



Subject card

Subject name and code	Basics of Teletraffic Engineering, PG_00048120						
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			2.0		
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 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	15.0	15.0	0.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Getting the knowledge and the skills of IRT applying to designing resources of the telecommunications networks with the guarantee of the quality of service.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U31] can identify telecommunications network architectures, differentiates their areas and functional elements, evaluates the quality of service delivery, calculates parameters of functional elements		Student has skills of practical designing and dimensioning of services systems of the switching node and trunks for the service of the traffic generated both subscribers and node control.		[SU1] Assessment of task fulfilment		
	[K6_W35] Knows the concepts of the technique of signal transmission, operation of telecommunications networks and multimedia services and the rules for providing them		Student describes basic models to quantitative analysis and synthesis of resources of the telecommunication networks.		[SW1] Assessment of factual knowledge		
Subject contents	<p>LECTURE: Essence and necessity of teletraffic engineering (TE) existence. Service system - basic element of TE. Describing of request and service stream. Steady state equation. Erlang and Engset model of service system. Load of services element – law of bundle. End to end Grade of Service. Erlang model of waiting service system. Service classes – priority service system. Model of calculating the time of carrying the messages (packets) in the network. Stack of protocols and the productivity of the link. End to end quality of service (losses, delay and his variability). Node control system reaction time. Method of BHCA calculating. Analytical model of CCS signaling system. Dimensioning of the interface between PSTN/ISDN/GSM and IP networks. Methods of the measurement and determining the traffic.</p> <p>PRACTICE: The call stream parameters calculating. The service stream parameters calculating. Solving the steady state equation. Resources calculating for the traffic concentration stage. Trunk group resources calculating. Describing the network traffic matrix. Resources calculating on the connection route for given GoS. Resources dimensioning of the waiting systems for different conditions. Analysis of the service system with classes of services. Calculating the end to end messages (packets) carrying time in the network. Link productivity calculating for chosen protocols stack of the user and the signalling plains. End to end packet loss probability calculating. End to end average and maximum time delay calculating. Reaction time calculating of the switch node control. BHCA calculating for switch nodes in the network. Design the number of signalling links. Converting the teletraffic in the circuit switching to streams in the packet switching. Resources calculating for PSTN/ISDN/GSM - IP media gateway. Calculating the biggest traffic hour and intensity.</p>						

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Analytical task	50.0%	50.0%
	Midterm test	50.0%	50.0%
Recommended reading	Basic literature	Material prepared by the lecturer in the form of xeroxcopy and in electronical form as PDF file.	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		