Advanced Mobile Systems

General Information

Number of ECTS Credits

3

Module code

TSM_MobSys

Valid for academic year

2019-20

Last modification

2018-12-04

Coordinator of the module

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Explanations regarding the language definitions for each location:

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Berne	**Lausanne**		**Lugano**	**Zurich**		
Instruction			**X** E 100%		**X** E 100%		
Documentation			**X** E 100%		**X** E 100%		
Examination		**X** F 100%	**X** E 100%		**X** E 100%		

Module Category

TSM Technical scientific module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

The students have a Bachelor degree knowledge in
- internet protocols
- computer networks

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

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
- Pratical demonstrations
- Case studies

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

Module uses certification requirements

Certification requirements for final examinations (conditions for attestation)

Validated presentation of at least one case study.

Basic principle for exams

As a rule, all the standard final exams for modules and also all resit exams are to be in written form

Standard final exam for a module and written resit exam

Kind of exam

written

Duration of exam

120 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

calculator with log function (of course no communicating device)

Other permissible aids

Lecture notes, open book, your own hand-written summary

colored pencils required: blue, black, green or another color :-)

Kind of exam

oral

Duration of exam

30 minutes

Permissible aids

No aids permitted