

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Introduction to telecommunications		Code 1010311431010322110
Field of study Power Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	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: 30 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 technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: Dr hab. inż. Andrzej Tomczewski email: andrzej.tomczewski@put.poznan.pl tel. 616652788 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of mathematics and computer science.
2	Skills	Ability to effectively self-education in a field related to the chosen field of study.
3	Social competencies	Broaden their awareness of the need for competence, willingness to work together as a team.
Assumptions and objectives of the course: Knowledge of both theoretical and practical issues related to the basic techniques of information transmission in wired and wireless communication systems. Presentation of the general characteristics of large telecommunications systems. Introduction to electromagnetic fields and waves and antennas. The acquisition of practical skills in the measurement of parameters of antennas, transmission line, and sample characteristics of analog and digital filters.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Explain the basic concepts of telecommunications. - [K_W16 +++, K_W15 +] 2. Describe the structure and replace the functions of the most important elements of wireless communication systems, explain the principle of operation and construction of antennas, describe examples of various types of radio waves. - [K_W16 +++, K_W15 +]		
Skills: 1. Define the concepts of sampling, quantization and coding of signals in the data transmission, interpret the frequency characteristics of the main types of signals, apply the basic knowledge of the modulation signal, comparing the characteristics and use of various types of radio waves. - [K_U19 +, K_U21 +] 2. Assess the possibility of using specific techniques of information transmission issues carried out by an engineer. - [K_U11 +]		
Social competencies: 1. Openness to the use of modern communication techniques in order to increase the competitiveness of products and services offered by the company. - [K_K04 ++, K_K05 +]		
Assessment methods of study outcomes		

<p>Lecture: ? Assess the knowledge and skills demonstrated by the completion of a combined writing: test and problematic (check the skills of solving the basic problems of the bases of telecommunications discussion).</p> <p>Laboratory: ? Checking preparations for laboratories, ? Rewarding practical knowledge gained during the previous laboratory, ? Assess the knowledge and skills associated with taking measurements and their development in the form of reports.</p> <p>Get extra points for the activity in the classroom, and in particular for: ? Ability to work within a team practice performing the task detailed in the laboratory, ? Use of elements and techniques that go beyond the material in the field of the lecture and laboratory exercises, ? Aesthetic diligence studies completed.</p>		
Course description		
<p>Social importance of telecommunications, introduction to information theory, types of telecommunication systems, analog and digital signals, discretization, quantization, spectral representation of the signal, analog modulation techniques, pulse and PCM modulation, electric and optical transmission media, study of transmission lines, testing of analog and digital low-pass filters, connection and connectionless mode, multiplication method (TDM, FDM and WDM), extensive telecommunications systems, introduction to waves and antennas (electromagnetic radiation, according to the basic equations and the theory of the electromagnetic field, wave TEM antenna types and parameters, measurement parameters and characteristics of antennas, propagation of radio waves in free space, energy balance, waves mundane , tropospheric and ionospheric).</p>		
Basic bibliography:		
<p>1. Gotfryd M. &#34; Podstawy telekomunikacji. Telekomunikacja analogowa i cyfrowa&#34;; Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów 2010 2. Kowalik R. , Pawlicki C. &#34; Podstawy teletechniki dla elektryków&#34;; Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2006 3. J. Szóstka ? Fale i anteny, WKŁ, Warszawa 2009 4. Szóstka J. &#34; Fale i anteny&#34;; WKŁ, Warszawa 2009</p>		
Additional bibliography:		
<p>1. Szabatin J. &#34; Podstawy teorii sygnałów&#34;; WKŁ, Warszawa 2007 2. Zieliński T. P. &#34; Cyfrowe przetwarzanie sygnałów&#34;. Od teorii do zastosowań, Wyd. WKŁ, Warszawa 2007 3. Haykin S. &#34; Systemy telekomunikacyjne. Cz. I&#34;; WKŁ, Warszawa 2004</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in class lectures	30	
2. participation in laboratory classes	15	
3. participate in the consultations on the lecture	5	
4. participate in the consultations on the lab	5	
5. preparation laboratory	10	
6. assessment of laboratory	3	
7. prepare for the completion of laboratory	5	
8. preparation for the completion of the lecture	25	
Student's workload		
Source of workload	hours	ECTS
Total workload	98	3
Contact hours	58	2
Practical activities	38	1