



Subject card

Subject name and code	Functional Modules of Electronic Systems, PG_00048100						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2028/2029		
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		3.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department Of Metrology And Optoelectronics -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Andrzej Kwiatkowski				
	Teachers		dr inż. Andrzej Kwiatkowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		3.0		42.0	75
Subject objectives	The aim of the course is to provide to students a knowledge about design, operation and parameters of the ADC, DAC and sample S/H device. As part of the course the student also learns the principle of modular devices, types of switches used in analogue commutators and examples of amplifiers configurations applied in measuring systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
Subject contents	1. Introduction and course grading 2. Elements of measurement path of measurement systems and virtual instruments 3. Programmed sources of measurement arbitrary AC and DC signals 4. Direct methods of frequency synthesis with constant and variable number of samples over period 5. Characteristics and static / dynamic parameters of digital-to-analog converters 6. Analog-to-digital converter with increase summation of voltage and current 7. Multiplying two- and four quadrant digital-to-analog converters 8. Analog-to-digital converters classification, static and dynamic parameters 9. Multi-slope integrating A/D converters 10. Sigma-delta A/D converters 11. Multiple signal folding A/D converters 12. Parallel (flash) and serial A/D converters 13. Sample-and-hold and sample-and-track fast circuits 14. Data acquisition cards 15. Analog one or multi stage multiplexers 16. Analog switch (reed relays, CMOS, J-FET, Opto-MOS) 17. Programmable measurement amplifiers 18. Galvanic isolation circuits 19. Circuits of electronic isolation of elements from electrical network using follower						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
			50.0%		30.0%		
			50.0%		70.0%		
Recommended reading	Basic literature		1. Jakubiec J., Roj.: Pomiarowe przetwarzanie próbkujące. Wyd. Politechniki Śląskiej. 2. Łakomy M., Zabrodzki J.: Scalone przetworniki a/c i c/a. PWN. 3. Noty aplikacyjne przetworników a/c i c/a Analog Devices				
	Supplementary literature		1. Kulka Z., Libura A., Nadachowski M.: Przetworniki a/c i c/a, WKiŁ. 2. Winiecki W.: Organizacja komputerowych systemów pomiarowych, Oficyna Wyd. Politechniki Warszawskiej				
	eResources addresses		Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed							

Work placement	Not applicable
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