GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Source Coding, PG_00064033		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department Of Radiocommunication Systems And Networks -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Małgorzata Gajewska	
	Teachers	dr inż. Małgorzata Gajewska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15	2.0	8.0	25

Subject objectives	The aim of the course is to familiarize students with source coding methods.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W01] knows and understands, to an increased extent, mathematics to the extent necessary to formulate and solve complex issues related to the field of study	The student knows and understands the role individual blocks in source encoders. The student is able to write the most important operations using mathematical operations.	[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 understands the principles of operation of source encoders. The student knows the dependencies between blocks in encoders.	[SW1] Assessment of factual knowledge

Subject contents	Purpose and basic concepts of source coding, properties and source models of speech signals.Modeling of the vocal tract.Linear and nonlinear scalar quantizationOverview of basic source coding methodsBasics of analysis-by-synthesis coding, codecs: MPLP, RPE.Basics of analysis-by-synthesis coding, codecs: CELP, VSELP.Criteria for assessing the quality of synthesized speech signals.RPE-LTP-LPC codec in the GSM system.Short-term predictive analysis.Long-term predictive analysis.Excitation signal synthesis, APCM quantization, transmission frame formation, RPE-LTPLPC decoder.AMR-ACELP coding in the UMTS/GSM system, mechanisms of transmitting/receiving speech signals, variable bit rate coding, transmission frame format.Short-term and long-term predictive analysis in the ACELP encoder, adaptive codebookAlgebraic code table, AMR-ACELP decoder.AMR-WB ACELP codec.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquium	50.0%	100.0%

Recommended reading	Basic literature	Goldberg R. (ed.), A Practical Handbook of Speech Coders. CRC Press LLC, 2000. Hanzo L., Somerville C., Woodard J.: Voice and Audio Compression for Wireless Communications, 2nd Edition. Wiley & Sons, 2007.
	Supplementary literature	Nie dotyczy
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Discuss the operation of the CELP encoder.
Work placement	Not applicable

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