

Module Description

Advanced Mobile Systems

General Information
Number of ECTS Credits

3

Abbreviation

TSM_MobSys

Version

9.12.2016

Responsible of module

Jean-Frédéric Wagen, HES-SO

Language

	Lausanne	Bern	Zürich
Instruction	<input checked="" type="checkbox"/> E <input type="checkbox"/> F	<input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F	<input type="checkbox"/> D <input checked="" type="checkbox"/> E
Documentation	<input checked="" type="checkbox"/> E <input type="checkbox"/> F	<input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F	<input type="checkbox"/> D <input checked="" type="checkbox"/> E
Examination	<input checked="" type="checkbox"/> E <input checked="" type="checkbox"/> F	<input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F	<input type="checkbox"/> D <input checked="" type="checkbox"/> E

Module category

- Fundamental theoretical principles
- Technical/scientific specialization module
- Context module

Lessons

- 2 lecture periods and 1 tutorial period per week

Brief course description of module objectives and content

The Advanced Mobile Systems module explains the various innovative technologies implemented or researched to offer current or future services and applications useful to everyone: from private individuals to commercial companies. The students obtain a working knowledge of the current and emerging wireless and mobile system technologies, protocols, and architectures of wireless, ad-hoc, cellular and satellite systems. The students are exposed to a wide variety of technical, security and marketing aspects based on current and future mobile and wireless systems. The students will review the basic knowledge and learn the specific know-how required in order to benefit from or contribute to future services and applications involving mobile devices and any connected objects.

Aims, content, methods
Learning objectives and acquired competencies

The students will be exposed to the most important problems and solutions involved in current and emerging services and applications relying on mobile and radio technologies.

At the end of this module, the student

- Can describe the main mobile communications systems from several perspectives: systems and network architectures, protocols, mobility management, applications and services.
- Can explain the similarities and major differences between current and emerging communication systems including mobile, nomadic or, simple wireless connectivity.
- Can describe the most important underlying technologies allowing wireless or cellular mobile services and applications.

Lectures, exercises, practical demonstrations and case studies will be used.

Contents of module with emphasis on teaching content

Cellular communication systems [70%]

- Current and future mobile radio access technologies: overview, cellular engineering, deployment of private and public systems.
- Protocols and services of mobile networks: 2G to current cellular networks, Mobility management, Interconnection to other voice, multimedia and data networks, including in particular the Internet Multimedia Subsystem (IMS).
- Security aspects.

Wireless technologies for mobile applications [30%]

- For example: WiFi, Bluetooth, LoRa, ad-hoc network, meshed network, PWLAN, wireless IoT
- Security aspects.

Case studies: taken from current interest in the industry (e.g., Software Defined Radio, Advanced Security, Positioning, Shared Radio Network, ...)

Teaching and learning methods

- Ex-cathedra teaching and exercises
- Practical demonstrations
- Case studies

Prerequisites, previous knowledge, entrance competencies

The students have a Bachelor degree knowledge in

- internet protocols
- computer networks

Literature

- Lectures notes (moodle)
- "Mobile & Wireless: Networks and services", J.-F. Wagen et al., EIA-FR 2009, ISBN 2-940156-29-8 (PDF provided)

Assessment**Certification requirements for final examinations (conditions for attestation)**

Validated presentation of at least one case study.

Written module examination

Duration of exam : 120 minutes
Permissible aids: Lecture notes, open book, your own hand-written summary, calculator with log function (of course no communicating device), colored pencils required: blue, black, green or another color :-)