

**CS 4435b/CS 9644b: Selected Topics on Scalable and Robust  
Distributed Systems  
The University of Western Ontario  
Course Outline – Spring 2022**

**1. General Course Information**

**Course Information**

CS 4435b/CS 9644b: Selected Topics on Scalable and Robust Distributed Systems

Monday: 12:30-2:30 SEB-2022 Wednesday: 2:30-3:30 SEB-2022

While online the course will be primarily asynchronous but synchronous activities (e.g., tests, office hours, Q&A) may occur during scheduled class times.

Online asynchronous lecture content will be posted on OWL no later than Mondays. The Wednesday time slot will be available for students to ask questions about the course content and assignments. Office hours will take place from 12:30 to 1:30 but will be extended to 2:30 when needed.

Any changes will be announced using OWL.

**Prerequisite Requirements**

Prerequisite(s): Computer Science 3305A/B or Computer Science 3357A/B; Computer Science 3307A/B/Y, Computer Science 3340A/B, or Computer Science 3342A/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

Office Location – Middlesex College: MC 418

Office Hours - TBA

E-mail: [hlutfiyy@uwo.ca](mailto:hlutfiyy@uwo.ca)

**TA:**

Name: Arshin Rezazadeh

E-mail: arezaza6@uwo.ca

When contacting the instructor/TA by email please put in the subject line **CS 4435/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.

### 4. Course Materials

**Textbook:** Maarten Van Steen and Andrew Tanenbaum, Distributed Systems: Principles and Paradigms, 3rd Edition

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

<https://www.distributed-systems.net/index.php/books/ds3/>

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

### Lecture Notes

Lecture material will be made available in [OWL](#) prior to class.

Students should check [OWL](#) on a regular basis for news and updates. The [OWL](#) course site will be the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis. If students need assistance with the course OWL site, they can seek support on the [OWL](#) help page. Alternatively, students can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800

### 5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (4)	60%
Midterm Exam	15%
Final Exam	25%

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 exams and 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 the exams and at least 50% in the assignments.

## Exams

The dates for the examples are below:

- **Midterm exam:** February 14 (online using OWL and Proctortrack)
- **Final Exam:** Scheduled by the Registrar.

There will be no makeup midterm exam, except for students requesting a special midterm exam for religious reasons. These students must have notified the course instructors and filed documentation with their Dean's office at least two weeks prior to the midterm exam. If you miss the midterm exam for any other reason, follow the procedure for Academic Accommodation for Medical Illness. If accommodation is approved by your Dean's office, the final exam will be reweighted to include the weight of the midterm exam.

## 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 four assignments (worth 50% of the final mark) with the following breakdown:

Assignment	Due Date	Expected Load	Weight
0	January 21	Easy	8%
1	February 18	Medium	14%
2	March 11	High	18%
3	April 8	High	20%

- The last assignment is intended to be a group project.
- For the last assignment, **graduate students** will be asked for additional work.
- 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 5 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.

## Late Coupons

Each student will receive three late coupons. A late coupon can be used for an additional day beyond the due date. 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.

## 6. Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an online portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are *not* able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar
- absence of a duration greater than 48 hours
- assessments worth more than 30% of the student's final grade
- if a student has already used the self-reporting portal twice during the academic year

Any student who self-reports an absence for an assignment will get an additional late coupon to be used for the assignment. **However, assignments more than 5 days late will not be accepted.**

Any student who self-reports an absence for the midterm the **weight of the final exam will be adjusted to accommodate the midterm.**

For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty

For information on academic consideration please review the policy on [Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs](#) and the policy for the [Student Medical Certificate \(SMC\)](#).

### **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](#).

### **Special Exam**

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation". (see [http://www.registrar.uwo.ca/examinations/exam\\_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html)). If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum

course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See Academic Calendar for details (under Special Examinations).

## **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)**

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](mailto: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 tests 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 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 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](#).