GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of Teletraffic Engineering, PG_00048120		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
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 -> 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	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

Obtain knowledge and skills to use IRT to design telecommunications network resources with a guarantee of service quality.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents

LECTURE: The essence and the need for the existence of traffic engineering (IR). General IR model. IR function model. Modelling complexity and its decomposition. Network, node and link level. Service system - the basic element of IR. Description of request and service event streams. Statistical equilibrium equation. Poisson, Erlang, Engset and Bernoulli models of the service system. Load capacity of service devices. End-to-end Grade of Service. Waiting service systems. Service classes - priority service systems. A model for calculating the time of message (packet) transfer in the network. Protocol stack and link performance. End-to-end Quality of Service (losses, delay and its variability). Network service classes. ITU-T reference model. Response time of the node control system. BHCA calculation method. Analytical model for the signalling system protocol stack. Dimensioning gateway resources between networks. ITU-T recommended traffic measurement and determination methods.

PRACTICE: Calculation of request stream parameters. Calculation of service stream parameters. Solving the equation of the state of statistical equilibrium. Calculation of resources of traffic concentrator. Calculation of resources for internode connections. Determining the network traffic flow matrix. Calculation of resources on the connection path for a given GoS. Dimensioning the resources of the waiting service system for various conditions. Analysis and synthesis service system with service classes. Calculation of end-to-end transfer time for messages (packets). Calculation of link performance for selected user plane and signalling protocol stacks. Calculation end-to-end packet loss probability. Calculation of average and maximum end-to-end delay times. Calculation of node control response time. Calculation of BHCA nodes in the network. Designing the number of signalling links. Conversion of channel-switched traffic into packet-switched streams. Calculation of media gateway resources between networks. Calculation of the hour and intensity of the highest traffic.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm test	50.0%	50.0%
Analytical task	50.0%	50.0%

Recommended reading	Basic literature	Materials prepared by the lecturer available in electronic form in PDF files and in the form of a photocopy (on request).
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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