



Carleton
UNIVERSITY

Department of
**Systems and
Computer Engineering**

SYSC 4701 Communications Systems Lab

Calendar description

Project-oriented level experience in the design of communication systems to meet user requirements. Lectures on queuing theory and teletraffic analysis; system specification and design: requirements analysis, solution alternatives, evaluation of alternative technologies, design, costing, implementation, test.

Includes: Experiential Learning Activity.

Lectures two hours a week, laboratory four hours a week.

<http://calendar.carleton.ca/undergrad/courses/SYSC/>

Prerequisites

Fourth-year status in Communications Engineering or permission of the department.

Prior knowledge

Students should have knowledge of:

- Network layers and functionalities of each layer.
- Basic network routing techniques.
- TCP/IP networking concepts.

Course objectives

- Develop expertise in emerging computer network technologies and industry-standard tools.
- Extend and integrate existing systems to meet new requirements in computer networks.
- Construct moderately complex network systems using industrial-quality software.
- Work independently and cooperatively in groups.
- Communicate the design effectively to peers in both oral and written forms in a collaborative environment.
- Develop problem solving skills in network systems.

List of topics

- Course Introduction, Overview of Operating Systems and Linux
- Concurrency and Semaphores
- Overview of Software-defined Networking (SDN): Why? How?

- The Overflow Specification
- SDN Controller
- Cloud Networking, SDN in Datacentre
- SDN in Other Environments
- Network Functions Virtualization (NFV)
- NFV Using Virtual Machines and Containers
- SDN Applications, MPLS Traffic Engineering
- Business Ramifications
- Segment Routing and SDN

Learning outcomes

By the end of this course, students should be able to:

- Understand the fundamentals of emerging computer network technologies, e.g., Software-defined Networking (SDN), Network Function Virtualization (NFV), Cloud Networking, Containers, etc.
- Develop hands-on skills using industry-standard tools for emerging network technologies.
- Understand practical issues in network systems and develop problem solving skills through experiments.
- Develop skills for problem analysis and evaluation of design alternatives.
- Design, implement, test, evaluate, and document a reasonably complex network system for a self-proposed project using the advanced technologies and tools.
- Work in a team using industry-standard tools to produce a project on schedule.
- Present and communicate effectively the problem and design to peers and the class in both oral and written forms.

Graduate Attributes (GAs)

The Canadian Engineering Accreditation Board requires graduates of engineering programs to possess 12 attributes at the time of graduation. Activities related to the learning outcomes listed above are measured throughout the course and are part of the department's continual improvement process. Graduate attribute measurements will not be taken into consideration in determining a student's grade in the course. For more information, please visit: <https://engineerscanada.ca/>.

Graduate Attribute	Learning outcome(s)
5.4: Use of Engineering Tools: Developed: Information from relevant publications	1, 4, 5
5.5: Use of Engineering Tools: Developed: Limitations of such tools and the assumptions inherent in their use	2, 3, 5
6.1: Individual and Team Work: Applied: Personal and group time management	5, 6
6.2: Individual and Team Work: Developed: Group culture, group dynamics	6, 7
7.3: Communication Skills: Applied: Oral and written presentations	7

Accreditation Units (AUs)

For more information about Accreditation Units, please visit:
<https://engineerscanada.ca/>.

The course has a total of 49 AUs, divided into:

- Engineering Science: 30%
- Engineering Design: 70%

Instructor and TA contact

Specific to course offering (tbd)

Textbook (or other resources)

Specific to course offering (tbd)

Evaluation and grading scheme

Specific to course offering (tbd)

Breakdown of course requirements

Specific to course offering (tbd)

Tentative week-by-week breakdown

Specific to course offering (tbd)

General regulations

Specific to course offering (tbd)