GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Telecommunication Systems, PG_00047817		
Field of study	Informatics		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Teleinformation Networks -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Narloch	
	Teachers	dr inż. Ryszard Weisbrodt	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie:						

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	30	4.0	66.0	100

Subject objectives	Student understands notion of telecommunication network, its architecture, principles of providing services fixed and mobile networks with circuit and packet switching. Student knows principles of circuit and packet switching nodes operation. Student understands principles of traffic engineering,operation of Intelligent Network and network management.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	Student knows location of informatics issues in solution of telecommunication problems.	[SU2] Assessment of ability to analyse information
	[K6_U42] can apply tools and methods of designing, optimization, monitoring, management, increasing reliability and protection from safety hazards in local and distributed information systems and applications	Student knows location of informatics issues in solution of telecommunication problems.	[SU2] Assessment of ability to analyse information
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student knows location of informatics issues in solution of telecommunication problems.	[SU2] Assessment of ability to analyse information
	[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	Students analyses various aspects of providing telecommunication services. Student analyses factors influencing quality of telecommunication services.	[SW1] Assessment of factual knowledge
	[K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Student knows formulation and solution of simple problems regarding telecommunication resources and quality of service analysis with the aid of mathematical models.	[SW1] Assessment of factual knowledge
Subject contents	1. Definition of telecommunications and notions composing definition of telecommunications: information: categories and measures, categories of information transport methods, telecommunication service. 2. Outline of telecommunications history as a evolutionary process conditioned by the development of technology and services. Criterions of telecommunications division. Characteristics of information society. 3. Notion of telecommunication network. Function of network and its elements. Circuit switching, message switching and packet switching networks. Characteristics of basic network structures. Hierarchical structure of the network. 4. Principles of network addressation and numeration. Notion of routing function. 5. Characteristics of services provided by telecommunication network: notion of multimedia service, notion of bearer service, teleservice, supplementary service and additional service. Conditions of service providing. 6. Notion of telecommunication channel, basic parameters and types of channels. Characteristics of analog, digital, electrical and optical signals. Types and modes of transmission. Principles of electrical and optical signals transmission. 7. Characteristics of basic types of networks: public, wide area, local networks, narrowband and broadband networks, Internet, Intranet. 8. Characteristics of transmission media: wired, coaxial, fiber optic, wireless, satellite. 9. Principles of transmission media multiple utilization (FDM, TDM, CDM). Principle of analog to digital signal conversion. 10. Fixed and mobile radiocommunication networks. 11. Telecommunication network as a mass scale service system. Notions of telecommunication traffic and resources. 12. Basic transmission parameters. Notion of transmission quality. Factors limiting transmission quality and range. Notion of telecommunication chain and its characteristics. 13. Quality of Service notion; basic measures of quality for circuit and packet switched networks. Notion of traffic engineering and its goals. 14. Notion of access network, general characteristics of access network types. 15. ISO/OSI reference model and its application to description of basic functions of telecommunication networks. 16. Notion of transport system of information streams. Notion of core network and its configurations. 17. General characteristics and functions of signaling systems in digtal network. Notion of signaling network. 18. Logical structure of telecommunication network: transport, signaling, synchronization, maintenance and management networks. 19. Characteristic of narrowband digital ISDN network. Notion of interface and types of interfaces. 20. Principle of providing service in connection mode in circuit switched network. Principles of connection creation. 21. Principle of providing service in connection mode in packet switched network. Principles of connection creation. 22. Characteristics of digital systems of information streams transport: plesiochronous and synchronous systems. General functions of stream switching nodes. 23. Characteristics of optical transport networks. General characteristics of optical stream switching systems. 24. Notion of network operator and his tasks. Types of operator. Notion of network maintenance and management. 25. Notion of intelligent network and its influence on increased range of services provided by network. 26. Rules of telecommunication networks cooperation. 27. Normalization regarding telecommunication networks. Goals of normalization. Norms and recommendations of international telecommunication institutions: ITU-T, ETSI, ATM Forum 28. Directions of anticipated services development, trends in network development – notion of next generation networks.		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	100.0%
Recommended reading	Basic literature	1. Kabaciński W:, Żal M: Sieci telekomunikacyjne WKŁ 2008	
	Supplementary literature	Przegląd telekomunikacyjny i Wiadomości Telekomunikacyjne, Wyd. SIGMA NOT	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Principles of providing service "telephony" in circuit switched networks. 2. Principles of providing service "transfer of moving pictures" in packet switched networks. 3. Principles of circuit, packet switching nodes operation. 4. Optical transport network elements and functions.		
Work placement	Not applicable		