STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Radiocommunications		**1010804161010810324**
Field of study	Profile of study (general academic, practical)	Year /Semester
Electronics and Telecommunications	**general academic**	**3 / 6**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**part-time**	
No. of hours		No. of credits
Lecture: **30** Classes: **-** Laboratory: **-** Project/seminars: **-**		**4**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
major	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**4 100%**
Technical sciences		**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	A student knows the basics of digital communication systems, baseband transmission, digital modulation, signal transmission over the channel, reception techniques, spectrum shaping nad techniques for combating channel distortions (K1_W15); A student has detailed knowledge and mathematical foundations in the area of telecomunication theory, necessary for understanding, analysis and testing of the analogue and digital telecommunication systems (K1_W17)
2	**Skills**	A student can draw information from the literature, databases and other sources in Polish and in English; A student can integrate information, interprete it, draw conclusions and provide reasoning for his/her opinions (K1_U01); A student can solve problems in the area of electronics and telecommunications using mathematical tools: mathematical analysis, algebra and probability theory (K1_U07)
3	**Social competencies**	A student knows the limitations of his/her knowledge and competences, understands the necessity of further learning (K1_K01); A student is aware of the necessity of professional approach to technical problems and responsibility for his/her proposed technical solutions (K1_K02)

Assumptions and objectives of the course:

Knowing and understanding the fundamental problems of radio communication in various radio propagation environments and the basics of contemoprary wireless communication systems.

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

Knowledge:

1. A student has detailed knowledge and mathematical foundations in the area of teorii pola elektromagnetycznego, propagacji fal elektromagnetycznych oraz budowy i własności anten - [K1_W07]

2. A student has basic knowledge and mathematical foundations in the area of radio communications, has basic knowledge of the 2G, 3G and 4G mobile systems; A student has basic knowledge concerning the architecture and maintainance of radio communication systems and elements of tele-informtion networks, including wireless networks - [K1_W14]

Skills:

1. A student is able to solve basic problems in the area of electromagnetic fields, radio propagation, antenna design - [K1_U11]

2. A student is able to compare radio communication systems and stantards, and to select advantageous radio transmission technique or wireless standard in the given propagation and users mobility conditions. - [K1_U23]

Social competencies:

1. A student is aware of the necessity of professional approach to technical problems and responsibility for his/her proposed technical solutions - [K1_K02]
2. A student feels responsibility the designed electronic and telecommunication systems and is aware of the potential threats for other persons or society of improper use of these systems and designs - [K1_K03]
3. A student is able to formulate opinions concerning challenges of contemporary radio communications; A student is aware of the impact of rario systems and networks on the information society. - [K1_K04]

Assessment methods of study outcomes

Written exam from theory and content of the lectures (test with open questions)

Course description

Lectures:

1. Classification of radio communication systems
2. Signal propagation in radio communication channels
3. Radio channel models
4. Basic physical layer techniques i radio communication
5. Multiple access techniques in radio communication networks
6. The concept of cellular systems
7. Cellular systems design and capacitity-inreasing methods
8. Basics of GSM and UMTS: architecture, phsical layer and higher OSI layers
9. OFDM technique - principles and applications in radio communication
10. Review of contemoprary broadcasting systems
11. Review of wireless computer networks
11. Perspectives of future wireless communications

Basic bibliography:

1. K. Wesołowski, Systemy radiokomunikacji ruchomej, Wydawnictwa Komunikacji i Łączności WKŁ, Warszawa 2003
2. H. Bogucka,Projektowanie i obliczenia w radiokomunikacji, Wyd. II, Wydawnictwo Politechniki Poznańskiej, Poznań 2005

Additional bibliography:

1. A. Molisch, Wireless Communication Systems, John Wiley and Sons, 2005
2. G. Stueber, Principles of Mobile Communication Systems, Kluwer Academic Publishers, 2003
3. T. S. Rappaport, Wireless Communications, Principles and Practice, Prentice Hall PTR, USA 1996

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	30
2. Individual studies, literature studies, consultations with the lecturer	15
3. Preparation for the exam	15

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	38	2
Practical activities	5	1