COMP 535: Computer Networks 1

Winter 2019

School of Computer Science

McGill University

Instructor Coordinates

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Office: McConnel Engineering Building - Room 206N

Office hours: Thursday 5 PM – 5:45 PM

Appointments can be made for meetings at other times

Note: Include the course number in the subject field of emails that you send

Teaching Assistant Coordinates

Qinglong Wang - qinglong.wang@mail.mcgill.ca

TA office hours: TBA

Course Schedule

January 7, 2019 to April 12, 2019

Lectures: Monday & Wednesday 11:35 AM – 12:55 PM in SADB 1/12

Tutorials: TBA

Course Prerequisites

- COMP 251 (Algorithms and data structures)
- COMP 202 (Introduction to programming)

Course Description

This course introduces the principles of computer networks. We will learn the fundamentals of networks and their key concepts. The course covers the different layers of the OSI model, with a particular focus on the Data Link Layer, Network Layer, Transport Layer and Application Layer. We will learn the functionalities of each layer and the main protocols linked to it (e.g. Ethernet, IP, TCP, UDP, FTP, HTTP, …). We will analyze network configurations and compute key metrics accordingly. We will design the architecture of sample networks, implement them and configure network equipment. We will analyze main mechanisms in protocols.

Course Objectives

At the end of the course, you will be able to:

- Explain mechanisms and operations of network protocols and applications
- Analyze network configurations and derive networking metrics (e.g. Throughput, delay)
- Design and illustrate the architecture of a network, implement it and configure it
- Analyze the performance of a network and investigate common networking problems

Course Methodology

- Lectures
- Theoretical exercises
- Practical activities (Cisco Packet Tracer)

Course Content

Note: Subject to adjustments

Topic	Description	Sessions
1	Overview of computer networks - Definition of the internet - Network structure: components, scales, topologies - Key concepts: Delay, loss, throughput - Protocol layers and service models	Week 1 Week 2
2	Physical and Data Link layers - Communication channels - Data link mechanisms - Medium access control - Switching schemes	Week 3
3	Network layer -Introduction -IP -Routing algorithms	Week 4 Week 5 Week 6 Week 7
4	Troubleshooting networks -Troubleshooting techniques and tools	
5	Transport layer - Introduction - UDP - TCP - Features and mechanisms	Week 8 Week 9
6	Application layer - Principles of network applications - DHCP, Telnet, SSH, HTTP, FTP, SMTP, DNS, P2P	Week 10 Week 11

7	Wireless and mobile networks - WiFi - Mobility management	Week 12
8	Networks of the future - IoT - SDN - NFV	Week 13

Evaluation

- 3 Assignments (8%,8%,8%) 24%
- Project 16%
- Midterm Exam 25%
- Final Exam 35%

Software

- Cisco Systems Packet Tracer from: https://www.netacad.com/courses/packet-tracer-download/
- Wireshark https://www.wireshark.org/

Reference books

- J. F. Kurose, K. W. Ross, “Computer Networking: a top-down approach,”, Pearson Education, 6th or 7th edition.
- D. Wetherall, A. S. Tanenbaum, “Computer networks”, Upper Saddle River, NJ: Pearson Prentice Hall, 5th or 6th edition.

Assignment Submissions

All submissions must be in electronic form and uploaded to myCourses.

Late Assignment Policy

Late assignments will be accepted up to only 2 days late and will be penalized by 15% per day.

Plagiarism Policy

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism, and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/integrity/ for more information).