GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electronic Circuit Design, PG_00048096					
Field of study	Electronics and Telecommunications					
Date of commencement of studies	October 2023		Academic year of realisation of subject		2026/2027	
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		4.0	
Learning profile	general academic profile		Assessment form		assessment	
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics					
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Wierzba				
	Teachers	dr hab. inż. Paweł Wierzba				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	0.0	45
	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	45	4.0	51.0	100

Subject objectives	Provision of knowledge and abilities in the fields of analysis and design of selected classes of analog circuits.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems	knows opartions performed by linear and nonlinear analog circuits; knows analysis mathods of analog circuits using SPICE family programs; knows design methods for circuits using operational amplifiers; selects apropriate type and order of LC filters accrding to specifications;	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	performs analysis of analog circuits using SPICE simulation programs; performs analysis of analog circuits with operational amplifiers and filters;	[SU1] Assessment of task fulfilment

Subject contents	1. Introduction to design of electronic circuits 2. Component characteristics important for the design process 3. Functions implemented with linear circuits 4. Operational amplifier in linear circuits 5. Design of selected linear circuits (instrumentation amplifier, control circuit) 6. Analog filter design 7. Design of selected non-linear circuits (amplitude demodulator, active rectifier, RMS measurement circuits) 8. Estimation of signal to noise ratio in designed circuits 9. Sensitivity of circuit to component parameters change. Introduction 10. Calculation of circuit sensitivity to component parameters change. Difference method 11. Calculation of circuit sensitivity to component parameters change. Monte-Carlo method 12. Calculation of circuit sensitivity to component parameters change. Worst case method 13. Selection of components tolerance 14. Design of low-power circuits 15. Assessment and improvement of designed circuits stability 16. Analysis of analog circuits 17. Analysis of digital and mixed signal circuits

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	50.0%	40.0%
	Project	50.0%	30.0%
	Midterm colloquium	51.0%	30.0%

Recommended reading	Basic literature	1. Z. Bielecki, A. Rogalski, Detekcja sygnałów optycznych, WNT Warszawa 2001 2. T. H. Wilmshurst, Signal recovery from noise in electronic instrumentation, Taylor and Francis, 1990 3. G. W. Roberts, A. S. Sedra, SPICE, 2nd edition, Oxford University Press, Oxford 1997 4. P.Horowitz, W. Hill, Sztuka elektroniki, WNT Warszawa 1992 5. M. Niedźwiecki, M. Rsiukiewicz, NIeliniowe elektroniczne układy analogowe, WNT Warszawa 1991 6. U. Tietze, Ch. Schenk, Układy półprzewodnikowe, WNT Warszawa 1996
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable