

Course Outline (F2025)

COE768: Computer Networks

Instructor(s)	Dr. Truman Yang [Coordinator] Office: ENG435 Phone: (416) 979-5000 x 554175 Email: cungang@torontomu.ca Office Hours: By Appointment
Calendar Description	This is an introductory course in computer networks. In particular, it concentrates on the Internet technology. It first introduces the OSI and TCP/IP network architecture models. It then studies the implementation principles and design issues at each layer of these models. Lecture topics include: OSI and TCP/IP models, data transmission basics, data-link protocols, local area networks, wide-area networks, Internet structures, TCP/IP protocol suite, and application Layer protocols. Laboratory work focuses on the implementation of stop-and-wait protocol based on the BSD socket. In addition, students will gain practical experience by building and studying a physical network using network devices such as switches and routers.
Prerequisites	(COE 538 or ELE 538) and ELE 532
Antirequisites	None
Corerequisites	None
Compulsory Text(s):	1. "Computer Networks", 5th edition, by Tanenbaum and Wetherall, Prentice Hall, 2011. ISBN-13: 978-0-13-212695-3
Reference Text(s):	1. Computer Networking, a Top-Down Approach by Kurose and Ross, 7th edition, 2016
Learning Objectives (Indicators)	<p>At the end of this course, the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Uses analytical models to predict and control and networking components and processes behaviors. (1b) 2. Uses engineering knowledge to solve real world open-ended engineering problems. Uses the specialized core engineering knowledge in the field of computer networks to understand and design a various types of communication links and networks. (1c) 3. Uses the specialized core engineering knowledge in the field of computer networks to understand and design a various types of communication links and networks. (1d) 4. Generate solutions for complex engineering design problems. (4b) 5. Demonstrates iterative design process in complex engineering projects. (4c) 6. Writes and revises documents using appropriate discipline specific conventions. (7a) 7. Demonstrates confidence in oral communications and explains and interprets results clearly. (7b) <p>NOTE: Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board (CEAB).</p>

Course Organization	3.0 hours of lecture per week for 13 weeks 2.0 hours of lab per week for 12 weeks 0.0 hours of tutorial per week for 12 weeks														
Teaching Assistants	TBA														
Course Evaluation	<table border="1"> <thead> <tr> <th colspan="2">Theory</th> </tr> </thead> <tbody> <tr> <td>Midterm Exam</td> <td>25 %</td> </tr> <tr> <td>Final Exam</td> <td>45 %</td> </tr> <tr> <th colspan="2">Laboratory</th> </tr> <tr> <td>Lab Assignments</td> <td>12 %</td> </tr> <tr> <td>Project</td> <td>18 %</td> </tr> <tr> <td>TOTAL:</td> <td>100 %</td> </tr> </tbody> </table> <p>Note: In order for a student to pass a course, a minimum overall course mark of 50% must be obtained. In addition, for courses that have both "Theory and Laboratory" components, the student must pass the Laboratory and Theory portions separately by achieving a minimum of 50% in the combined Laboratory components and 50% in the combined Theory components. Please refer to the "Course Evaluation" section above for details on the Theory and Laboratory components (if applicable).</p>	Theory		Midterm Exam	25 %	Final Exam	45 %	Laboratory		Lab Assignments	12 %	Project	18 %	TOTAL:	100 %
Theory															
Midterm Exam	25 %														
Final Exam	45 %														
Laboratory															
Lab Assignments	12 %														
Project	18 %														
TOTAL:	100 %														
Examinations	Midterm exam, week 7, close book. Final exam, during exam period, close book, two hours.														
Other Evaluation Information	Project demonstration and report Lab demonstration All 4 Lab assignments have to be done individually. The project is a group project (2 students per group). Source codes of each lab assignment should be submitted to D2L 24 hours before the beginning of next lab. Late source code submission or late demonstrations will not be accepted and will receive a mark of 0.														
Teaching Methods	Voice assistant maybe used. Three hours lecture each week Two hours lab per week														
Other Information	None														

Course Content

Week	Hours	Chapters / Section	Topic, description
------	-------	--------------------	--------------------

1-2	6	Chapter 1, 6.1, 6.2	OSI and TCP/IP layer architecture models. Introduction of TCP and UDP. Socket programming
3	3	Section 3.1	Overview of link layer and framing
4	3	Section 3.2.2, 3.3	Error detection coding and framing
5	3	Section 4.3	Local Area Networks (LANs): CSMA/CD, Ethernet
6	3	Sections 4.4	Wireless LAN, VLAN.
7			Midterm Exam
8	3	Sections 4.8	LAN Switching and Spanning Tree Protocol
9	3	Section 5.1, 5.5.1, 5.5.2, 5.6.1 and 5.6.2	IP: IP diagram format and IP addressing
10	3	Section 5.6.3, 5.6.4, 7.1	IP related protocols: ARP, DNS, IPv6
11	3	Section 5.6.3, 5.6.4, 7.1	IP related protocols: ARP, DNS, IPv6
12	3	Section 3.4	Sliding Window Protocols: Go-back-N protocol, Selective Repeat Protocol
13	3	Section 6.4.1, 6.5.1-6.5.9	UDP and TCP protocols and Final Review

Laboratory(L)/Tutorials(T)/Activity(A) Schedule

Week	L/T/A	Description
2-3 (week of Sept. 15 and Sept. 22)	Lab	Lab 1: Study of the concepts of Layer Architecture <ul style="list-style-type: none">o Traffic analysis using Wiresharko Study of network encapsulation
4 (week of Sept. 29)	Lab	Lab 2: Study of the characteristics of server running on TCP <ul style="list-style-type: none">o TCP connection establishment and terminationo Server concurrencyo Socket program structure Demonstration of Lab 1
5 (week of Oct. 6)	Lab	Lab 3: File download application based on TCP Demonstration of Lab 2
6-7 (week of Oct 13 and Oct. 20)	Lab	Lab 4: UDP server implementation Demonstration of Lab 3 on week 6
8 (Week of Oct 27)	Lab	Demonstration of Lab 4 Project: Peer-to-Peer application
9-11 (week of Nov 3, 10 and 17)	Lab	Continuation of the project
12 (week of Nov. 24)	Lab	Demonstration of the project. Submit source code of project to D2L before your demonstration. Final date to submit the project report: Friday, week 12 (Nov. 28)

University Policies & Important Information

Students are reminded that they are required to adhere to all relevant university policies found in their online course shell in D2L and/or on [the Senate website](#)

Refer to the [Departmental FAQ page](#) for further information on common questions.

Important Resources Available at Toronto Metropolitan University

- [The University Libraries](#) provide research [workshops](#) and individual consultation appointments. There is a drop-in Research Help desk on the second floor of the library, and students can use the [Library's virtual research help service](#) to speak with a librarian, or [book an appointment](#) to meet in person or online.
- [Student Life and Learning Support](#) offers group-based and individual help with writing, math, study skills, and transition support, as well as [resources and checklists to support students as online learners](#).
- You can submit an [Academic Consideration Request](#) when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement. You may always visit the [Senate website](#) and select the blue radio button on the top right hand side entitled: Academic Consideration Request (ACR) to submit this request.

For Extenuating Circumstances, [Policy 167: Academic Consideration](#) allows for a once per semester ACR request without supporting documentation if the absence is less than 3 days in duration and is not for a final exam/final assessment. Absences more than 3 days in duration and those that involve a final exam/final assessment, always require documentation. Students must notify their faculty/contract lecturer once a request for academic consideration is submitted. See Senate [Policy 167: Academic Consideration](#).

Longer absences are not addressed through Policy 167 and should be discussed with your Chair/Director/Program to be advised on next steps.

- [FAQs Academic Considerations and Appeals](#)
- Information on Copyright for [Faculty/Contract Lecturers](#) and [students](#).

Lab Safety (if applicable)

Students are to strictly adhere and follow:

- a. The Lab Safety information/guidelines posted in the respective labs,
- b. provided in their respective lab handouts, and
- c. instructions provided by the Teaching Assistants/Course instructors/Technical Staff.

During the lab sessions, to avoid tripping hazards, the area around the lab stations should not be surrounded by bags, backpacks etc, students should place their bags, backpacks etc against the walls of the labs and/or away from their lab stations in such a way that it avoids tripping hazards.

Accessibility

- Similar to an [accessibility statement](#), use this section to describe your commitment to making this course accessible to students with disabilities. Improving the accessibility of your course helps minimize the need for accommodation.
- Outline any technologies used in this course and any known accessibility features or barriers (if applicable).
- Describe how a student should contact you if they discover an accessibility barrier with any course materials or technologies.

Academic Accommodation Support

Academic Accommodation Support (AAS) is the university's disability services office. AAS works directly with incoming and returning students looking for help with their academic accommodations. AAS works with any student who requires academic accommodation regardless of program or course load.

- Learn more about [Academic Accommodation Support](#).
- Learn [how to register with AAS](#).

- Learn about [Policy 159: Academic Accommodation of Students with Disabilities](#)

Academic Accommodations (for students with disabilities) and Academic Consideration (for students faced with extenuating circumstances that can include short-term health issues) are governed by two different university policies. Learn more about [Academic Accommodations versus Academic Consideration and how to access each](#).

Wellbeing Support

At Toronto Metropolitan University, we recognize that things can come up throughout the term that may interfere with a student's ability to succeed in their coursework. These circumstances are outside of one's control and can have a serious impact on physical and mental well-being. Seeking help can be a challenge, especially in those times of crisis.

If you are experiencing a mental health crisis, please call 911 and go to the nearest hospital emergency room. You can also access these outside resources at anytime:

- **Distress Line:** 24/7 line for if you are in crisis, feeling suicidal or in need of emotional support (phone: 416-408-4357)
- **Good2Talk:** 24/7-hour line for postsecondary students (phone: 1-866-925-5454)
- **Keep.meSAFE:** 24/7 access to confidential support through counsellors via [My SSP app](#) or 1-844-451-9700

If non-crisis support is needed, you can access these campus resources:

- **Centre for Student Development and Counselling:** 416-979-5195 or email csdc@torontomu.ca
- **Consent Comes First - Office of Sexual Violence Support and Education:** 416-919-5000 ext 3596 or email osvse@torontomu.ca
- **Medical Centre:** call (416) 979-5070 to book an appointment

We encourage all Toronto Metropolitan University community members to access available resources to ensure support is reachable. You can find more resources available through the [Toronto Metropolitan University Mental Health and Wellbeing](#) website.