



## Subject card

Subject name and code	Electronic Circuits - laboratory, PG_00049312						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2021/2022	
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				1.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jacek Jakusz				
	Teachers		dr hab. inż. Jacek Jakusz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	E-learning hours included: 0.0						
Układy elektroniczne - laboratorium 2021-2022 - Moodle ID: 22254 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22254">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22254</a>							
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	15		1.0		9.0	25
Subject objectives	knowledge of instruments and retention of theoretical knowledge on the structure and properties of electronic systems of linear electronic circuits in the student's lab.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn		The student is able to calculate the parameters of electronic circuits and then perform their practical measurements. In this way, it strengthens the knowledge of structures and parameters of analog electronic circuits discussed during the lecture.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment	
[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 is able to calculate the values of basic elements of transistor amplifiers.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
Subject contents	<ol style="list-style-type: none"> <li>1. CMOS programmable array for analog circuit applications</li> <li>2. Basic gain stages for MOS amplifiers</li> <li>3. Amplifier with negative feedback loop</li> <li>4. Bipolar wideband amplifiers</li> <li>5. Differential pair amplifier</li> <li>6. Phase-locked oscillator (PLL)</li> <li>7. Diode rectifier and voltage regulator</li> <li>8. Buck DC/DC converter</li> </ol>						

Prerequisites and co-requisites	Is required to pass the lecture "ELECTRONIC CIRCUITS" on the 3rd semester		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	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	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		