

**CS 4459b/CS 9644b: Selected Topics on Scalable and Robust
Distributed Systems
Western University
Course Outline – Spring 2025**

1. General Course Information

Course Information

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

Monday: 12:30-2:30 [REDACTED] Wednesday: 2:30-3:30 [REDACTED]

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 requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees if you are dropped from a course for failing to have the necessary prerequisites.

2. Instructional Team

Instructor

Name: Dr. Hanan Lutfiyya
[REDACTED]

Office Hours - TBA

E-mail: hlutfiyy@uwo.ca

TAs:

Name: Muhamed Alarbi

E-mail: malarbi@uwo.ca

Name: Muhammad Haris Rafique Zakar

E-Mail: mzakar@uwo.ca

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 interprocess communication, clocks, replication, data consistency models, consistent hashing, and failure handling.

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

- understand how network and server failures impact the design of reliable distributed systems
- understand the core concepts and mechanisms needed to develop 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.

This class is in person. In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

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 BrightSpace

Students should check BrightSpace on a regular basis for news and updates. The BrightSpace course site will be the primary method by which information will be disseminated to all students in the class. Students are responsible for checking BrightSpace on a regular basis. If students need assistance with the course BrightSpace site, they can seek support on the 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

Undergraduate Students

The overall course grade will be calculated as listed below:

Assignments (2)	30%
Two quizzes.	40%
Project	30%

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 quizzes, at least 40% in the assignments and 50% in the project.
- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in quizzes, at least 60% in the assignments and 60% in the project.

Quizzes

The dates for the examples are below:

- **Quiz #1:** February 10 during class
- **Quiz #2:** March 24 during class

There will be no makeup for Quiz #1, except for students requesting a special quiz for religious reasons. These students must have notified the course instructor and filed documentation with their Dean's office at least two weeks prior to quiz #1. If you miss quiz #1 for any other reason, follow the procedure for Academic Consideration outlined under Student Absences. If you receive consideration, **the second quiz will be reweighted to include the weight of the first quiz.**

A makeup quiz will be held for Quiz #2, date TBD.

Assignments

- Assignments will be made available on OWL. Students are responsible for checking the course web page on a regular basis. Submission instructions will be provided for each assignment
- There will be two assignments with the following breakdown:

Assignment	Due Date	Expected Load	Weight
1	February 3	Medium	12%
2	March 7	High	18%

Project

- Students must form groups of 2-4 students. The group must submit a report of their project.
- **Due date: April 1st, at 11:59pm**
- **Late submissions will be accepted without academic penalty until the last day of classes on April 4th, at 11:59pm**

Other

- The student evaluation procedure cannot be changed from that given in the course outline without prior consultation with the Undergraduate Chair and approval of the Dean of Science.
- 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 marks a day. Saturday and Sunday together count as one day. Assignments more than 4 days late will not be accepted.
- 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.

Graduate Students

Graduate students have the same assignments and projects as undergraduates. However, graduate students are expected to present a two-page paper on a technology or algorithm related to the course. The assignments will be 28% of the grade and the two-page paper is two percent of the grade. The paper is due on the last day.

Late Coupons

Each student will receive three 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 5 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. The late coupons cannot be used for projects.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please see the information below.

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://www.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:

- **Quiz #2**

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If you use your undocumented absence on Quiz #2 (excluded from policy), the project (built-in flexibility), or the assignments (built-in flexibility), it will be rejected and you will lose the undocumented absence for this course.

Any student who reports an absence for an assignment will get an additional late coupon to be used for the assignment. **However, assignments more than 4 days late will not be accepted.**

Any student who reports an absence for the quiz #1 the **weight of quiz #2 will be adjusted to accommodate quiz #1.**

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the [Western Multicultural Calendar](#).

7. Accommodation and Accessibility

Accessibility

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. Please review the policy for the [Academic Accommodation for Students with Disabilities](#).

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

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.

Masks (this applies if classes are in person and if required)

This applies in the event of a return to in-person classes. Students will be expected to wear masks deemed acceptable at all times in the classroom. Students who are unable to wear a mask for medical or religious reasons must seek formal accommodation through Accessible Education at aew@uwo.ca. Students are expected not to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks.

Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Department, and such actions will be considered a violation of the student Code of Conduct.

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.

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.

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](#).