GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Reception of Radio Signals I, PG_00047459
Field of study	Electronics and Telecommunications

Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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	2.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Department of Radiocommunication Systems and Networks -> Faculty of Electronics, Telecommunications and Informatics

Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Stefański
	Teachers	prof. dr hab. inż. Jacek Stefański

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	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	4.0	16.0	50

Subject objectives	Acquaint students in detail with construction and operation of a modern radio communications receiver

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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 knows the basic elements of the theory of radio reception with particular emphasis on digital systems and knows the reception techniques used in modern cellular systems.	[SW1] Assessment of factual knowledge
	[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	The student can formulate the radio link budget and explain the influence of the receiver parameters on this budget. The student solves simple tasks on the receiver's noise ratio, can explain the causes and effects of intermodulation distortion in the receiver	[SU4] Assessment of ability to use methods and tools
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems	The student knows and can use specialized vocabulary in the field of modern radio communication.	[SK4] Assessment of communication skills, including language correctness

Subject contents	1. Radio link budget 2. Criteria of speech and data signals reception: distortions, signal to noise ratio, bit error rate 3. Basic parameters of receiver: sensitivity, selectivity, stability and inter-modulation resistance 4. Noise of receiver 5. Noise figure and noise temperature 6. Analog receiver scheme in FDMA system 7. Digital receiver scheme in TDMA and CDMA system 8. Optimal reception of digital signals in Gaussian channel 9. Intersymbol interference cancellation 10. Fading signal reception 11. Receiver for SDMA system 12. Adaptive receiver 13. Viterbi algorithm for MLSE detector 14. Frequency, time, bit and block synchronization in digital receiver 15. Multiuser detection (decorrelation detector, MMSE detector)
Prerequisites and co-requisites	No requirements

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	30.0%
	Written examination	50.0%	70.0%

Recommended reading	Basic literature	Tomasi W., Advanced Electronic Communications Systems, Prentice Hall, 1992. Mitola J., Software Radio Architecture, John Wiley & Sons, 2000. Schaub K. B., Kelly J., Production Testing of RF and System-on-a-Chip Device for Wireless Communications, Artech House, 2004. Proakis J. G., Digital Communications, McGraw-Hill, 1989.
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie: Technika odbioru radiowego (Reception of Radio Signals) - 2022/2023 - Moodle ID: 16671 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16671

Example issues/ example questions/ tasks being completed	

Work placement	Not applicable