

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Telecommunication systems</b>		Code <b>1010802211010810197</b>
Field of study <b>Technical Applications of Internet</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</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>2</b> Classes: <b>2</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Hanna Bogucka email: hbogucka@et.put.poznan.pl tel. 061-665-3911 Elektroniki Telekomunikacji ul. Piotrowo 3A, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	A student has advanced knowledge from mathematics and physics (K_W01)
2	<b>Skills</b>	A student is able to effectively make use of the data sources, both in classical form (books and text sources) and in modern form (Internet, discussion fora, data bases, etc.) (K_U01); A student can communicate and exchange informations using modern information and communication techniques, also in English (K_U02)
3	<b>Social competencies</b>	A student knows limitations of his/her knowledge and competences; is able to precisely formulate questions; understands the necessity of further learning and systematic reading of scientific and popular literature in the area of studied topic (K_K01).
<b>Assumptions and objectives of the course:</b> Understanding the architecture, functions and design of telecommunication systems, in particular digital communication, digital signals transmission and reception.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. A student has basic knowledge of key achievements in physics, computer science and telecommunications; the knowledge is systematic, practical knowledge is supported by theoretical basis - [K_W02] 2. A student knows basic technics used for solutions of practical problems in the area of physics, computer science and telecommunications, and in particular interdisciplinary problems (wireless systems, computer networks); - [K_W04] 3. A student has systematic knowledge of the theory of signals. - [K_W13]		
<b>Skills:</b> 1. A student is able to integrate knowledge from physics, computer science, telecommunications and related areas, and is able to use this knowledge in given economic conditions (in particular in the context of knowledge-based economy); - [K_U09] 2. A student is able to solve basic technical problems dealing with evaluation, analysis and architecture of popular telecommunication and computer networks, both wired and wireless ones; - [K_U12]		
<b>Social competencies:</b> 1. A student understands the need for popularization of knowledge in the area of modern ICT technologies, including newest scientific and technological achievements; - [K_K04] 2. A student is able to formulate opinions on basic challenges of the Internet of the Future and contemporary telecommunication and computer science; - [K_K07]		

<b>Assessment methods of study outcomes</b>		
Written exam on the theory and content of lectures (open questions)		
Passing of classes based on problems solutions and a written test.		
<b>Course description</b>		
<p>Lecture:</p> <ol style="list-style-type: none"> <li>1. Introduction: telecommunication system, data sources, telecommunication channels, multiple access to the transmission medium, systems and signals representations, modulations, analogue and digital telecommunication</li> <li>2. OSI model, TCP/IP protocol stack, IP networks elements, quality of service</li> <li>3. Transmission channels properties</li> <li>4. Basics of signals analysis</li> <li>5. Amplitude, phase and frequency modulation</li> <li>6. Sampling and quantization, pulse-coded modulation PCM</li> <li>7. Baseband transmission, elementary signals</li> <li>8. Digital modulations? amplitude, phase and frequency shift keying, coherent and non-coherent reception</li> <li>9. Intersymbol interference</li> <li>10. Basic limitations of telecommunication systems</li> <li>11. Fundamentals of telecommunication networks</li> <li>12. Modern telecommunication systems</li> </ol> <p>Classes:</p> <ol style="list-style-type: none"> <li>1. Information sources, signals and systems representation,</li> <li>2. Modulation, analogue and digital telecommunications</li> <li>3. Signal spectrum</li> <li>4. Properties of telecommunication channels</li> <li>5. Sampling and quantization, PCM</li> <li>6. Digital modulations</li> </ol>		
<p><b>Basic bibliography:</b></p> <ol style="list-style-type: none"> <li>1. S. Haykin Systemy telekomunikacyjne t. 1 ? 2. Wydawnictwa Komunikacji i Łączności WKŁ, Warszawa 2004</li> </ol>		
<p><b>Additional bibliography:</b></p> <ol style="list-style-type: none"> <li>1. K. Wesolowski, Podstawy cyfrowych systemów telekomunikacyjnych, Wydawnictwa Komunikacji i Łączności WKŁ, Warszawa 2003</li> </ol>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in lectures	30	
2. Participation in classes	30	
3. Individual literature studies, consultations with the lecturer	10	
4. Individual work on problems solutions	10	
5. Preparation for the exam	5	
6. Preparation for the test	5	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	90	4
Contact hours	45	2
Practical activities	45	2