

## SDAŃSK UNIVERSITY 的 OF TECHNOLOGY

## Subject card

Subject name and code	Engineering of Integrated Circuits and Systems, PG_00048077								
Field of study	Electronics and Telecommunications								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024			
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			4.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Microe	ms -> Faculty of Electronics, Telecommunications and Informatics							
Name and surname	Subject supervisor		dr hab. inż. Bogdan Pankiewicz						
of lecturer (lecturers)	Teachers		dr hab. inż. Bogdan Pankiewicz dr hab. inż. Waldemar Jendernalik						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	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 classes include plan		ed in study consultation hours		Self-study SUM				
	Number of study 45 hours		4.0		51.0		100		
Subject objectives	Main aim of the subject is introduction to design of integrated circuits and systems.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		knows the syntax of PSPICE files, types of possible simulations, ways of describing analog and digital circuits, and methods of simulating electronic circuits			[SW1] Assessment of factual knowledge			
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions		can design integrated circuit, can make electrical simulation and choose correct technology, can design electrical schematic and layout, can estimate speed and power consumption			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task			
	[K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems		knows the basic principles of designing analog and digital integrated circuits, knows the limitations resulting from the technology used, is able to estimate the speed of work as well as the consumed power of the digital circuit in the core and on external terminals			[SW1] Assessment of factual knowledge			
Subject contents	1. IC technologies, technological processing steps, process scenario. 2. Design rules. 3. Passive and active components in integrated circuits. 4. IC cost of design, prototyping and volume production. 5. IC defects and process yield. 6. Technology window of the process. 7. Relative and absolute device mismatches. 8. Methods of matching devices in IC technology. 9. Parasitic phenomenon. 10. AnalAnalog I/O circuits. 11. Digital I/O circuits. 12. Noise coupling, noise margin. 13. Power dissipation and temperature considerations. 14. Circuit extraction. 15. PSPICE circuits simulations.								

Prerequisites and co-requisites					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade		
	labs	51.0%	25.0%		
	project	51.0%	25.0%		
	lecture	51.0%	50.0%		
Recommended reading	Basic literature	<ul> <li>R. L. Geiger, P. E. Allen, N. R. Strader, VLSI design techniques for analog and digital circuits, McGraw-Hill 1990. Matching properties of MOS transistors, M. Pelgrom, A. Duinmaijer, A. Welbres, IEEE Journal of Solid-State Circuits, vol 24, no. 5, October 1989 J. Izydorczyk, PSpice komputerowa symulacja układów elektronicznych, Helion, 1993 C. Wai-Kai (editor), The VLSI Handbook, Taylor &amp; Francis Group, 2007</li> </ul>			
	Supplementary literature	No requirements			
	eResources addresses	Adresy na platformie eNauczanie:			
		Inżynieria układów i systemów scalonych - 2023/24 - Moodle ID: 30618 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30618			
Example issues/ example questions/ tasks being completed					
Work placement	Not applicable				