



Subject card

Subject name and code		Information Systems Fundamentals, PG_00048119						
Field of study		Electronics and Telecommunications						
Date of commencement of studies		October 2022	Academic year of realisation of subject			2024/2025		
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. Maciej Sac 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_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.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
		[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.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
		[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.		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		

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"> <thead> <tr> <th data-bbox="456 703 794 730">Subject passing criteria</th> <th data-bbox="799 703 1137 730">Passing threshold</th> <th data-bbox="1142 703 1481 730">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 736 794 763">Written exam</td> <td data-bbox="799 736 1137 763">40.0%</td> <td data-bbox="1142 736 1481 763">50.0%</td> </tr> <tr> <td data-bbox="456 770 794 797">Midterm colloquium</td> <td data-bbox="799 770 1137 797">50.0%</td> <td data-bbox="1142 770 1481 797">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	40.0%	50.0%	Midterm colloquium	50.0%	50.0%
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Written exam	40.0%	50.0%										
Midterm colloquium	50.0%	50.0%										
Recommended reading	Basic literature	1. Krzysztof Wesołowski, Podstawy cyfrowych systemów telekomunikacyjnych, WKŁ, 2003 2. Simon Haykin, Systemy telekomunikacyjne, WKŁ, 2004										
	Supplementary literature	No requirements										
	eResources addresses	Adresy na platformie eNauczanie: Podstawy systemów informacyjnych - 2024/2025 - Moodle ID: 39982 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=39982										
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											

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