STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Telecommunication mobile systems		**1010331561010334977**
Field of study: **Information Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **3 / 6**
Elective path/specialty: **Information Technologies**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **-**		No. of credits: **3**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W07: Student has organized and theoretically grounded knowledge concerning computer network technologies. K_W05: Student has organized and theoretically grounded knowledge concerning basic programming constructions, algorithm implementations, programming paradigms, programming styles, software verification and evaluation methods, formal languages, compilers, and platforms.
2	**Skills**	K_U02: Student is able to work alone and in a group; student is able to estimate time needed for given work realisation; student can construct and realize the work schedule in a way ensuring meeting the deadlines. K_U03: Student is able to prepare the documentation of his engineering task realisation and to provide the description of the obtained results.
3	**Social competencies**	K_K04: Student is aware of the responsibility for her/his own work and is willing to follow the principles of teamwork and to share the responsibility for the implementation of tasks realized within the team

Assumptions and objectives of the course:

The goal of the project is to provide the knowledge about the leading and currently developed technologies concerning mobile teleinformatics systems, including systems integrating functions of mobile access to the services (the access based on use of mobile terminals) with other functions of information systems available in the Internet (in particular Web Services developed according the SOA paradigm).

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student has organized and theoretically-grounded knowledge concerning teleinformatics, protocols and services used in telecommunication networks. - [K_W15]

Skills:

1. Student is able to provide the critical analysis of the operation of computer hardware, operating systems, and computer networks. - [K_U11]

2. Student is able to analyse the selected platforms for programming protocols and services in telecommunication networks. - [K_U18]

Social competencies:

1. Student understands the need and knows the possibilities of continuous training and learning (second- and third-order studies, postgraduate studies, other courses) - improving her/his language skills, professional skills, personal skills, and social skills. - [K_K01]

Assessment methods of study outcomes

Lectures: Exam (50,01% is necessary to pass the exam);

Laboratories: the mark calculated as the average of individual marks given after each laboratory (including quality of conducted exercises and provided reports).

Course description

Lectures: The objective of the course is to discuss the key issues of information and communication technologies (including the idea of Future Internet) enabling the efficient multi-service networking (i.e., involving heterogeneous traffic service). The presented technologies will concern wireless multi-hop/mesh networking including the issues of proactive dynamic routing and the mobility. The scope of lectures will also include the technology of Web Services (based on SOAP or REST), the integration of systems based on Web Services with the mobile telecommunication services based on 3G IP Multimedia Subsystem (including the one realized in the cellular networks provided by telecom operators), SIP, RTP, 3GPP IMS, the issues of authorized secure access to the mobile information and communication systems, the application of the AAA framework (authentication, authorization and accounting) for the mobile access to Web applications and streaming applications compliant with the IMS, the mobility support in mobile ad-hoc wireless networks, and OLSR protocol.

Laboratories: The laboratories will be strictly connected with the scope of the lectures. Their objective will be to experimentally evaluate the solutions described during the lectures (based on the methods based on virtualization of the network components and the student work on her/his own virtual installations). The part of laboratories will be aimed at providing the modifications and enhancement to the implementation of network protocols and services provided to students (including the source code of communication protocols, e.g., the OLSR protocol by means of its OLSRd implementation, the control and signalling protocols for wireless network management, source code of Fokus Open IMS Core servers and installation).

Basic bibliography:

1. Comer D. E., Sieci komputerowe i intersieci, WNT, Warszawa 2001.

2. Adrain Farrel, Morgan Kaufmann, The Internet And Its Protocols, A Comparative Approach, Elsevier, San Francisco, 2004

3. Srikant R.: The Mathematics of Internet Congestion Control, Birkhauser, Boston, 2004.

4. Miikka Poikselka, Aki Niemi, Hisham Khartabil, Georg Mayer The IMS: IP Multimedia Concepts and Services.

Additional bibliography:

1. 1. Clausen, T., Jacquet, P.: Optimized Link State Routing Protocol (OLSR). RFC3626 (Experimental) (October 2003), http://www.ietf.org/rfc/rfc3626.txt

2. 2. Camarillo, G., Garcia-Martin, M.-A.: The 3G IP Multimedia Subsystem (IMS): Merging the Internet and the Cellular Worlds, Second Edition. John Wiley & Sons, 2006.

3. 3. Alan B. Johnson: SIP: Understanding the Session Initiation Protocol.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	15
2. Laboratiories	15
3. Consulations and the exam	5
4. Preparation to labolatories	22
5. Prepartions of reports of labolatories and prepariation to the exam	18

Student's workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	35	1
Practical activities	50	2