

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Advanced radiokomunikation systems		Code 1010812121010814001
Field of study Electronics and Telecommunications	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty Radio Communications	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: 1 Laboratory: 1 Project/seminars: -		No. of credits 5
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: dr hab. inż. Paweł Szulakiewicz, prof. nadzw. email: szulak@et.put.poznan.pl tel. 61 6653870 Faculty of Electronics and Telecommunications ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student knows digital communication systems, digital modulations, wireless channels, encoding methods, Viterbi algorithm (K1_W14, _W15, _W16, _W17)
2	Skills	Student is able to analyse and design simple digital communication systems.(K1_U15) Is able to evaluate digital communication systems by computer simulation. (K1_U21)
3	Social competencies	Knows challenges for the designers of the communication systems (K1_K04, K1_K05)
Assumptions and objectives of the course: Teaching students how to utilize new technology achievements in the wireless digital communication systems and networks. Classes and laboratories are devoted to prepare computer simulation of the selected wireless communication system.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Algorithms MAP, Max-Log MAP, SOVA - [K2_W05, W06, W13] 2. Iterative receiver, block SISO - [K2_W05, W06, W13] 3. BICM-ID system with iterative decoder - [K2_W05, W06, W13] 4. ICI cancellation, SIC technique - [K2_W05, W06, W13] 5. Nowoczesne technologie w standardzie 802.11 n oraz ac - [K2_W05, W06, W13]		
Skills:		
1. Student is able to evaluate and find parameters of the communication system by computer simulation (BICM-ID) - [K2_U13] 2. Student is able to present and apply in other communication systems the techniques used in IEEE 802,11 n and ac - [K2_U13] 3. Student is able to apply the SIC method when it is possible or necessary - [K2_U13]		
Social competencies:		
1. Student understands the necessity to study new achievements in technology and their significance for the network standards - [K2_K02]		

Assessment methods of study outcomes		
Oral examination. Evaluation of the computer simulation done by the student during the classes and laboratory.		
Course description		
Lectures: Serial realization of the turbo codes. Iterative decoder - MAP,SOVA, max-Log-MAP. BI-STCM-ID systems and iterative decoder.The significance of bit mapping into constellation points. STTC and STBC codes (Alamouti). MIMO technique. ICI cancellation. The IEEE 802.11n and ac standards. Classes and lab.: Computer simulation of a selected communication system.		
Basic bibliography:		
1. Papers in the scientific journals and papers available in the internet which concern the course subjects.		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	30	
2. Classes	15	
3. Laboratory	15	
4. self organized work	60	
Student's workload		
Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	3
Practical activities	45	2