



## Subject card

Subject name and code	Computer Communication Networks Analysis, PG_00048060						
Field of study	Informatics						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
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	2		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Computer Communications -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jerzy Konorski				
	Teachers		dr hab. inż. Jerzy Konorski				
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	30.0	60
	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	60		8.0		32.0	100
Subject objectives	Sensitizing students to the need for analytical methods in the design and performance evaluation of computer networks.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions	Student can identify relevant parameters of computer network operation.	[SU2] Assessment of ability to analyse information
	[K7_U10] can individually plan and pursuit their own lifelong education and influence others in this aspect, also by means of advanced information and communication technologies (ICT), and communicate on specialist issues with diverse recipients, appropriately justify points of view, hold debates, present, assess and discuss different opinions and points of view, as well as use specialist terminology related to the field of study in communication	Student can present and discuss selected methods and results of computer network analysis.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[K7_U42] can solve engineering and research problems including design, assessment and maintenance of information systems and applications, using experimental methods and management techniques	Student explains the principles of mathematical and simulation-based modeling of computer network functionalities, with examples of concrete network environments and protocols.	[SW2] Assessment of knowledge contained in presentation
	[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.	Student explains the principles of mathematical and simulation-based modeling of computer network functionalities, with examples of concrete network environments and protocols.	[SW1] Assessment of factual knowledge
Subject contents	Introduction to the course, description of assessment items. Goals of computer communication networks analysis. Selected mathematical methods of computer network analysis: flow maximization, advanced queuing systems, optimum routing and capacity assignment, nonlinear and multicriteria optimization, basics of QoS routing. Principal performance measures and characteristics of application requirements Performance analysis of selected network protocols and mechanisms. Seminar topics: Traffic analysis for selected types of network applications. Characteristics and methods of increasing network reliability. Mechanisms of self-organization in data communication networks. Methods of data transport in DTN networks. Traffic management in SDN. Analytical models of transport protocols for IP networks. Models and tools for simulation of computer networks. Measurements of selected characteristics of traffic handling in IP networks. Cognitive networks. Multi-hop wireless networks - characteristics and analysis. Selected cooperative network environments. Selected routing mechanisms. Selected QoS and GoS issues. Dimensioning of network resources. Issues of construction of overlay networks. IoT modeling and analysis issues. Applications of AI and ML for modeling and analysis of selected network environments. Traffic management in optical networks.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	seminar presentations of selected topics	50.0%	60.0%
	final test	50.0%	40.0%
Recommended reading	Basic literature	W. Stallings, Data and Computer Communications, 9th ed. Prentice-Hall 2011	
	Supplementary literature	selected research and survey material available online	
	eResources addresses	Adresy na platformie eNauczanie: Modelowanie i analiza STI 2024 - Moodle ID: 33574 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33574">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33574</a>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		