

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>(-)</b>		Code <b>1010812121010812683</b>
Field of study <b>Electronics and Telecommunications</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 2</b>
Elective path/specialty <b>Radio Communications</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>elective</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>2</b> Classes: <b>1</b> Laboratory: <b>1</b> Project/seminars: <b>-</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>from field</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b> prof. dr hab. inż. Krzysztof Wesolowski email: wesolows@et.put.poznan.pl tel. 0616653812 Faculty of Electronics and Telecommunications ul. Piotrowo 3A 60-965 Poznań		<b>Responsible for subject / lecturer:</b> prof. dr hab. inż. Krzysztof Wesolowski email: wesolows@et.put.poznan.pl tel. 0616653812 Faculty of Electronics and Telecommunications ul. Piotrowo 3A 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
<b>1</b>	<b>Knowledge</b>	Has a systematic knowledge, together with necessary mathematical background, of the theory of EM field, EM waves propagation, and of construction and properties of antennae [K1_W07] Has a systematic knowledge, together with the necessary mathematical background, of radio communication foundations. Has basic knowledge of the architecture and operation of mobile networks. Has basic knowledge of main standards, architecture and operation of WLANs and of radio access methods. [K1_W14] Has basic knowledge of construction and exploitation of radiocommunication systems and components of ICT networks, including wireless networks.
<b>2</b>	<b>Skills</b>	Is able to solve typical problems in EM field analysis, EM wave propagation, and design and realizations of antennae [K1_U11] Is able to compare systems and standards of wireless transmission and select the appropriate transmission mode or wireless standard, given particular transmission conditions and user mobility pattern [K1_U23]
<b>3</b>	<b>Social competencies</b>	Demonstrates responsibility and professionalism in solving technical problems. Is able to participate in collaborative projects [K1_K02] Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. [K1_K03] Is aware of the main challenges facing contemporary radiocommunication. Is aware of the impact electronics and ICT systems and networks will have on the development of the information society [K1_K04]
<b>Assumptions and objectives of the course:</b> Learning the rules of operation of satellite systems, including personal satellite systems (Iridium and Globalstar) and VSAT systems, and their potential applications		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has a systematic knowledge in the area of construction and functioning of satellite communication systems used for multimedia services - [K2_W01] 2. Has a wide systematic knowledge in the area of contemporary mobile wireless systems and current techniques applied in them, in particular several satellite systems - [K2_W06] 3. Has a systematic knowledge, together with mathematical background in the area of teleinformatic networks and means of information transmission using VSAT satellite systems - [K2_W13]		

<b>Skills:</b>
1. Is able to evaluate the parameters of telecommunication satellite systems. - [K2_U10] 2. Is able to analyze, design, construct and exploit advanced satellite systems, ensuring that the designed systems and networks will have required technical parameters. - [K2_U16]
<b>Social competencies:</b>
1. Is aware of the necessity to approach solving technical problems with responsibility and professionalism in the area of satellite systems. - [K2_K05] 2. Demonstrates responsibility for designed satellite systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. - [K2_K06]

<b>Assessment methods of study outcomes</b>		
Examination of the course contents, checking knowledge gained at exercises by test, report on the performed lab experiments		
<b>Course description</b>		
Basic physical rules of astronomy, satellite orbits, rules of ensuring reliable satellite links, satellite constellations, satellite link power budget, transmission methods and protocols used in satellite systems, multiple access methods, VSAT systems, personal satellite systems, applications of satellite networks, INMARSAT systems, digital TV using satellite segment (DVB-S and DVB-S2)		
<b>Basic bibliography:</b>		
1. D. Roddy, Satellite Communications, 4th Ed., McGraw Hill, New York, 2006		
<b>Additional bibliography:</b>		
1. K. Wesołowski, Mobile communication systems, Wiley, Chichester, 2003		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in lectures	30	
2. Participation in problem exercises	15	
3. Participation in laboratory exercises	15	
4. Literature studies on satellite systems	30	
5. Preparation to examination	20	
6. Preparation for passing credits in exercises and labs	10	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	110	4
Contact hours	65	2
Practical activities	45	2