

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject DSP Algorithms for Wireless Systems		Code 1010811171010813661
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 4 / 7
Elective path/specialty Radio Communications	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: Dr hab. inż. Hanna Bogucka email: hbogucka@et.put.poznan.pl tel. 61 6653911 Elektroniki i Telekomunikacji ul. Piotrowo 3A, 60-965 Poznań		
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 and techniques for combating channel distortions (K1_W15); A student has detailed knowledge and mathematical foundations in the area of telecommunication 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, interpret 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 methods of digital signal processing in a physical layer of contemporary and future radio communication systems.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. 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 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 radio 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) Classes passing based on solved problems and written test.		
Course description		
<ol style="list-style-type: none"> 1. Perspectives and challenges of contemporary and future mobile radio communication systems, 2. Transmission and reception methods of multicarrier signals, 3. Adaptive coding and modulation, 4. Channel estimation methods and signal equalization at the radio receiver, 5. Radio receiver design, velocity estimation, frequency and phase correction algorithms, 6. Digital signal processing (DSP) in multi-antenna systems, 7. DSP algorithms in geolocation (GPS) and in indoor localization, 8. DSP algorithms for adaptive antennas 9. Spectrum detection. 		
Basic bibliography:		
<ol style="list-style-type: none"> 1. M. Ibnkahla (ed.), Signal Processing for Mobile Communications Handbook, CRC Press, New York, Washington, D.C., 2005 2. Krzysztof Wesołowski, Systemy radiokomunikacji ruchomej, Wydawnictwa Komunikacji i Łączności WKŁ, Warszawa 2003 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. S. Glisic, Advanced Wireless Networks. 4G Technologies, J. Wiley and Sons, Ltd., 2006 		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	30	
2. Participation in classes	15	
3. Individual literature studies	10	
4. Preparation for the exam	10	
5. Individual work on solving problems	10	
6. Preparation for the test	10	
Student's workload		
Source of workload	hours	ECTS
Total workload	90	3
Contact hours	50	2
Practical activities	35	1