GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	QoS Packet Networks Design, PG_00048336		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam

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	30.0	0.0	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	4.0	16.0	50

Subject objectives

getting to know methods of designing next generations networks using different technologies and architecture in individual layers for this one networks

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W06] Knows and understands, to an increased extent, the basic processes taking place in the life cycle of devices, facilities and technical systems.	The student is describing advanced systems of the service for complex streams of packages with diversifying classes of services.	[SW1] Assessment of factual knowledge
[K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study.	The student applies analytical models of these systems of the service and is calculating quality parameters.	[SW1] Assessment of factual knowledge
[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.	The student is using different methods applied in practice of the the net design guaranteeing the diversity qualities of services.	[SW1] Assessment of factual knowledge

Subject contents	Aims and tasks of design the NGN and NGI networks. Parameters describing QoS and GoS packet networks for IP QoS, MPLS, ATM and DWDM technologies. Elements of teletraffic engineering are needed for design. Models of traffic source and streams. Self-similarity and its measure; short- and long-range dependent streams. Guaranteed different class of service (streaming, elastic). Service system models for edge (access). Service system models in domens (core). Effective bandwide and calculation methods. Statistical multiplexing – REM and RS model. e2e delay budget and its variation in design. Application of large deviation theory. Traffic control mechanisms and its design. CAC, DBAC and MBAC function. Traffic flow in network and describing source – destination path. Z model in network design. Formal description of design. Edge conditions for design tasks solving of resources (bandwide, paths, number of wave length) taking into account the cost. Allocation traffic design. Optimisation of path selection. Cost minimize problem for set of traffic class and QoS, structure, control and technology. Linear programming methods for solving task design. Integer programming method for solving task design. Evolution algorithms for solving task design. One layer design for IP QoS, MPLS and DWDM technology. Multi layer design for IP QoS, MPLS and DWDM technology. Traffic grooming. Designing of networks resistive on damages. Designing of networks resistive on variation of traffic matrix. Point design between PSTN/ISDN/GSM and IP QoS networks.
Prerequisites and co-requisites	No requirements
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	100.0%

Recommended reading	Basic literature	Material prepared by the lecturer in the form of xeroxcopy and electronical version in PDF file.
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie: Projektowanie sieci pakietowych z QoS - Moodle ID: 28846 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28846
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	