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				No. of credits **3**
Lecture: **30**	Classes: **-**	Laboratory: **15**	Project/seminars: **-**	

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 waves,antennas and radio systems. The acquisition of practical skills in the parameter measurement and analysis of:the antena systems, transmission lines,and basic 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

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).

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.

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.

Course description

Social importance of telecommunications, an introduction to the theory of information, types of telecommunication systems, analog signal processing (discretization, quantization), spectral representation of the signal, analog modulation techniques, pulse and PCM modulation, spread-spectrum techniques, types and properties of line coding, noise and their role in data transmission in telecommunication systems, electrical and optical media transmission, connection-oriented and connectionless packet swiching, multiplication method (TDM, FDM and WDM), broad telecommunications systems, study of transmission lines, and analog and digital low-pass filters, introduction to waves and antennas (TEM wave, the types and characteristics of antennas, radio wave propagation in free space, energy balance, wave propagation: mundane, tropospheric and ionospheric, measurement parameters and characteristics of antennas), examples of wireless transmission systems.

Update 2017: introduction to Global Positioning System (GSM).

Applied methods of education:

Lectures - Lecture with multimedia presentations (including: drawings, photos, animations, videos) supplemented by examples given on the board; having regard to (taking into account) the various aspects of the presented issues, including: economic, environmental, legal and social; presenting a new topic preceded by a reminder of related content, known to students from other subjects,

Laboratory - instructors detailed review of the reports and discussions about comments , demonstrations, work in teams.

Basic bibliography:

1. Gotfryd M. &#38;#34; Podstawy telekomunikacji. Telekomunikacja analogowa i cyfrowa&#38;#34;, Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów 2010

2. Kowalik R. , Pawlicki C. &#38;#34;Podstawy teletechniki dla elektryków&#38;#34;, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2006

3. J. Szóstka ? Fale i anteny, WKŁ, Warszawa 2009

4. Szóstka J. &#38;#34;Fale i anteny&#38;#34;, WKŁ, Warszawa 2009

Additional bibliography:

1. Szabatin J. &#38;#34;Podstawy teorii sygnałów&#38;#34;, WKŁ, Warszawa 2007

2. Zieliński T. P. &#38;#34;Cyfrowe przetwarzanie sygnałów&#38;#34;. Od teorii do zastosowań, Wyd. WKŁ, Warszawa 2007

3. Haykin S. &#38;#34;Systemy telekomunikacyjne. Cz. I&#38;#34;, WKŁ, Warszawa 2004

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