



COURSE OUTLINE

ENEL 519.57 – IP Networking

Group Study in Switzerland Spring 2024

1. Calendar Information

IP Networking

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.

Course Hours: H(3-2)

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

Antirequisites: ENEL 573, CPSC 441

2. Learning Outcomes

At the end of the module, students will be able to 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 to this technology (Addressing, VLAN, Trunking, Spanning Tree, Performance),
- 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.

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

- design IP networks considering performance, resilience and security aspects,
- 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

TBA

4. Course Instructors

Course Instructor

Section	Name	Phone	Office	Email
	Buntschu François	+41 26 429 65 79	C10-03	francois.buntschu@hefr.ch
	Luca Haab	+41 26 429 65 71	C10-03	luca.haab@hefr.ch

5. Examinations

The following examinations will be held in this course:

- One midterm examinations (2 hours duration, closed book)
- Final exam (2 hours duration, closed book)

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	Weight
Laboratory work (<i>Pre-lab + Lab work + Report</i>)	30 %
One Midterm Examination	30 %
Final Examination	40 %
TOTAL	100 %

Notes:

- a) It is necessary to earn a passing grade on the final exam in order to pass the course as a whole.
- b) Conversion from a score out of 100 to a letter grade will be done using a scale determined after the final examination has been marked. This allows the creation of a scale appropriate to the relative difficulty/easiness of the term work and the final exam.

8. Textbook hands-out

Hands out will be distributed during 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

9. Course Policies

Advising Syllabus

All Schulich School of Engineering students and instructors have a responsibility to familiarize themselves with the policies described in the Schulich School of Engineering Advising Syllabus available at:

<http://schulich.ucalgary.ca/undergraduate/advising>

The course policies are in compliance with the general course policies at Ecole d'Ingénieurs et d'Architectes (EIA-FR), Switzerland.

10. Additional Course Information

Note: 20 periods of lectures (10 X 2) and 36 periods of labs (9 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.