



Subject card

Subject name and code	Electronic circuits, PG_00051073						
Field of study	Układy elektroniczne						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Ryszard Barczyński				
	Teachers		dr hab. inż. Ryszard Barczyński				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	15.0	0.0	60
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 1993 Układy elektroniczne 2025 https://enauczanie.pg.edu.pl/2025/course/view.php?id=1993						
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	60		5.0		60.0	125
Subject objectives	The aim of this course is to familiarize students with basic electronic circuits implemented using operational amplifiers. Particular attention is paid to circuits found in measurement systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W12] Knows basic health and safety rules.		The student works in the laboratory in compliance with occupational health and safety regulations.		[SW1] Ocena wiedzy faktograficznej		
	[K6_U05] Can design and build a simple measuring device		The student designs, builds, and tests the parameters of electronic systems with specific parameters.		[SU2] Ocena umiejętności analizy informacji [SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania		
	[K6_W07] Has knowledge of the construction and operation of physical instruments, measurement and research equipment.		The student analyzes and designs basic systems found in measuring equipment.		[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym [SW1] Ocena wiedzy faktograficznej		
	[K6_W06] Has knowledge of electronics.		The student knows the properties of basic electronic components and is able to apply them in practical systems.		[SW2] Ocena wiedzy zawartej w prezentacji [SW1] Ocena wiedzy faktograficznej		
	[K6_U04] Can plan and conduct experiments, critically analyze their results, draw conclusions and form opinions. Has laboratory work experience.		The student measures and analyzes the parameters of self-built systems.		[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU1] Ocena realizacji zadania		

Subject contents	* Amplifier as a quad, feedback, amplifier stability. * Fulfillment of degrees amplifiers on an operational amplifier, sum amplifier, integrator, derivative circuit, current-voltage converter. * Selective amplifiers, active RC filters. * Non-linear analog blocks functional. * Broadband and power amplifiers. * RC, LC and quartz generators. * Layouts impulse, flip-flop. * Power supply systems, linear and impulse voltage stabilizers * Digital blocks functional, synthesis of combinational and sequential logic circuits. Practical design of individual systems discussed in lectures. Construction of basic electronic circuits using operational amplifiers. Designing a system (e.g. an anti-aliasing filter) based on assumed parameters, Construction and testing of a prototype.		
Prerequisites and co-requisites	None.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	51.0%	25.0%
	Tutorial	51.0%	25.0%
	Lectures	51.0%	25.0%
	Project	51.0%	25.0%
Recommended reading	Basic literature	* WWW site * Michał Polowczyk, Elektronika dla fizyków, PWN Warszawa * P. Horowitz, W. Hill, Sztuka elektroniki, WKŁ 2003 * U. Tietze, Ch. Schenk, Układy półprzewodnikowe	
	Supplementary literature	* Ben G. Streetman, Przyrządy półprzewodnikowe * Ch.L. Alley, K.W. Atwood, Elementy i układy półprzewodnikowe * Behzad Razavi, Fundamentals of microelectronics, Wiley 2008. * Mirosław Rusek, Jerzy Pasierbiński, Elementy i układy elektroniczne w pytaniach i odpowiedziach, NT Warszawa 2006.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Which goal cannot be achieved by using negative feedback in an amplifier circuit? A) Reducing the sensitivity of the amplifier to the spread of element parameters. B) Reduction non-linear distortions. C) Increase the gain. D) Widening the bandwidth amplifier. To obtain a 1V signal at the output of a certain differential amplifier, you can apply it between... its inputs have a 1mV signal. When we change the supply voltage by 1V, the output voltage will change by 10mV. The amplification factor of this amplifier is therefore... A) 120dB. B) 40dB. C) 60dB. D) 90dB.		
Practical activities within the subject	Not applicable		

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