



Subject card

Subject name and code	Information Systems Fundamentals, PG_00048119						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-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	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Teleinformation Networks -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Czaplewski					
	Teachers	dr inż. Bartosz Czaplewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	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	45		4.0		51.0	100
Subject objectives	Familiarizing students with the basic issues of information theory describing theoretical basis for the modeling and analysis of the information system and with the key principles of coding theory which specifies design methods of functional elements of an information system.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	Determines Huffman code and constructs Hamming codewords. Uses polynomial codes. Decodes selected redundant block codes. Demonstrates arithmetic coding. Calculates the information capacity of the symbol transmitted through the channel.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	[K6_W34] Knows the characteristics of telecommunications channels, methods of securing information, modulation systems, methods of access to the channel.	Defines and knows the differences between source and channel coding. Defines polynomial and cyclic codes. Describes the encoding and decoding of convolutional codes.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_W35] Knows the concepts of the technique of signal transmission, operation of telecommunications networks and multimedia services and the rules for providing them	Describes digital channel models. Explains the principles of information systems with feedback channel.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	1. Information system - fundamental definitions 2. Fundamentals of information theory 3. Source coding 4. Probability relations in a discrete channels; kinds of the channels 5. Bit error rate (BER) and Gilbert model of the channels 6. General optimization problem of data transmission systems 7. Optimal decoding for given channel code 8. Code quality evaluation 9. Error detecting and correcting codes general 10. Example of linear detecting code 11. Hamming code; examples and evaluation 12. General idea of optimal decoding for linear codes 13. Elements of polynomial algebra for polynomial coding 14. Generator polynomial coding and modifications 15. Matrix describing codes 16. Cyclic codes 17. Decoder for polynomial and cyclic codes 18. Convolutional codes 19. Viterbi algorithm for decoding of convolutional codes 20. Ungerboeck codes 21. Feedback systems; general idea, kinds 22. Feedback systems - kinds of errors and quality evaluations 23. General problem of receiving rule optimization											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Midterm colloquium</td> <td>50.0%</td> <td>50.0%</td> </tr> <tr> <td>Written exam</td> <td>40.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Midterm colloquium	50.0%	50.0%	Written exam	40.0%	50.0%
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Written exam	40.0%	50.0%										
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Written exam	40.0%	50.0%										
Recommended reading	Basic literature	1. Krzysztof Wesolowski, Podstawy cyfrowych systemów telekomunikacyjnych, WKŁ, 2003 2. Simon Haykin, Systemy telekomunikacyjne, WKŁ, 2004										
	Supplementary literature	No requirements										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											