GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2026	Academic year of realisation of subject	2029/2030
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	Metrology and Electronic Systems Department -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Andrzej Kwiatkowski	
	Teachers	dr inż. Andrzej Kwiatkowski	

Lesson types

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

Course content – lecture
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%	70.0%
	50.0%	30.0%

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	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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