GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Information Systems Fundamentals, PG_00048119
Field of study	Electronics and Telecommunications

Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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_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	Subject passing criteria	Passing threshold	Percentage of the final grade
	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:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable