COMPSCI 3357A (Computer Networks I) Course Outline

1. Course Information

Course Information
- Course title: Computer Networks I
- Course code: COMPSCI 3357A
- Academic term: Fall 2023
- Lectures:
    o Hours: Tuesdays 12:30 - 2:30 pm and Thursdays 1:30 - 2:30 pm
    o Location: TC-141
- There will be no tutorial or laboratory.

List of Prerequisites
- Computer Science 2210A/B and
- Computer Science 2211A/B.

List of Antirequisites
- ECE 4436A/B

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) 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 in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Zubair Fadlullah	Zubair.Fadlullah@uwo.ca	MC360 (consulting via Zoom)	Western extension 80123	Online via Zoom, Tues/Thursdays 3:00-4:00 pm

Students must use their Western (@uwo.ca) email addresses when contacting the instructor. The preferred email address to contact the instructor is cs3357a-z@groups.uwo.ca.

3. Course Syllabus, Schedule, Delivery Mode

Course Description

This course provides an introduction to concepts and issues involved in computer networks and data communications. Topics include the Internet, protocol layers and their service models (with a focus on the TCP/IP model), network programming, principles of reliable data transfer, congestion control, routing, error detection and correction techniques, analog and digital data signaling and transmission, and a variety of other topics in network security, multimedia networking, mobile and wireless data communications, and network management, as time permits.

Course-level learning outcomes

Upon completion of this course, a student will be able to:
- Gain knowledge of networking principles with a long shelf-life that will remain relevant even in emerging communication systems and modern network technologies.
- Explain physical and logical organization and layers of computer networks including the Internet.
- Demonstrate an understanding of client-server interactions and applications.
- Develop an understanding of networking fundamentals, such as reliable communication over an unreliable network layer, congestion and flow control, multiplexing, and multiple access channel sharing.
- Demonstrate an understanding of the difference between IPv4 and IPv6 network protocols.
- Demonstrate an understanding of one or more routing algorithms in the context of growingly complex modern networks.
- Compare functionalities of network elements, such as hubs, switches, bridges, routers, firewalls.
- Become familiar with reliability need of networks through hands-on assignments.
- Be able to write socket-based network application programs.

Lecture notes

Course lecture notes will be posted on the course website on a weekly basis, as they are developed. Note that they are provided as a courtesy by the course instructor. Possessing (and even reading) these notes is not a suitable substitute for the lectures.

Delivery mode

The course will be delivered in person. Office hours are online (in Zoom) and require prior appointment/scheduling.

Course website
The CS3357A website is accessible through OWL at http://owl.uwo.ca. Class and assignment information will be posted on this website on a fairly regular basis. You are responsible for reading this information frequently.

Table of contents (tentative schedule)

The course will address as many of the following topics as time will allow:

Networking Fundamentals	- A history of computer networking and the Internet - Structure of the Internet - Connectionless and connection-oriented services - Circuit switching and packet switching fundamentals - Protocols - Layered protocol architectures and service models
A tour of protocol layers	- The OSI and TCP/IP layered architectures; the application layer and sample application services; transport layer services, including discussions of the principles of reliable data transfer and congestion control; network layer services, including routing and multicasting; data link layer services, including error detection and correction techniques and a variety of protocols (Ethernet, wireless 802.11X, etc.); physical layer services, including signalling, analog and digital data transmission, and channel capacity.
A tour of protocol layers	- The OSI and TCP/IP layered architectures - The application layer and sample application services - Transport layer services, including discussions of the principles of reliable data transfer and congestion control - Network layer services, including routing and multicasting - Data link layer services, including error detection and correction techniques and a variety of protocols (Ethernet, wireless 802.11X, etc.) - Physical layer services, including signalling, analog and digital data transmission, and channel capacity.
Network programming	- Socket programming - TCP and UDP programming interfaces - Asynchronous communications - Advanced socket options and programming techniques
Advanced topics:	- Multimedia networking - Network security - Wireless and mobile computing - Network management

Key Sessional Dates

Classes begin: September 7, 2023
Fall Reading Week: October 30 – November 5, 2023
Classes end: December 8, 2023
Exam period: December 10 – 22, 2023

E-Mail Contact

We will occasionally need to send e-mail messages to the whole class, or to students individually. In accordance with policy (https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf), 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 her/his official university address is attended to in a timely manner.

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Required Textbook

The following text is required for this course:
- Computer Networking: A Top Down Approach, 8th Edition by Kurose and Ross, published by Pearson Education, 2021.

To obtain a digital version of the 8th Edition of the text, please go to Book Store at Western or see VitalSource here: https://www.vitalsource.com/en-ca/products/computer-networking-james-kurose-keith-ross-v9780135928523
Additional references and suggested readings may be provided throughout the course as the assignments require them. Please check back to the course website for updates and more information.

Students are responsible for checking the course OWL site (http://owl.uwo.ca) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: http://owl.uwo.ca.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Recommended References

1. Andrew S. Tanenbaum and David J. Wetherall, Computer Networks (5th Edition), Prentice Hall, 2010

2. W. Stallings, Data and Computer Communications, Prentice Hall, 2002. 3. Leon-Garcia and I. Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, McGraw-Hill, 2000

3. W. Stevens, B. Fenner, and A. Rudoff, Unix Network Programming, Volume 1: The Sockets Networking API

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (#4)   65%

- o Assignment 1   (5%)
- o Assignment 2   (15%)
- o Assignment 3   (20%)
- o Assignment 4   (25%)

Final Exam   35%

To be eligible to receive a passing grade in the course, your mark on the final exam must be at least 40%, and your average on the assignments must be at least 40%. Otherwise, the maximum overall mark you can receive is 45%. To be eligible to receive a grade of C or higher, your mark on the final exam must be at least 50%, and your weighted average on the assignments must be at least 50%. Otherwise, the maximum overall mark you can receive is 58%.

Assignment/Test Feedback

Every effort will be made to have assignments marked and handed back within 3 weeks of the hand-in date, preferably sooner. If we are unable to comply with our intended return dates, revised dates will be posted on the course website.

Final Exam

3 hours during the December exam period.

As an important note, 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. Furthermore, there will be no cheat sheets, books, or other reference materials allowed for the exam. No calculators, cell phones, or other electronic devices will be permitted either.

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

Assignments Due Dates (tentative)

	Difficulty level	**Assigned date (tentative)**	**Due date (tentative)**
Assignment #1	Light (5%)	September 13th 2023	September 28th 2023
Assignment #2	Medium (15%)	September 28th 2023	October 19th 2023
Assignment #3	Heavy (20%)	October 19th 2023	November 9th 2023
Assignment #4	Heavy (25%)	November 9th 2023	December 8th 2023

If, for any reason, the assignment schedule given above cannot be adhered to, the assignment marks will be pro-rated. (The assignments are worth 65% of the overall mark for the course. If an assignment has to be cancelled for any reason, the remaining assignment weights will be prorated to add up to 65%.)

Assignments Late Policy

- Late assignments will be accepted for up to two days after the due date, with weekends counting as a single day; the late penalty is 20% of the available marks per day. Lateness is based on the time the assignment is submitted.
- Extensions will be granted only by your course instructor. If you have serious medical or compassionate grounds for an extension, you **must** take supporting documentation to the Academic Counselling unit of your faculty, who will contact the instructor.

Backups

It is your responsibility to keep up-to-date backups of all assignment files in case of system crashes or inadvertently erased files. Retain copies of all material handed in, as well as the actual graded version, to guard against the possibility of lost assignments or errors in recording marks. It is not safe to discard these materials until you are satisfied that your final mark for the course has been computed properly.

Tutoring

The role of tutoring is to help students understand course material. Tutors should not write assignments, projects, or take-home tests for the students who hire them. Having employed the same tutor as another student is not a legitimate defense against an accusation of collusion, should two students hand in work judged similar beyond the possibility of coincidence.

Marking

- Assignments are marked by the instructor and/or a teaching assistant assigned to the course. We will attempt to include some information about the marking criteria in the appropriate descriptions.
- When marking has been completed, you will be informed via the course website and/or e-mail.
- A request for adjustment in a mark must be made within 2 weeks of the date grades were first available. (Beyond that date, re-grading will not be considered.) Such a request must be submitted in writing, and must include specific reasons why you believe you deserve more marks. The request must be accompanied by all materials that were originally handed in, as well as the original marker's grade summary sheet. Re-grading requests will take a minimum of 24 to 48 hours to process; you will be informed when it is complete.
- Assignment marks may be posted periodically throughout the term through OWL. It is your responsibility to check that your marks have been recorded correctly.

6. Student Absences

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

Assessments worth less than 10% of the overall course grade:

For work less than 10% of the overall course grade (e.g., Assignment #1), if you required additional time with the work with a valid reason, you should contact your academic counsellor to seek accommodations for the assignment that are late and then contact your course instructor about it.

Assessments worth 10% or more of the overall course grade:

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible.

For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour 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. 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 the Academic Calendar for details (under Special Examinations).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation and Accessibility

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

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

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

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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 their official university address is attended to in a timely manner.

Electronic devices are not permitted on tests and exams.

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.

Plagiarism
Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Please note, however, that students are not allowed to make use of the work of others unless explicitly instructed to do so in the description of an assignment.

All projects are to be exclusively your own work. While project work requires you to work in teams, each team is expected to act individually. You may discuss approaches to problems among yourselves; however, the actual details of the work (coding, documentation, etc.) must be an individual effort. Incidents that are judged to be the result of academic dishonesty will be reported to the Undergraduate Chair. The selection of penalty to be applied is up to the Chair, with consultation of the instructor.

The standard departmental penalty for assignments that are judged to be the result of academic dishonesty is, for the student's first offence, a mark of zero for the assignment, with the offence reported to the Dean of your home faculty. You are responsible for reading and respecting the Department of Computer Science's policy on Scholastic Offenses. and Rules of Ethical Conduct.

The University of Western Ontario uses software for plagiarism checking. Students may be required to submit their written work and programs in electronic form for plagiarism checking.

All required papers 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. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

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 adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/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.

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.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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 Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.