GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Telecommunication Systems, PG_00047898		
Field of study	Informatics		
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	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department Of Teleinformation Networks -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Sylwester Kaczmarek	
	Teachers	dr hab. inż. Sylwester Kaczmarek	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	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	10.0	45.0	100

Subject objectives

Getting to know basic technologies applied in telecommunications networks, principles of the organization of the networks and phenomena which are taking place in the realization of services with diversified quality requirements.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U12] is able, to an advanced degree, to analyze the operation of components and systems related to the field of study, and to measure their parameters and study their technical characteristics, as well as to plan and carry out experiments related to the field of study, including measurements and computer simulations, and to interpret the obtained results and draw conclusions	Is able to analyze situations on the telecommunication networks and perform basic measurements in the first three layers ISO/OSI model.	[SU1] Assessment of task fulfilment
[K6_W03] knows and understands, to an advanced 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 describes realization technologies of the telecommunication networks as well as by users available telecommunication services. Student explains architectures, solutions and working principles of functional elements of this networks. Student has also the skill of observation and description of event taking place on the physical, link and network level.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>LECTURE: Global Information Infrastructure (GII) place and role of Telecommunications. GII convergence planes. The essence of telecommunications. Entities of the service delivery process. Telecommunications market goals. Aims of the telecommunications market. Basic definitions. Features, structure and resources of the information exchange system. Basic functions: transmission, switching, multiplexing. Transmission mediums and parameters defining their features. The essence of the problem in signal transmission via the transmission medium. Analogue and digital technology. Processing the information into a telecommunications signal. Problem of the maximization of using transmission mediums. The channel, the link, the transmission system. Telecommunications connection: connectionoriented systems and connectionless systems. Circuits switching, message switching and packets switching. The structure of the telecommunications network and the addressing. Connection control on the node and networks level. The need for signalling. Signalling network. Routing function. The problem of subscriber movement. Mobile subscriber network and addressing. Telecommunications services and theirs classification. Problem of the openness to the telecommunication services. The intelligent network services (IN). A short history of telecommunications. PSTN, IDN, ISDN, GSM, UMTS, LTE - next steps in telecommunications development. STM and ATM technology. The need to evolve IP networks to IP QoS networks. IP QoS network architectures: IntServ, DiffServ, MPLS. Generalized MPLS - GMPLS. Broadband network access. IMS/NGN as an example of the implementation of the NGN concept. Service scenario and its performance parameters. Transport (core) plane in telecommunications. Changes in the services market and their consequences for telecommunications. SDN - Software Defined Networks. NFV - Network Function Virtualization.

LAB: Physical layer for the S/T and U interface of the BRA-ISDN access. Physical layer for the E1 interface of the PCM30/32 system. Structure of the frame and multiframe of PCM30/32 system. DWDM optical transmission systems. The use of GMPLS in optical networks. Call handling scenario in the PSTN/ISDN network. Signalling messages for DSS1. Signalling messages for SS7 with ISUP. Teleservices and supplementary services in networks with circuits switching and with packets switching. Access to broadband services in the ADSL, VDSL and GEPON systems.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>No requirements</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>Midterm tests</td><td>50.0%</td><td>64.0%</td></tr>
<tr><td>Practical exercise</td><td>50.0%</td><td>36.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Materials prepared by the lecturer available in electronic form in PDF files and in the form of a photocopy (on request).</td></tr>
<tr><td>Supplementary literature</td><td>No requirements.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<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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