



## Subject card

Subject name and code	Telecommunication Systems and Networks II, PG_00047921						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	2	Language of instruction			Polish		
Semester of study	4	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 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	0.0	0.0	15.0	15.0	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	Practical familiarize of student with the functioning of interfaces, protocols and implementation of telecommunication services for digital network with circuit switching and packet switching. Understanding the basic principles of practical network dimensioning for transmission part and switching nodes.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student is able to make a critical analysis of the functioning of existing technical solutions in telecommunications systems and networks and assess the functionality of these solutions as well as take advantage of experience related to the maintenance of telecommunications equipment and systems	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	Student is able to use analytical and experimental methods, see their system and non-technical aspects, make a preliminary assessment and selection of proposed system solutions	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_U07] can apply methods of process and function support, specific to the field of study	Student is able to use methods supporting processes and functions, specific to issues related to telecommunications systems and networks	[SU4] Assessment of ability to use methods and tools
	[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 identifies the telecommunications network architecture, distinguishes its areas and functional elements, assesses the quality of services, calculates the parameters of functional elements	[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 the concepts of the functioning of the telecommunications network and telecommunications services, the principles of their implementation, techniques of signal transmission, the concepts of multiplication and synchronization in a transmission network.	[SW1] Assessment of factual knowledge	
Subject contents	<p>Reach of digital transmission systems for copper pair  Transmission distance for optical link and / or the optical path.  Capacity dimensioning of the interface between nodes  Dimensioning of switching node equipment  Dimensioning of unidirectional SDH ring  Dimensioning of bidirectional SDH ring  The physical layer for the S/T and U point in the BRA-ISDN access.  The physical layer for the E1 interface of the PCM30 track.  Frame and multiframe structure of the PCM30 system.  Service scenario of the connection in the PSTN/ISDN network.  Signaling messages for DSS1.  Signaling messages for SS7 ISUP.  Teleservices and supplementary services in networks with circuit switching.  Teleservices and supplementary services in networks with the packets switching.  The access to broadband services in ADSL system.  The simultaneous access to services of PSTN/ISDN network and IP network.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	50.0%	50.0%
	Project	50.0%	50.0%
Recommended reading	Basic literature	Material prepared by the lecturer in the form of xeroxcopy. Manual in the form of xeroxcopy.	
	Supplementary literature	Horak R.: Telecommunications and data communications handbook John Wiley, 2007  Kula S.: Systemy teletransmisyjne, WKL, Warszawa 2004	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	The TDM network Interfaces Teleservices and supplementary services in ISDN Telephone services in IP networks Dimensioning of access network PSTN / ISDN Dimensioning of equipment of access node Design of optical SDH rings Reach of optical transmission Designing of WDM optical ring
Work placement	Not applicable