GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Telecommunications, PG_00064151		
Field of study	Electronics and Telecommunications, Informatics, Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	English
Semester of study	1	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department Of Teleinformation Networks -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Czaplewski	
	Teachers	mgr inż. Jacek Litka dr inż. Wojciech Siwicki dr inż. Bartosz Czaplewski dr hab. inż. Sławomir Ambroziak	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	20.0	0.0	20.0	0.0	0.0	40

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	40	8.0	77.0	125

Subject objectives: Acquainting with the basics of operation of modern telecommunications systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions	The student is able to carry out simple experiments, realize research and analyze the results from telecommunications area.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[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	Student identifies, classifies and describes the basic concepts, problems and challenges of the area telecommunications.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Lecture:1. Basic concepts: telecommunications, information, information sources, signal, telecommunicationsservice, telecommunications system, telecommunications channel, telecommunications network.2. The telecommunications system and functions of its elements; open and feedback system.3. Description of analog signals in the domain of time and frequency; logarithmic measures of the signallevel.4. Transmission media (open space, conductive lines, optical fiber) and their parameters; transmission ofsignals in the base band and in the higher frequency band.5. Analog modulation and demodulation; modulation of amplitude, frequency and phase; synchronous andasynchronous demodulation.6. Disturbances (noise, crosstalk, echo, multi-path) and distortions (linear and non-linear); reasons for theirformation and general properties.7. Processing analog signals into digital form; sampling, quantization, coding.8. Quantization noise, compression and speech signal expansion.9. Source coding, source entropy, lossy and lossless compression; classification of coding and compressionmethods.10. Telecommunication channel: analogue, digital; properties, interference and distortion, channel capacity,Shannon's theorem.11. Transmission of digital signals in the basic band; transmission codes and their properties.12. Channel and corrective coding, detection and correction of errors.13. Multiplexing as a technique for maximizing the use of transmission resources; multiplexing: FDM, TDM,WDM, CDM and SDM.14. ISO / OSI layered model of equipment and systems cooperation; application of this model intelecommunications.15. Telecommunications network (fixed and mobile subscribers); structure and functional elements;classification of services.16. Connecting process; channel switching and packet switching.17. Service request process for both fixed and mobile subscribers.18. Access networks and core networks.19. The evolution of the Internet network to the operator's network of telecommunications services.20. Next generation networks - NGN and NGI.Laboratory:1. Pulse code modulation (PCM).2. Properties of selected transmission lines.3. Transmission codes and modulations.4. Detection and correction of errors in digital systems.5. Sampling, quantization and compression, and sound and image quality.6. Interfaces and access to the telecommunications network.</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>measurement reports - part 2</td><td>50.0%</td><td>20.0%</td></tr>
<tr><td>measurement reports - part 1</td><td>50.0%</td><td>20.0%</td></tr>
<tr><td>test - part 2</td><td>50.0%</td><td>30.0%</td></tr>
<tr><td>test - part 1</td><td>50.0%</td><td>30.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1.Lathi B.P.: Modern Digital and Analog Communication Systems,Oxford University Press, 20092.Sklar B.: Digital Communications, Pearson Educations, 20013.Schneier B.: Applied Cryptography: Protocols, Algorithms, andSource Code in C, 1996</td></tr>
<tr><td>Supplementary literature</td><td>1.Zalecenia ITU-T2.S.Kula: Systemy i sieci dostepowe xDSL, WKŁ, Warszawa 20093.J. Fridrich, Steganography in Digital Media: Principles, Algorithms,and Applications, Cambridge University Press, 2010</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>none</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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