

Module Description

# Mobile Systems and Services

General Information

Number of ECTS Credits

3

Abbreviation

TSM\_MobSys

Version

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Responsible of module

Jean-Frédéric Wagen, HES-SO

Language

	Lausanne	Bern	Zürich
Instruction	<input checked="" type="checkbox"/> E <input checked="" type="checkbox"/> F	<input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F	<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> E
Documentation	<input checked="" type="checkbox"/> E <input checked="" type="checkbox"/> F	<input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F	<input checked="" 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 checked="" 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
- 2 lecture periods per week

Brief course description of module objectives and content

The *Mobile Systems and Applications* explains to Master students the various technologies required to offer mobile and nomadic services useful to individuals and enterprises. The students obtain a working knowledge of the current and emerging techniques, protocols, and architectures (e.g., ad-hoc, cellular, LMDS, satellite, MobileIP, IMS, ...), which enable services and applications to be available to users on the move or moving from place to place. The students are exposed to a wide variety of technologies, services and applications based on the following systems: wireless (DECT, WLAN, Bluetooth, ...), mobile (from GSM to LTE), satellite (Inmarsat, Thuraya, ...), broadcasting (DAB, DVB-H, ...), positioning (from GPS to indoor systems). The students acquire the basic knowledge required to become the architects of future mobile or convergent services and applications.

**Aims, content, methods****Learning objectives and acquired competencies**

The students:

- Can describe several mobile communications systems at the following levels: systems and network architectures, protocols, mobility management, applications and services.
- Can explain the major difference and similarities between the different systems.
- Can describe an overview of today mobile applications and services and are able to design mobile applications.
- Can develop or easily understand emerging network functions and applications based on one or several mobile systems and services as investigated in case studies.

**Contents of module with emphasis on teaching content**

1. Mobile communication systems [35%]
  - Current and future wireless access technologies (overview, particularities with respect to fixed communications).
  - Protocols and services of mobile networks (GSM to LTE, Cellular systems protocols, Mobile TCP, Optimisation und QoS, Signaling, Mobility management, Interworking, Internet Multimedia Subsystem).
2. Enabling technologies for mobile applications [30%]
  - Geolocation technologies (global and local systems: Satellite systems, GPS, DGPS, Galileo, WLAN and RFID-based PS, cellular based PS ...).
  - Broadcast systems and technologies for mobile applications (DAB, DVB-T, DVB-H, DRM technologies).
3. Services and applications [35%]
  - Mobile business market, Mobile applications and services (SMS, MMS, Mobile Internet, mobile payment, mobile software programming, ...), Location-based services (geocoding services, travel, routing and navigation services etc.).
  - Pervasive and Ubiquitous Computing and Ad Hoc Networks in mobile applications.
  - Current trends in mobile services and applications.

**Teaching and learning methods**

Lectures, training exercises, problem based learning exercises, case-studies.

Learning methods valorising effective students participations.

**Prerequisites, previous knowledge, entrance competencies**

Basic knowledge in:

- Modulation techniques (e.g., BPSK and QAM).
- Access technologies (FDMA, TDMA, CDMA).
- LAN Standards (IEEE 802.3/Ethernet, 802.11/WLAN): layer 1 & 2.
- Internet protocols.
- Client-Server architectures and basic programming knowledge.

**Literature**

"Mobile & Wireless: Networks and services", J.-F. Wagen et al., EIA-FR 2009, ISBN 2-940156-29-8.

References will be part of the lecture notes provided by the professors.

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

Validated participation to the case studies and to the formative tests.

**Written module examination**

Duration of exam : 120 minutes

Permissible aids: Lecture notes, open book, self produced hand-written notes (no electronic copy), basic calculator.