DALHOUSIE UNIVERSITY
Faculty of Computer Science

CSCI3171 --- Network Computing
Course Information and Syllabus – Winter 2024

Instructor Information

Instructor:	Dr. Samer Lahoud	**Office:**	CS 216
E-mail:	sml@dal.ca	**Office Hours:**	TBA on Brightspace
Class Meeting Time:		**Room No:**	
Course Homepage:	https://dal.brightspace.com/		
Course Mail List:			

Course Overview

Welcome to Network Computing, a core third year course that lays the foundation for Networks and Communications. This course gives students a foundation in computer networks. It presents a top-down view of the layered architectural elements of communication systems, focusing on the Internet and TCP/IP. Topics include TCP/IP application layer protocols such as HTTP and DNS, Transport layer protocols (TCP and UDP), client/server systems, packet switching, socket programming, reliable transport, and security.

Learning Outcomes

- Identify the elements of network infrastructure, both in the network edge and the network core.
- Explain network performance in terms of delay, throughput, and loss, and estimate.
- Explain the responsibilities of the layers in the OSI and TCP/IP stacks.
- Select an appropriate architecture for a network application, particularly from among client-server, peer-to-peer, and hybrid systems.
- Explain the operation of the HTTP, DNS, SMTP, IMAP protocols.
- Explain the operation of UDP.
- Identify the structure in the address organization at each layer of the TCP/IP stack.
- Analyze pros and cons of packet switching and circuit switching technologies.
- Explain the operation of TCP relative to basic operations, reliable data transfer, flow control, and congestion control.
- Explain the steps and trade-offs involved in error detection.
- Use sockets to establish exchange data between processes.
- Explain how peer-to-peer systems, particularly those based on distributed hash tables, locate and exchange resources.
- Select deployments of symmetric and asymmetric encryption to provide data confidentiality, data integrity, and non-repudiation in the presence of malicious network activity.
- Understand the principles of secure communications.

Course Format

This is an **in-person** course with all lectures held in person in the classroom. Attendance to lectures is important for completing the course successfully. You must not have conflicts during the lecture times since exams and quizzes will be conducted during these times.

Lecture Sessions

Lectures for this course will be on Monday 11.35 – 12.55 AM and Thursday 10.05 – 11.25 AM in **Goldberg** Computer Science Building **Room 127**.

Lab Sessions

Lab Sessions will be held on Tuesday 13.05 – 14.25 and Wednesday 11.35 – 12.55 in **Goldberg** Computer Science Building **Room 134**. Please attend the lab session for which you have signed up.

Attendance

You are strongly encouraged to attend all the lecture sessions in person. Short quizzes will be held during the lecture sessions.

Grading Scheme

Assignments:	20%
Lab reports:	15%
Lab exams:	20%
Quizzes during lectures:	10%
Final Exam:	35%

Prerequisites

CSCI 1120: Introduction to Computer Systems
CSCI 2110: Data Structures and Algorithms
CSCI 2134: Software Development

Assignment Details

Assignments are worth 20% of your grade. Each assignment will be worth 5% and will be of approximately equal level of difficulty. Assignments will be posted on Brightspace, and submission is on Brightspace. No collaboration is permitted – you must work on your assignment independently.
There will be five assignments, one of which is optional – it means that the best four out of five assignments will be taken for grading. You can choose to do all five assignments, or simply aim to do the any four out of five.

Lab Requirements

Labs constitute 35% of your overall grade, and you can expect nine sessions throughout the term. Lab materials will be accessible on Brightspace. It is highly recommended that you complete most lab exercises during the designated lab time.
For each lab, you are required to submit reports:

- Three reports will be graded, collectively accounting for 15% of the total grade.
- Non-graded labs will serve as supplementary material for the lab exams.

Two lab exams, constituting 20% of the total grade, will be conducted during lab hours. These exams will be closed book, and the only permitted reference materials will be your previously submitted lab reports. Lab exams will be held in person on Brightspace with Respondus Lockdown Browser.

Week	Lab	Delivery
1		
2	Lab 1	Graded report
3	Lab 2	Graded report
4	Lab 3	Graded report

5	Lab 4	Non-Graded report
6	Lab 5	Non-Graded report
Study Break		
7	Lab Exam 1	
8		
9	Lab 6	Non-Graded report
10	Lab 7	Non-Graded report
11	Lab Exam 2	
12		

Quizzes During Lectures

There will be four short quizzes held during the lecture sessions. These are worth 10% of your grade. They are mainly meant to be reflective, and to encourage you to attend the lecture sessions. One quiz will be dropped. These quizzes will be on Brightspace. They are open book.

Late Submissions

Labs and assignments must be submitted by 6:00 PM on the designated due date. Late submissions within the first 5 hours (up to 11:00 PM on the same day) will be accepted without a penalty. Following this grace period, a 10% late penalty per day will be applied to the obtained mark. Submissions beyond 48 hours (two days) after the grace submission time will not be accepted.
For example, if a lab is due at 6:00 PM on Sunday and you submit it on Monday at 7:00 PM with an initial score of 8/10, it will be reduced to 7.2/10. Additionally, submissions after 11:00 PM on Tuesday will not be accepted.

Final Exam

Final exam is closed book and will be held in person. It will be on Brightspace with Respondus Lock-down Browser.

Grading

- A minimum grade of C is required in this course if it is core to your FCS degree, or if it will be used as a prerequisite for a subsequent CSCI course.
- As of 2019, students who receive a grade lower than C in the same required CS course twice, will be dismissed.
- The grade conversion scale in Section 17.1 of the Academic Regulations, Undergraduate Calendar will be used. https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=7302&topicgroupid=32188&loaduseredits=False
- **A student must score a minimum of 50% out of the total weightage for the lab exams and the final exams to pass the course.**

Course Communication

- All course information, including announcements, lecture material, labs, assignments, etc. will be posted on Brightspace. Please check Brightspace and your Dal e-mail daily.
- Office hours will be posted on Brightspace.

Student Declaration of Absence

The Student Declaration of Absence policy shall apply. https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html The student has a maximum of two (2) SDAs per course per semester. The student **must** notify the instructor of their inability to meet a deadline **before** the deadline by contacting the instructor or submitting the completed SDA. Upon notification the student has 3 days after the deadline to submit the SDA. Not that you have the option to drop one assignment and one short quiz. In view of the above flexibility, SDAs do not apply for quizzes and assignments.

Academic Standards

Failure to properly attribute sources in your work will be treated as academic standards issue and points may be deducted for not following citation requirements. For example, forgetting to quote text taken from other sources, failure to include in-text citations, or a failure to include required information in the citations or references. Please see the resources on proper citation provided by the Dalhousie Writing Center (https://dal.ca.libguides.com/c.php?g=257176&p=5001261).

Please note that if it appears that the error was made with intent to claim other people's work as your own such as a lack of both citations and references, an allegation of plagiarism will be submitted to the Faculty Academic Integrity Officer, which could result in consequences such as a course failure.

Required Texts and Resources

- The recommended text for the course is:
  - *Computer Networking: A top down approach featuring the Internet* by J.F. Kurose and K.W.Ross, Addison Wesley, 8th edition.
  - Computer Networking: Principles, Protocols and Practice, O. Bonaventure, www.computer-networking.info, second edition.
- The lecture slides will be posted on the learning management system (Brightspace).
- Additional assistance is available from the Student Learning Centre (2nd floor, Goldberg CS Bldg.).

Tentative[1] List of Topics and Course Organization

For Academic Calendar visit: http://www.dal.ca/academics/important_dates.html

Week	Dates	Lecture	Quiz	Lab	Assignment
1	Jan 8 - Jan 12	Introduction to Networks			
2	Jan 15 - Jan 19	Introduction to Networks		Lab 1	
3	Jan 22 - Jan 26	TCP/IP Layered Architecture	Quiz 1	Lab 2	Assignment 1
4	Jan 29 - Feb 2	The Application Layer		Lab 3	
5	Feb 5 - Fab 9	The Application Layer		Lab 4	
6	Feb 12 - Feb 16	The Application Layer	Quiz 2	Lab 5	Assignment 2
	Feb 19 - Feb 23	Study Break			
7	Feb 26 - Mar 1	Socket programming		Lab Exam 1	Assignment 3
8	Mar 4 - Mar 8	Transport Layer			
9	Mar 11 - Mar 15	Transport Layer		Lab 6	
10	Mar 18 - Mar 22	Transport Layer	Quiz 3	Lab 7	Assignment 4

[1] Any modifications impacting this organization will be communicated through Brightspace.

11	Mar 25 - Mar 29	Principles of Secure Communications	Lab Exam 2	
12	Apr 1 - Apr 5	Principles of Secure Communications	Quiz 4	Assignment 5

Responsible Computing Policy

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies (https://www.dal.ca/dept/university_secretariat/policies/information-management-and-technology/acceptable-use-policy-.html) and the Faculty of Computer Science Responsible Computing Policy. For more information please see https://www.dal.ca/content/dam/dalhousie/pdf/faculty/computerscience/policies-procedures/fcs_policy_local.pdf

Use of Plagiarism Detection Software

All submitted code may be passed through a plagiarism detection software, such as the plagiarism detector embedded in Codio, the Moss (https://theory.stanford.edu/~aiken/moss/) Software Similarity Detection System, or similar systems. If a student does not wish to have their assignments passed through plagiarism detection software, they should contact the instructor for an alternative. Please note, that code not passed through plagiarism detection software will necessarily receive closer scrutiny. https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf

Student Health and Wellness

Taking care of your health is important. As a Dalhousie student, you have access to a wide range of resources to support your health and wellbeing. Students looking to access physical or mental health & wellness services at Dalhousie can go to the Student Health & Wellness Centre in the LeMarchant Building. The team includes: registered nurses, doctors, counsellors and a social worker. Visit **dal.ca/studenthealth** to learn more and book an appointment today.

Students also have access to a variety of online mental health resources, including telephone/texting counselling and workshops/training programs. Learn more and access these resources at d**al.ca/mentalhealth**.

Culture of Respect[2]

Every person has a right to respect and safety. We believe inclusiveness is fundamental to education and learning. Misogyny and other disrespectful behaviour in our classrooms, on our campus, on social media, and in our community is unacceptable. As a community, we must stand for equality and hold ourselves to a higher standard.

What we all need to do:

1. **Be Ready to Act:** This starts with promising yourself to speak up to help prevent it from happening again. Whatever it takes, summon your courage to address the issue. Try to approach the issue with open-ended questions like "Why did you say that?" or "How did you develop that belief?"
2. **Identify the Behaviour:** Use reflective listening and avoid labeling, name-calling, or assigning blame to the person. Focus the conversation on the behaviour, not on the person. For example, "The comment you just made sounded racist, is that what you intended?" is a better approach than "You're a racist if you make comments like that."

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[2] Source: Speak Up! © 2005 Southern Poverty Law Center. First Printing. This publication was produced by Teaching Tolerance, a project of the Southern Poverty Law Center. Full "Speak Up" document found at: http://www.dal.ca/dept/dalrespect.html. Revised by Susan Holmes from a document provided April 2015 by Lyndsay Anderson, Manager, Student Dispute Resolution, Dalhousie University, 902.494.4140, lyndsay.anderson@dal.ca www.dal.ca/think.

3. **Appeal to Principles:** This can work well if the person is known to you, like a friend, sibling, or co-worker. For example, "I have always thought of you as a fair-minded person, so it shocks me when I hear you say something like that."
4. **Set Limits:** You cannot control another person's actions, but you can control what happens in your space. Do not be afraid to ask someone "Please do not tell racist jokes in my presence anymore" or state "This classroom is not a place where I allow homophobia to occur." After you have set that expectation, make sure you consistently maintain it.
5. **Find or be an Ally:** Seek out like-minded people that support your views, and help support others in their challenges. Leading by example can be a powerful way to inspire others to do the same.
6. **Be Vigilant:** Change can happen slowly, but do not let this deter you. Stay prepared, keep speaking up, and do not let yourself be silenced.

University Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and the Senate. https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&loaduseredits=False

Territorial Acknowledgement

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

Dalhousie acknowledges the histories, contributions, and legacies of the African Nova Scotia people and communities who have been here for over 400 years.

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." https://www.dal.ca/about-dal/internationalization.html

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect. As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. (read more: http://www.dal.ca/dept/university_secretariat/academic-integrity.html)

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion please contact: https://www.dal.ca/campus_life/academic-support/accessibility.html for all courses offered by Dalhousie with the exception of Truro.

Conduct in the Classroom — Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion — Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). (read more: http://www.dal.ca/cultureofrespect.html)

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. (read more: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/Code%20of%20Student%20Conduct%20rev%20Sept%202021.pdf)

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. (read more: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html)

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work, and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. (read more: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf)

Student Use of Course Materials

These course materials are designed for use as part of the CSCI courses at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading material to a commercial third party website) may lead to a violation of Copyright law.

Learning and Support Resources

Please see https://www.dal.ca/campus_life/academic-support.html