

**Western University**  
**Department of Computer Science**  
**CS9668/4446A Internet Algorithmics**

**Instructor**

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*Office hours:* Monday 4:00 pm - 5:30 pm.

*Lectures:* Friday 1:30 pm - 3:30 pm ██████████

**Course Description**

This course focuses on the study of algorithms used for solving problems that arise from the design and use of wide-area networks, such as the Internet. Among the topics that we might cover are:

- Computer networks and internets
- Distributed algorithms for network problems
- Peer-to-peer systems
- The Web Graph and searching for information in the Web
- Caching
- Game Theory

**Prerequisites**

- Either Computer Science 3340A/B or Software Engineering 3310A/B.
- Knowledge of Java or knowledge of another programming language and willingness to learn Java on your own

Antirequisite(s): Computer Science 4438A/B, if taken during the 2018-2019, 2021-2022 academic years; Software Engineering 3314A/B.

**Course Learning Outcomes**

- Achieve a high level understanding of how computer networks and internets work.
- Design distributed algorithms that correctly solve simple problems.
- Analyze distributed algorithms to determine their time and communication complexities.
- Understand efficient algorithms for storing and locating information in peer-to-peer systems.
  
- Understand efficient algorithms for finding relevant information on the Web.
- Design and analyze caching algorithms that can be used to improve the efficiency of Internet applications.
- Understand how Game Theory can help design efficient Internet applications.
- For graduate students: Deep understanding of a problem arising from the design and use of computer networks and of algorithmic solutions for it.

## Reading Material

The material covered in this course will be taken from the following resources.

- Computer Networks and Internets, D. Comer, Pearson.
- Distributed algorithms for message-passing systems, M. Raynal, Springer.
- Distributed algorithms, N. Lynch, Morgan Kaufmann.
- Research papers.

Relevant chapters of above books and research papers will be posted in OWL.

## Student Evaluation

### Undergraduate Students

- Four assignments worth 34% of the final mark.
- A midterm exam worth 28% of the final mark.
- Final exam worth 38% of the final mark.

### Graduate Students

- Two assignments worth 8% of the final mark.
- A project worth 26% of the final mark.
- A midterm exam worth 28% of the final mark.
- Final exam worth 38% of the final mark.

## Schedule *(Tentative, some of these dates might change)*

All assignments are due at 11:55pm on the date indicated.

- Assignment 1 due on October 7.
- Assignment 2 due on October 20.
- Assignment 3 due on November 18.
- Assignment 4 due on December 8.
- Project (for graduate students) due on December 8.
- Midterm exam on October 25 (tentative date).
- Final exam scheduled by the University.

### No electronic devices are allowed on the exams.

There will be **no makeup** Midterm Exam. If you miss the midterm exam and receive an accommodation by your Dean's office, your final exam mark will be re-weighted to include the weight of the midterm exam.

## Assignments and Late Penalties

Some assignments require that you write Java code for a simulator of distributed algorithms. The availability of assignments will be announced through OWL. Students are responsible for checking their e-mail and the OWL site for this course on a regular basis.

The penalty for late submissions is  $[2.5^i]$  (2.5 to the  $i$ -th power, rounded to the nearest integer), where  $i > 0$  is the number of days you are late. So if you hand in your assignment 1 day late, you will be penalized 3%, a delay of 2 days will decrease your grade by 6%, 3 days is penalized 16% and 4 days takes 39% off your grade. You cannot be more than 4 days late.

## Appeals of Assignment Marks

Appeals of assignment marks should be addressed to the T.A. first. If you and the T.A. cannot agree, then please discuss the situation with the lecturer.

Appeals **must occur within 1 week** from the first day that the marked assignments were made available to students. After that 1 week period has gone by, no more appeals will be considered.

## 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.

## 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](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:

[https://academicsupport.uwo.ca/accessible\\_education](https://academicsupport.uwo.ca/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/](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 exam
- Final exam

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above, the request cannot be recalled and reapplied. This privilege is forfeited.

## Evaluation Scheme for Missed Assessments

If a student receives academic consideration for an assignment, if the request is for less than 48 hours, the deadline for the assignment will be extended by the amount of time specified in the academic consideration. If the academic consideration is for more than 48 hours, the weight of the missed assignment will be transferred to the final exam.

If a student receives academic consideration for the midterm exam, the weight of the midterm exam will be transferred to the final exam.

When a student misses the Final Exam and their academic consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

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.

## Ethical Conduct

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

**All assignments and projects are individual assignments. Students must write their assignments on their own** and are not allowed to copy or share any part of their work. Collaborative group work is prohibited, and students cannot use code or solutions for concept assignments that were not designed by themselves. Students are not permitted to use ChatGPT or any other AI chatbots.

Assignments that are judged to be the result of academic dishonesty will be penalized and the Department of Computer Science and the Dean's office will be informed of this offence. Notice that the Department or the Dean's office might impose additional penalties. You are responsible for reading and respecting the Computer Science Department's policy on Scholastic Offences and Rules of Ethical Conduct

[https://www.csd.uwo.ca/undergraduate/current/policies/ethical\\_conduct.html](https://www.csd.uwo.ca/undergraduate/current/policies/ethical_conduct.html)

We will use the plagiarism checking software called MOSS to compare student program submissions.

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

## Email Contact and OWL

Students should check the course's OWL site on a regular basis for news and updates. Email messages will be sent to the UWO email address assigned to students by Western Technology Services (WTS), i.e. your email address @uwo.ca. It is each student's responsibility to read this email on a frequent and regular basis, or to have it forwarded to an alternative email address if preferred. See the WTS website for directions on forwarding email. However, you should note that email at WTS (your UWO account) and other email providers such as hotmail.com or yahoo.com may have quotas or limits on the amount of space they can use. If you let your email accumulate there, your mailbox may fill up and you may lose important email from your instructors. Losing email that you have forwarded to an alternative email address is not an excuse for not knowing about the information that was sent.

Students must use their Western (@uwo.ca) email addresses when contacting the instructor. If you send email to the instructor from a commercial account, send a carbon copy (cc) to your UWO email address. The instructors will respond to your UWO address.

## Religious Considerations

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request academic consideration for their absence in writing to the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays: <https://www.edi.uwo.ca>.

## Academic Consideration Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for academic consideration based on medical documentation or psychological and cognitive testing. The policy on Academic Considerations for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic%20Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf).

## General Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

**Use of @uwo.ca email:** In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf),

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.

**Requests for Relief** (formally known as "appeals")

Policy on Request for Relief from Academic Decision:

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/requests\\_for\\_relief\\_from\\_academic\\_decisions.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf)

Procedures on Request for Relief from Academic Decision (Undergraduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/undergrad\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf)

Procedures on Request for Relief from Academic Decision (Graduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/graduate\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf)

## Scholastic Offences

Policy on Scholastic Offences:

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_offences.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf)

Procedures on Scholastic Offences (Undergraduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/undergrad\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf)

Procedures on Scholastic Offences (Graduate):

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/graduate\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf)

## Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a scholastic offence, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

## 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: <https://www.uwo.ca/sci/counselling>

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

[https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html).

To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) 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.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

<http://www.uwo.ca/health>

for a complete list of options about how to obtain help. Additional student-run support services are offered by the USC,

<http://westernusc.ca/services>.