



Subject card

Subject name and code	NGN Systems and Architectures, PG_00048114						
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	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	2.0		18.0	50	
Subject objectives	Getting of the knowledge concerning systems and architectures of the next generation networks in that of the next generation Internet in the context of the realization of the real time services.						
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 determines correct solutions of systems and architectures fulfilling qualitative and service needs formulated by users.			[SU2] Assessment of ability to analyse information		
	[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 conceptions and realizations of architectures for the next generation networks being based on the packet switching and the Internet. Student propose mechanisms and architectures those assure realization of the differentiated qualities of network services.			[SW1] Assessment of factual knowledge		
Subject contents	<p>The evolution of services, technologies and networks - integration or the convergence. ATM technology as the trial of integration of services and networks. ATM idea as conception of reconciling the channel and packet switching. The structure and functional elements of the ATM network. Service systems and the guarantee of the multimedia quality of service in ATM. Examples of using ATM technology: access, core, IP over ATM. Virtues and limitations of the ATM technology. Changes of the traffic character and services but selection of the target service platform. Features of IP technology from a point of view of the target service platform. Problem of the QoS guarantee in IP. IntServ and DiffServ architectures for the IP QoS realization. IntServ conception - advantages and disadvantages. Signaling protocol for the IntServ realization. Realization of connection scenario. DiffServ conception - classes of services. Functional model of the edge node (router). Functional model of the core node (router). Demands service of connections of aggregated streams; the AC function and the Broadband Broker. Guarantee of the quality of service in multidomain IP QoS network. Problem of realization of the switching and traffic engineering function. MPLS technology with response to this one problems. MPLS functional elements and creating LSP paths. Functional models of the input/output node and inside node the MPLS domain. GMPLS - generalized MPLS to different technologies. Realization "voice" service in the IP QoS network – VoIP. Controlling the VoIP connection - Softswitch conception. Convergence of technology - gateway conception. Protocols and the functionality of the media gateway MGW. Protocols and the functionality of the signaling gateway MGS. NGN architecture as the response to the convergence of technology, services and networks. Functionality's of layers: mediums, servers of the connection controlling, servers of the services controlling, the application servers. Example of the NGN system realization. NGN as the element of the Global Information Infrastructure (GII).</p>						

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm tests	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		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		