Overview

CS 456/656, Computer Networks provides an introduction to the fundamentals of network architectures and protocols. Emphasis is placed on protocols used on the Internet.

When: Winter 2021

Where: Online

Instructor: Dr. Noura Limam

Email: n2limam@uwaterloo.ca

Contact: Email, Microsoft Teams (CS 456/656 Winter 2021)

OH: Thursdays 3:30pm~4:30pm by appointment (email)

Teaching Assistants:

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Required Text

Computer Networking: A Top-Down Approach, Jim Kurose & Keith Ross, Addison-Wesley, 8th Edition (7th Edition is also OK)

To access the Pearson eText **Kurose/Ross - Computer Networking, 8/e,** your course materials. Here's how:

1. Enter your Course Invite Link: https://console.pearson.com/enrollment/uxt7tk
2. Sign in or create an account from the "Sign in" button on the top-right corner (If you have used a Pearson product before, you will have a Pearson account.)
3. **Select your access option**

a. Redeem access code" you purchased from the bookstore. Or purchase instant access from the bookstore

https://www.campusebookstore.com/integration/AccessCodes/default.aspx?bookseller_id=22&Course=CS+456+041+(WINTER+2021+-+WAT)&frame=YES&t=permalink

b. Purchase materials online with a credit card or PayPal account

c. Get 3-day temporary access" if you're waiting on financial aid or want to try the product first

4. From now on, you can log in from **http://console.pearson.com**

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Course Objectives

This course provides an overview of computer networks featuring the Internet, covering aspects ranging from transmitting frames on a comm. link and routing packets in a network to the design of network applications.

Course Topics

The following topics are covered:

We will take a 'top-down' approach to networking to explain how networking principles are put into practice in the support of widely used networked applications and systems.

Chapter I. Overall Picture of Computer Networking

Circuit Switching Vs. Packet Switching, Access Networks, Physical Media, Network Delays, Protocol Layering, Internet architecture

Chapter II. Application layer protocols

World Wide Web (HTTP), File Transfer (FTP), Electronic Mail (SMTP), Domain Name System (DNS), Socket Programming.

Chapter III. Transport layer protocols

Design Issues, Connectionless UDP, Principles of Reliable Data Transfer, Connection-oriented Transport TCP, Flow Control, Congestion Control.

Chapter IV. and V. Network layer and routing

Routing approaches, routing in the Internet, Internet Protocol, multicast routing, IPv6, tunnelling, router design, control/data plane, SDN.

Chapter VI. Data link layer

Multiple access protocols and LAN's, address resolution protocol, wireless LAN's.

Course Requirements

It is expected that students complete the required assignments and take all quizzes and exams. Any material presented in lectures or covered in the textbook will be examinable unless specifically noted.

Course resources

Primary electronic material for the course is available on **Waterloo Learn**.

Course Prerequisites

CS 350 or 354; Computer Science students only

Anti-requisites: CS 436, ECE 358, 428

Grading Policy

CS 456

Assignments: 3 programming assignments of 10% each
Midterm Exam: 25%
Final Exam: 35%
Quizzes: 10%

CS 656

Midterm Exam: 25%
Final Exam: 35%
Assignments: 2 programming assignments of 5% each
Project (Research Paper): 20%
Quizzes: 10%

Assignments are to be returned by the provided due dates. In the case of illness or extraordinary circumstances, a 10% penalty will apply for each 24 hours late submission up to a maximum of 72 hours of the assignment deadline. No further extension will be granted.

Midterm and final have to be passed, in the aggregate, in order to pass the course; i.e.,:

[(Midterm*25) + (Final*35)] / 60 >= 50%

In case of a missed exam, a medical certificate or doctor's note MUST include the statement "This Student is unable to write the exam on (date) for (medical reasons)". Documentation MUST show that the physician was consulted before or on the day of the exam. Only ORIGINAL copies can be accepted. A statement merely confirming a report of illness made by the student is NOT acceptable. No Dr note will be accepted for a missed quiz or assignment.

FALSE STATEMENTS AND/OR DOCUMENTATION WILL BE TREATED AS ACADEMIC OFFENCES AND HANDLED ACCORDINGLY.

Plagiarism

A programming assignment is an individual creative process. Individuals must reach their own understanding of the problem and discover a path to its solution. During this time, discussions with friends are encouraged. However, when the time comes to write the code that solves the problem, such discussions are no longer appropriate; the program must be your own work.

Do not, under any circumstances, copy another person's program. This includes relevant web sources. Writing code for use by another or using another's code in any form is academic fraud and will be dealt with harshly. You are also responsible for ensuring that the code you write for the assignments is not readable by others.

Appeals

Assignment appeals should be directed to the TA who marked the assignment. Exam appeals need to be submitted in writing to the instructor. The whole exam will be remarked.

Academic Integrity

Academic Integrity
In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. All members of the UW community are expected to hold to the highest standard of academic integrity in their studies, teaching, and research. The Office of Academic Integrity's website (www.uwaterloo.ca/academicintegrity) contains detailed information on UW policy for students and faculty. This site explains why academic integrity is important and how students can avoid academic misconduct. It also identifies resources available on campus for students and faculty to help achieve academic integrity in — and out — of the classroom.

Grievance
A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4,http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm

Discipline
A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm

Avoiding Academic Offenses

Most students are unaware of the line between acceptable and unacceptable academic behaviour, especially when discussing assignments with classmates and using the work of other students. For information on commonly misunderstood academic offenses and how to avoid them, students should refer to the Faculty of Mathematics Cheating and Student Academic Discipline Policy,http://www.math.uwaterloo.ca/navigation/Current/cheating_policy.shtml

Appeals
A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals,http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

Mental Health Support

The Faculty of Math encourages students to seek out mental health support if needed.

On-campus Resources:
- Campus Wellness https://uwaterloo.ca/campus-wellness/
- Counselling Services: counselling.services@uwaterloo.ca/ 519-888-4567 ext 32655
- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services: mates@uwaterloo.ca
- Health Services: located across the creek from the Student Life Centre, 519-888-4096.

Off-campus Resources:
- Good2Talk (24/7): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Diversity

It is our intent that students from all diverse backgrounds and perspectives be well served by this course, and that students' learning needs be addressed both in and out of class. We recognize the immense value of the diversity in identities, perspectives, and contributions that students bring, and the benefit it has on our educational environment. Your suggestions are encouraged and appreciated. Please let us know ways to improve the effectiveness of the course for you personally or for other students or student groups. In particular:
- We will gladly honour your request to address you by an alternate/preferred name or gender pronoun. Please advise us of this preference early in the semester so we may make appropriate changes to our records.
- We will honour your religious holidays and celebrations. Please inform of us these at the start of the course.
- We will follow AccessAbility Services guidelines and protocols on how to best support students with different learning needs.