

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Analog Electronic Circuits, PG_00047538								
Field of study	Electronics and Telecommunications								
Date of commencement of studies	October 2024		Academic year of realisation of subject			2025/2026			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study			
						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	2		Language of instruction			Polish			
Semester of study	4		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form		exam				
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics								
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Stanisław Szczepański						
	Teachers	prof. dr hab. inż. Stanisław Szczepański							
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	0.0	0.0		0.0	30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	30		3.0		42.0		75	
Subject objectives	Knowledge of methods of analysis and design of analog electronic circuits structures based on the MOSFET, JFET and bipolar transistors.								

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_W05] Knows and understands, to an advanced extent, methods of supporting processes and functions, specific to the field of study	The student describes and classifies the methods of supporting the design and optimization of basic analog structures and digital electronic circuits.	[SW1] Assessment of factual knowledge				
	[K6_W06] Knows and understands the basic processes occurring in the life cycle of devices, facilities and systems specific to a given field of study.	The student describes the basic processes in the life cycle of devices using analog and digital electronic circuits.	[SW1] Assessment of factual knowledge				
	[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	The student classifies and describes basic structures of analog and digital electronic circuits. The student defines and explains the technical parameters of analog and digital electronic circuits. The student indicates and explains the applications of analog and digital electronic circuits.	[SU4] Assessment of ability to use methods and tools				
	[K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems	Student defines and explains technical parameters and functions of analog and digital electronic circuits.	[SW3] Assessment of knowledge contained in written work and projects				
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	The student defines and explains performance parameters of analog and digital electronic circuits. The student indicates and explains applications of analog and digital electronic circuits.	[SU4] Assessment of ability to use methods and tools				
Subject contents	 Introduction, categories of the electronic circuits 2. Power supply and biasing techniques for bipolar and MOS transistors 3. Models, DC and AC analysis of bipolar and MOS amplifiers 4. Frequency-domain analysis of bipolar and MOS amplifiers 5. Bipolar and CMOS differential amplifiers - properties and integrated circuit (IC) realizations 6. Functional blocks for linear ICs realized in bipolar and CMOS technologies 7. Operational amplifiers and their applications 8. Analytical models and analysis of IC amplifiers (bipolar and CMOS) 9. IC wideband amplifiers (bipolar and CMOS) 10. CMOS operational transconductance and transresistance amplifiers. 11. IC bandpass amplifiers 12. IC power amplifiers 13. Amplifiers with negative feedback loop. 14. Design of bipolar and CMOS amplifiers with negative feedback to application specific Integrated Circuit (ASIC) design 20. IC layout and design verification tools 21. Analog Application Specific Integrated Circuit (ASIC) design 20. IC layout and design verification tools 21. Analog multiplier and its applications 22. Amplitude , frequency and phase detectors 23. Oscillations in the lossy resonance circuit. Negative resistance . Feedback-type oscillator structure. 24. Well-known feedback-oscillator structures 25. Relaxation-mode oscillators 26. Oscillators based on a high-Q resonator . Crystal-oscillator. 27. Signal generation in the phase-locked loop 28. Power supply rectifiers and filters. 29. Analog voltage regulators 30. Switching DC/DC and AC/DC converters. 						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Written exam	50.0%	100.0%				
Recommended reading	Basic literature Guziński A: "Liniowe elektroniczne układy analogowe", WNT, 1994 Tietze U., Schenk Ch.:"Układy półprzewodnikowe", WNT2009 Sedra A.S., Smith K.C.: "Microelectronic circuits", Oxford University Press, New York, Oxford, 2004						
	Supplementary literature No requirements						
	ekesources addresses	Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						