STUDY MODULE DESCRIPTION FORM

Name of the module/subject **IP Telephony**		Code **1010822121010822434**

Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 2**
Elective path/specialty **Computer Networks and Internet**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**

Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**

No. of hours				No. of credits **5**
Lecture: **2**	Classes: **1**	Laboratory: **1**	Project/seminars: **-**	

Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **from field**

Education areas and fields of science and art **technical sciences** 　　　**Technical sciences**	ECTS distribution (number and %**)** **5　100%** 　　**5　100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	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 convertion 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	**Skills**	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	**Social competencies**	She/he knows the limits of their own knowledge and skills, understands the need for lifelong education [K1_K01].

Assumptions and objectives of the course:

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.

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

Knowledge:

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]

Skills:

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]

Social competencies:

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]

Assessment methods of study outcomes

Forming assessment:

a) in the classes: on the basis of the current progress of perform the tasks

b) 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 classes: based on (1) a public presentation on the topic indicated by the teacher, (2) discussions held after the presentation, (3) the form and the quality of the prepared materials.

b) in the laboratory: based on summary test.

c) in respect of lectures: on the basis of an oral examination.

Course description

Introduction to Internet telephony. Telecommunications networks in terms of historical and technical aspects. 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. Internet telephony services in mobile networks. Commercial equipment and software for VoIP networks. Telecommunications market in Poland and around the world including VoIP services. Related and new solutions in packet switched networks for the implementation of multimedia services.

Basic bibliography:

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

3. Marek Bromirski ?Telefonia VoIP?, Wydawnictwo BTC, Warszawa 2006

Additional bibliography:

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

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Classes	15
3. Laboratory	15
4. Consultation laboratories	5
5. Consultation classes	5
6. Preparing for the laboratory	28
7. Preparing for the classes	28
8. The examination	2

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	72	3
Practical activities	83	3