

COM-407

TCP/IP networking

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Cursus	Sem.	Type
Communication systems minor	H	Opt.
Computer science minor	H	Opt.
Computer science	MA1, MA3	Obl.
Cyber security minor	H	Opt.
Cybersecurity	MA1, MA3	Obl.
Electrical and Electronical Engineering	MA1, MA3	Opt.
SC master EPFL	MA1, MA3	Obl.

Language of teaching	English
Credits	8
Session	Winter
Semester	Fall
Exam	Written
Workload	240h
Weeks	14
Hours	6 weekly
Courses	2 weekly
Exercises	2 weekly
Lab	2 weekly
Number of positions	

Summary

In the lectures you will learn and understand the main ideas that underlie and the way communication networks are built and run. In the labs you will exercise practical configurations.

Content

- The internet architecture.
- Layer 2 networking; switching/bridging.
- The Internet protocol versions 4 and 6.
- The transport layer, TCP, UDP, sockets, QUIC.
- Routing algorithms: Link state routing, OSPF, Distance Vector routing. Interdomain routing, BGP.
- Congestion control principles. The fairness of TCP. Application to the Internet (TCP Reno, Cubic, DCTCP, BBR).
- Tunnels and hybrid architectures.
- A few things about internet security.
- Application layer protocols.

Keywords

TCP/IP
Computer Networks

Learning Prerequisites**Required courses**

A first programming course (Python)

Recommended courses

An undergraduate course on Computer Networks

Learning Outcomes

By the end of the course, the student must be able to:

- Run and configure networks
- Understand the main ideas that underlie the Internet
- Write simple communicating programs
- Use communication primitives for internet and industrial applications.

Transversal skills

- Access and evaluate appropriate sources of information.
- Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods

Lectures.
Online quizzes.
Labs on student's computer.

Expected student activities

Participate in lectures
Participate in online quizzes
Make lab assignments (in the rule, every other week)

Assessment methods

Theory grade = final exam
Practice grade = average of labs
Final grade = mean of theory grade (50%) and practice grade (50%).
The research exercise may add a bonus of at most 0.5 points in 1-6 scale to the practice grade.

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Bibliography

"Computer Networking: A Top-Down Approach (6th or later Edition)". James F. Kurose and Keith W. Ross. 2012. Pearson.

"Computer Networking : Principles, Protocols and Practice". O. Bonaventure, open source textbook, <http://inl.info.ucl.ac.be/CNP3>

Ressources en bibliothèque

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- [Computer Networking / Kurose](#)

Notes/Handbook

Slides are on moodle

Websites

- <http://moodle.epfl.ch/course/view.php?id=523>

Moodle Link

- <https://go.epfl.ch/COM-407>