COMP 535: Computer Networks 1
Winter 2019
School of Computer Science
McGill University

Instructor Coordinates
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   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
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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

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<tr>
<th>Topic</th>
<th>Description</th>
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| 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 | Week 8  
|       |                                              | Week 9  |
| 5     | Transport layer  
|       | - Introduction  
|       | - UDP  
|       | - TCP  
|       | - Features and mechanisms | Week 10  
|       |                                              | Week 11  |
| 6     | Application layer  
|       | - Principles of network applications  
|       | - DHCP, Telnet, SSH, HTTP, FTP, SMTP, DNS, P2P |
| 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:  
- Wireshark  
  [https://www.wireshark.org/](https://www.wireshark.org/)

**Reference books**

**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/](http://www.mcgill.ca/integrity/) for more information).