

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Internet Telephony</b>		Code <b>1010802131010822908</b>
Field of study <b>Electronics and Telecommunications</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>Information and Communication</b>	Subject offered in: <b>English</b>	Course (compulsory, elective) <b>elective</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>1</b> Classes: <b>-</b> Laboratory: <b>2</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>major</b>		(university-wide, from another field) <b>from field</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Grzegorz Danilewicz, prof. nadzw. email: grzegorz.danilewicz@put.poznan.pl tel. +48 61 665 3908 Wydział Elektroniki i Telekomunikacji ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	She/he knows the rules for the transmission of information in networks [K1_W17] she/he is familiar with the basic principles of analog-to-digital conversion and vice versa [K1_W19], she/he knows signaling functions in telecommunication networks [K1_W22] she/he knows the basics of network protocols from TCP / IP stack [K1_W22].
2	<b>Skills</b>	She/he can take the information from the literature and databases and other sources in Polish or English; she/he is able to integrate the information, make their interpretation, draw conclusions and justify opinions [K1_U01]. She/he can communicate in English or Polish in workplace and in other environments [K1_U02].
3	<b>Social competencies</b>	She/he knows the limits of their own knowledge and skills, understands the need for lifelong education [K1_K01].
<b>Assumptions and objectives of the course:</b> Presentation of the concept of using packet-switched networks (including IP-based) for the implementation of multimedia services, mainly audio and video. Indication of the similarities and differences in Internet telephony systems over previous solutions, such as mobile telephony, analog and ISDN. Presentation of the issues related to ensuring the quality of service (QoS) for real-time services implemented in packet switched networks.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has knowledge of the equipment performing signaling functions and data transfer in packet switching networks used to provide multimedia services, knows the signaling systems used in networks based on IP protocol that provide establish, maintenance and disconnection of communication sessions to support real-time services - [K2_W01]		
2. Has knowledge about the functioning of packet switching networks in practical applications for implementing multimedia services, knows the important parameters for assessing the quality of service in circuit switching and packet switching networks. - [K2_W13]		
3. Has the necessary knowledge to determine the functionality of the devices that need and / or can be used to create packet switching networks used to provide multimedia services, knows services and equipment to design a VoIP telephony network at least for a small business - [K2_W14]		
<b>Skills:</b>		
1. Is able to collect and analyze technical information needed for VoIP network design, is able to present these issues in the form of short paper and presentation (in Polish or English), and participate in the discussion to follow - [K2_U02]		
2. He can use the knowledge base accumulating norms and standards for telecommunications, knowing the importance of standardization can take into account the limitations of standards in the design of VoIP network - [K2_U08]		
3. He can practically implement the selected tasks for building a VoIP network - [K2_U15]		

<b>Social competencies:</b>
1. Understands the importance of communication for the development of individuals and societies, understands the evolutionary development of networks and telecommunications systems include increased needs of users in the development of telecommunications networks - [K2_K02]
2. Demonstrates responsibility and professionalism in solving technical problems - [K2_K05]
3. Is aware of the limitations of his/her current knowledge and skills; is committed to lifelong learning - [K2_K04]

<b>Assessment methods of study outcomes</b>
Forming assessment: In the laboratory: on the basis of preliminary questions, based on answers to questions about the material from the previous laboratory, on the basis of written reports of laboratory and based on the tests.
Summary assessment: a) in the laboratory: based on summary test. b) in respect of lectures: on the basis of test examination.

<b>Course description</b>
Introduction to Internet telephony. Methods for switching signals (messages, circuits, channels, packets, datagrams cells). The importance of signaling networks. Fundamentals of VoIP network solutions based on the H.323 protocol family. Functions of H.323 devices in the domain. Signaling protocols in the system based on the H.323 protocol family. Fundamentals of VoIP network solutions based on SIP. Device features in VoIP network based on SIP protocol. SIP signaling procedures. Cooperation of solutions based on H.323 and SIP. Related and new solutions in packet switching networks for the implementation of multimedia services.

<b>Basic bibliography:</b>
1. International Telecommunication Union (ITU-T) ?Packet-based multimedia communications systems?, H.323 Recommendation
2. J. Rosenberg et. al. ?SIP: Session Initiation Protocol?, RFC 3261

<b>Additional bibliography:</b>
1. Samrat Ganguly, Sedeept Bhatnagar: VoIP. Wireless, P2P and New Enterprise Voice over IP, Wiley, 2008
2. Olivier Hersent, Jean-Pierre Petit, David Gurle: IP Telephony, Wiley, 2005
3. Olivier Hersent, Jean-Pierre Petit, David Gurle: Beyond VoIP Protocols, Wiley, 2005
4. Sivannarayana Nagireddi: VoIP Voice and Fax Signal Processing, Wiley, 2008
5. Marek Bromirski ?Telefonia VoIP?, Wydawnictwo BTC, Warszawa 2006

<b>Result of average student's workload</b>	
<b>Activity</b>	<b>Time (working hours)</b>
1. Lectures	15
2. Laboratory	30
3. Preparing for the laboratory	15
4. preparation for completion of the course	10
5. Participation in the course completion	2
6. Consulting with teachers	3

<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	75	2
Contact hours	50	2
Practical activities	45	2