

COM-405

**Mobile networks**

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Communication systems minor	E	Opt.
Computer science	MA2, MA4	Opt.
Cyber security minor	E	Opt.
Cybersecurity	MA2, MA4	Opt.
Electrical and Electronical Engineering	MA2, MA4	Opt.
Robotics, Control and Intelligent Systems		Opt.
SC master EPFL	MA2, MA4	Obl.

Language of teaching	English
Credits	8
Session	Summer
Semester	Spring
Exam	Written
Workload	240h
Weeks	14
<b>Hours</b>	<b>5 weekly</b>
Lecture	3 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Remark**

pas donné en 2023-24

**Summary**

This course provides a detailed description of the organization and operating principles of mobile and wireless communication networks.

**Content**

Introduction to wireless networks  
 Wireless PHY Layer Techniques  
 MAC (Medium Access Control) Layer Protocols  
 Wi-Fi & Bluetooth  
 Cellular networks (3G, 4G, 5G).  
 Internet of Things (IoT) Networks and Technologies.  
 Multi-Hop Networks, Mesh Networks, and Sensor Networks  
 Routing in Wireless Networks  
 Network Coding  
 Cross Layer Networking  
 Wireless Sensing and Localization

**Keywords**

Communication networks, protocols, wireless, IoT

**Learning Prerequisites****Required courses**

COM-208 Computer Networks

**Recommended courses**

COM-302 Principles of Digital Communications

**Important concepts to start the course**

Operating principles of communication protocols and layer organization.

**Learning Outcomes**

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

- Synthesize the way a mobile network operates
- Interpret the behavior of such networks
- Propose evolutions to existing protocols
- Identify weaknesses, bottlenecks and vulnerabilities
- Identify weaknesses and bottlenecks

### Teaching methods

Lectures  
Weekly Readings  
Exercise sessions  
Homework Problems

### Expected student activities

Class participation, readings, homework, exercise sessions

### Assessment methods

Homeworks + final exam

### Supervision

Office hours	No
Assistants	Yes
Forum	No

### Resources

#### Virtual desktop infrastructure (VDI)

No

#### Bibliography

Handouts, recommended books (see course URL)

#### Ressources en bibliothèque

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#### Moodle Link

- <https://go.epfl.ch/COM-405>