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 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 hab. inż. Marek Blok	
	Teachers	dr hab. inż. Marek Blok	

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

<table>
<tr><td>Subject contents</td><td>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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>40.0%</td><td>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>50.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Krzysztof Wesołowski, Podstawy cyfrowych systemów telekomunikacyjnych, WKŁ, 2003
2. Simon Haykin, Systemy telekomunikacyjne, WKŁ, 2004</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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