



## Subject card

Subject name and code	Signalling Systems and Protocols, PG_00048153						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2024		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	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		4.0		
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 inż. Marcin Narloch				
	Teachers		dr inż. Marcin Narloch				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		4.0		51.0	100
Subject objectives	Obtaining knowledge regarding communication and signalling protocols used in circuit switching and packet networks particularly for VoIP technology.						
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 analyses connection scenarios for typical signalling systems and protocols. Student recognizes messages content and evaluates their correctness. Student uses tools for signalling analysis.		[SU4] Assessment of ability to use methods and tools [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 knows communication and signalling protocols used in circuit and packed switched networks, particularly for VoIP technology.		[SW1] Assessment of factual knowledge		
Subject contents	1. Notion and classification of communications protocols 2. Notion and classification of signaling systems; communications protocols in signaling systems 3. Functions of communications protocols in OSI and Internet architecture 4. Protocols and protocol stacks in IP network 5. Characteristics and functions of physical layer protocols. 6. Characteristics and functions of data link layer protocols (LAPB, LAPB,PPP). 7. Characteristics, functions and procedures of network layer protocols 8. Characteristics, functions and procedures of network transport layer protocols: TCP, UDP 9. Characteristics and functions protocols to support routing functions BGP, OSPF 10. Characteristics, functions and procedures RSVP protocol 11. Protocols in MPLS networks. 12. Signalization systems for PSTN/ISDN telecommunication networks: DSS1 and SS7 13. Signalization system DSS1: functions, types and structures of signalling messages 14. Signalization system DSS1: basic signalization procedures. 15. Signalization system SS7. Signalling network architecture 16. Signalization system SS7 ISUP: functions, types and structures of signalling messages 17. Basic signalization procedures for PSTN/ISDN network. 18. Signalization system SS7 MAP. Messages and basic signalization procedures 19. Signalization system SS7: SCCP and TACP protocols. Messages and basic signalization procedures 20. Call handling scenarios for signalization network 21. Signaling protocols utilized in VoIP technology 22. H.323 standard: types and structures of signalization messages 23. Basic call handling procedures in H.323 24. Cooperation between network with SS7 ISUP and IP network 25. Signaling protocol SIP: functions , types and structures of signalization messages. 26. Basic call handling procedures in SIP. 27. Cooperation between SIP and H.323 28. Signaling protocol NSIS 29. Standard of MGCP protocol: messages, functions and structure, API parameters 30. Basic call handling procedures in MGCP						

Prerequisites and co-requisites	no requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory exercises	50.0%	40.0%
	exam	50.0%	60.0%
Recommended reading	Basic literature	Material prepared by the lecturer in the form of xeroxcopy. Manual in the form of xeroxcopy.	
	Supplementary literature	1. Bromirski M. ,Telefonia VoIP., Wydawnictwo BTC, Warszawa 2006.  2. Johnston A. B., SIP: Understanding the Session Initiation Protocol, Artech House 2009.  3. Danilewicz G., Kabaciński M., System sygnalizacji nr 7 Protokoły standaryzacja zastosowania, WKiŁ 2005.	
	eResources addresses	Adresy na platformie eNauczanie:	
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		