st at 11:56pm and September 2nd at 11:55 pm. After September 2nd at 11:55pm and up to September 3rd at 11:55 pm, 2 late coupons would be required. After September 3rd at 11:55pm and up until September 4th at 11:55pm 3 late coupons would be required. After September 4th at 11:55pm and up until September 5th at 11:55pm 4 late coupons would be required. After September 5th at 11:55pm, no more submissions will be accepted, and a zero grade will be given on the assignment.
- It is the student’s responsibility to keep track of how many late coupons they have available throughout the semester. Occasionally the teaching assistants may be tardy on updating each student’s late coupon total. In case of a discrepancy, the actual number of coupons used (and not what is listed in OWL) will be applied.
- If a student has no late coupons remaining or submits an assignment more than 4 days late, a zero grade will be given for the assignment (no partial late marks will be given).
- Late coupons must be used before special circumstances are considered. This means that you need to consume all late coupons before applying for academic consideration. Therefore, late coupons will be override any academic consideration.
- After all late coupons are used, no extensions will be given for assignments except for in the event of serious medical or compassionate grounds. A student must follow the procedure for Academic Accommodation for Medical Illness as given in this document.
- Late coupons cannot be used on any course component except assignments.

Assignments are to be done individually, not in groups. The submitted code will be run through a similarity-checking software to look for cheating. Do not copy or share code in any way.

General information about missed coursework

Students must familiarize themselves with the University Policy on Academic Consideration – Undergraduate Students in First Entry Programs, posted on the Academic Calendar:

https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for attempted or completed work, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request without supporting documentation in this course. However, the following assessments are excluded from this and, therefore, always require formal supporting documentation:

- Midterm tests (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)**

When a student mistakenly submits their one allowed Academic Consideration request without supporting documentation for the assessments listed above or those in the Coursework with Assessment Flexibility section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

7. Accommodation and Accessibility

Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf

8. Academic Policies

In accordance with policy the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a [Scholastic Offence](#).

All required assignment submissions may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. This may include MOSS and [Turnitin](#).

Computer-marked, multiple-choice quizzes and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is not permitted in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a scholastic offence.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

9. Support Services

Please visit the [Science & Basic Medical Sciences Academic Counselling webpage](#) for information on add/drop courses, academic considerations for absences, appeals, exam/quiz conflicts, and many other academic related matters.

Mental Health

Mental and emotional well-being is highly important and should not be treated lightly. Students who are in emotional/mental distress should refer to [Mental Health@Western](#) for a complete list of options about how to obtain help.

Learning-skills counsellors at the [Student Development Centre](#) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice quiz/exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the [USC](#).