Module Description

Advanced Mobile Systems

General Information

Number of ECTS Credits

3

Abbreviation

TSM_MobSys

Version

22.03.2016

Responsible of module

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Language

	Lausanne	Bern	Zürich
Instruction	☒ E ☒ F	☐ D ☐ E ☐ F	☐ D ☒ E
Documentation	☒ E ☐ F	☐ D ☐ E ☐ F	☐ D ☒ E
Examination	☒ E ☒ F	☐ D ☐ E ☐ F	☒ D ☒ E

Module category

☐ Fundamental theoretical principles

☒ Technical/scientific specialization module

☐ Context module

Lessons

☒ 2 lecture periods and 1 tutorial period per week

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Brief course description of module objectives and content

The Advanced Mobile Systems module explains to Master students the various technologies required to offer mobile or nomadic services useful to everyone from private individuals to commercial companies. The students obtain a working knowledge of the current and emerging techniques, protocols, and architectures of wireless, ad-hoc, cellular , satellite, MobileIP, IMS, etc., 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 security aspects based on current and future radio systems, for example: wireless (WiFi, Bluetooth, ...) and cellular (from GSM/2G to future generations). Depending on the interest, the lectures also cover satellite communications, broadcasting, positioning (e.g., GPS, cellid, WiFi-based, ibeacon) in special case studies. The students will not only review the basic knowledge but learn the pratical know-how required to become a contributor or an architect of future services and applications using mobile devices or other connected objects.

Aims, content, methods

Learning objectives and acquired competencies

The students:

- Can describe several mobile communications systems from the following perspectives: systems and network architectures, protocols, mobility management, applications and services.
- Can explain the major difference and similarities between the different systems.
- Can describe the underlying technologies allowing wireless and cellular mobile services and applications.

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 xG cellular networks, Mobility management, Interconnection, Internet Multimedia Subsystem.
- Security aspects.

Wireless technologies for mobile applications [30%]

- WiFi, Bluetooth, LoRa, ad-hoc network, meshed network, PWLAN
- Security aspects.

Case studies: upon the interest of the students (e.g., Software Defined Radio, Advanced Security, Positioning, wireless IoT)

Teaching and learning methods

- Ex-cathedra teaching and exercises
- Pratical 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.

Assessment

Certification requirements for final examinations (conditions for attestation)

Validated participation to at least one case study.

Written module examination

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