



## Subject card

Subject name and code	Smart TV, PG_00047496						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Radiocommunication Systems and Networks -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Sławomir Gajewski				
	Teachers		dr inż. Sławomir Gajewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	15		2.0		33.0	50
Subject objectives	To acquaint students with modern techniques of TV broadcasting and with issues TV systems design.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.		The student knows the techniques of signal processing in television. He knows and understands the design of television systems and networks. Is able to analyze and choose technical solutions used in TV. He knows the basics of TV network design.		[SW1] Assessment of factual knowledge		
	[K7_W08] Knows and understands, to an increased extent, the fundamental dilemmas of modern civilisation, the main development trends of scientific disciplines relevant to the field of education.		The student knows the development directions of digital television. Understands social needs in the development of television techniques. He knows modern television systems and their development trends.		[SW1] Assessment of factual knowledge		
Subject contents	1. The smart TV – objectives and targets. Classification of TV systems. Digital TV in the world. 2. Block diagram of the smart TV receiver. TV platforms - functions, services, TV decoders. 3. Architecture of terrestrial, satellite and cable digital TV networks. TV head stations. Backbone networks: ATM/SDH, IP, Hybrid-Fibre Coax (HFC). 4. Digitalization and compression of TV image signals, MPEG codecs. MPEG2 encoding, , levels and profiles of image signals, performance standards. Image signals forming. 5. Motion-compensated predictive coding, groups of pictures, motion estimation, block scheme of MPEG2 transceiver. Differential DPCM encoding. 6. Discrete cosine transform. Adaptive quantization. Entropy coding with variable codeword length, Huffman coding. Output stream rate control in MPEG2. 7. The MPEG4 encoding. Comparison to MPEG2. 8. Basic properties of the DVB-T/T2 system. Properties of transmitted OFDM signals – the OFDM modulation and symbol creation. 9.OFDM signals spectrum. Conditions of transmission of OFDM signals over radio channel. Guard intervals and signal reception. 10. Block diagram of the DVB-T transmitter, packet formats. 11. Hierarchical channel coding and modulation, signal constellations, baseband shaping. 12. DVB-H properties. Block diagrams. 13. The DVB-S and DVB-S2 systems characteristics, transceiver diagram.. Propagation conditions. Adaptation of transmission mode, channel coding and modulation.14. Characteristics of the DVB-C/C2 system. Transmission properties of a cable channel. Transceiver diagram. 15. TV over internet.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam, 2 hours. An oral exam is allowed with a small number of students.	50.0%	100.0%
Recommended reading	Basic literature	Ibrahim K. F., NEWNES GUIDE TO TELEVISION AND VIDEO TECHNOLOGY, 4-th ed. Elsevier LTD. 2007	
	Supplementary literature	Gerald W. Collins, Fundamentals of Digital Television Transmission. December 2000, Wiley-IEEE Press.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		