



## COURSE OUTLINE SPRING 2024

	Date	Initials
Prepared by Instructor	03-May	S.Y.
Approved by Head		

### 1. Calendar Information

#### ENCM 519.57

#### IP Networking - Group Study in Switzerland

This course covers the fundamental protocols and architectural elements used in IP networks and the Internet. This knowledge is applied to the configuration and use of networking elements and to build up a full operational network with features fulfilling actual requirements. The course includes practical training in the telecommunication laboratory regarding the design, built-up and testing of IP networks.

Prerequisites: Electrical Engineering 471 (Introduction to Communications Systems and Network) or consent of the department.

Antirequisites: ENEL 573, CPSC 441

Course Hours: 3 units; H(3-2)

Academic Credit: 3

Calendar Reference: <https://www.ucalgary.ca/pubs/calendar/current/computer-engineering.html#31548>

### 2. Learning Outcomes

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

- 1 understand the performance and limitation of different physical mediums used in networking, the principles of layer 2 switching in Ethernet networks including the topics associated with this technology (Addressing, VLAN, Trunking, Spanning Tree, Performance)
- 2 understand the concepts and protocols of layer 3 routing in IP networks ( IPv4 and IPv6 addressing, IGP- EGP routing protocols, the methods to dimension, implement and troubleshoot networks considering performance, resilience and security aspects
- 3 design IP networks considering performance, resilience and security aspects
- 4 use different kind of market equipment to implement an IP Network, test the network conformance to the specifications, use the adequate methodology and tools to troubleshoot a network

### 3. Timetable

Section	Day(s) of the Week	Time	Location
LEC 01	MTWThF	8:00-11:50, 1:00-5:00	HEFR
LAB B01	WF	1:00-5:00	HEFR

### 4. Course Instructors

Course Coordinator

Section	First Name	Family Name	Phone	Office	Email
L01	Svetlana	Yanushkevich	403-210-5410	ICT343	<a href="mailto:syanshk@ucalgary.ca">syanshk@ucalgary.ca</a>

#### Other Instructors

Section	First Name	Family Name	Phone	Office	Email
L01	François	Buntschu	41-26-429-6579	C10-03	<a href="mailto:francois.buntschu@hefr.ch">francois.buntschu@hefr.ch</a>
L01	Luca	Haab	41-26-429-6571	C10-03	<a href="mailto:luca.haab@hefr.ch">luca.haab@hefr.ch</a>

#### Teaching Assistants

Section	First Name	Family Name	Phone	Office	Email

## 5. Assessments

The following examinations will be held in this course:

- One midterm examination (2h, closed book, May 15th 2025)
- Final examination (2h, closed book, May 27, 2025)

There are laboratories, with pre-lab, lab work and report.

All the lab reports should be handed in before the respective final exam. There is no additional delay possible and the students are advised to hand in their work as early as possible, especially for the labs that took place at the beginning of the class. In case when a student is exceptionally sick, a 4-day extension is permitted.

## 6. Use of Calculators in Examinations

Non-programmable scientific calculators (without formulae storage and /or text display features) may be used during examinations

## 7. Final Grade Determination

The final grade in this course will be based on the following components:

Component	Learning Outcome(s) Evaluated	Weight
Laboratory work (Pre-lab + Lab work + Report)	3,4	30%
Midterm examination	1,2	30%
Final examination	1,2	40%

**Total:** 100%

It is necessary to earn a passing grade on the final exam in order to pass the course as a whole.

Conversion from a score out of 100 to a letter grade will be done using a scale determined

## 8. Textbook

Handouts will be distributed in the course.

The following textbook is recommended for additional reading:

Title	Internetworking with TCP/IP
Author(s)	Douglas E. Comer
Edition, Year	Sixth edition, 2014
Publisher	Pearson

The following textbook(s) is recommended for this course:

Title	
Author(s)	
Edition, Year	
Publisher	

## 9. University of Calgary Policies and Supports

### SSE ADVISING AND POLICIES

All Schulich School of Engineering students have access to a D2L site titled "Engineering Student Centre". Students have a responsibility to familiarize themselves with the policies available on this site.

### ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For more information on the University of Calgary Student Academic Misconduct Policy and Procedure and the SSE Academic Misconduct Operating Standard, please visit:

<https://schulich.ucalgary.ca/current-students/undergraduate/student-resources/policies-and-procedures>

Additional information is available on the Academic Integrity Website at

<https://ucalgary.ca/student-services/student-success/learning/academic-integrity>

## ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>). SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/).

Students needing an accommodation in relation to their coursework or to fulfil requirements for a degree based on a Protected Ground other than Disability, should communicate this need by submitting a SSE Request for Academic Accommodation Form (ESC D2L - Forms) to the Associate Head (Undergraduate Studies) within 10 business days prior to the class, test, exam, or assignment at issue.

## INSTRUCTOR INTELLECTUAL PROPERTY

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

## FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

## COPYRIGHT LEGISLATION

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Acceptable-Use-of-Material-Protected-by-Copyright-Policy.pdf>) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Non-Academic-Misconduct-Policy.pdf>.

### MEDIA RECORDING (if applicable)

Please refer to the following statement on media recording of students:

[https://elearn.ucalgary.ca/wp-content/uploads/2020/05/Media-Recording-in-Learning-Environments-OSP\\_FINAL.pdf](https://elearn.ucalgary.ca/wp-content/uploads/2020/05/Media-Recording-in-Learning-Environments-OSP_FINAL.pdf)

#### *\*Media recording for lesson capture*

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

#### *\*Media recording for self-assessment of teaching practices*

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

#### *\*Media recording for the assessment of student learning*

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

### SEXUAL VIOLENCE POLICY

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>

### OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at: <https://www.ucalgary.ca/registrar/registration/course-outlines>

for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk

## **10. Additional Course Information**

### Course Format and Scheduling

Note: 20 periods of lectures (10 X 2) and 32 periods of labs (8 X 4) are proposed.

The students will conduct a project during the last laboratories. It will include tasks like designing, implementing, testing and documenting a corporate network according to the provided specifications.

Topics like Switching (VLAN, Spanning Tree), Routing (Static, OSPF, BGP), IP Services (DHCP, DNS, NAT-PAT), QoS and security will be handled both theoretically and practically