

§ GDAŃSK UNIVERSITY § OF TECHNOLOGY

Subject card

Subject name and code	Control Systems with Signal Processors, PG_00044091								
Field of study	Electrical Engineering								
Date of commencement of studies	February 2024		Academic year of realisation of subject			2024/2025			
Education level	second-cycle studies		Subject group						
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	1		Language of instruction			Polish			
Semester of study	2		ECTS credits			2.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Contro	ives -> Faculty of Electrical and Control Engineering							
Name and surname	Subject supervisor		dr inż. Filip Wilczyński						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	1 type Lecture		Laboratory	Project		Seminar	SUM	
	Number of study hours	15.0	0.0	D 15.0 0.0			0.0	30	
	E-learning hours included: 0.0								
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17244								
Learning activity and number of study hours	Learning activity Participation in classes include plan		didactic Participation in d in study consultation hours		Self-study		SUM		
	Number of study 30 hours			5.0		15.0		50	
Subject objectives	Tha main aim of the subject is to introduce implementation methods of control systems using current microprocessor systems.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	К7_U03		student can propose a control system and can use a reference manual of the implemented microprocessor system			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools			
	K7_W01		student can prepare a mathematical model of the plant and can numerically solve differential equation systems			[SW1] Assessment of factual knowledge			
	K7_U02		student can explain proposed control system and present the results			[SU5] Assessment of ability to present the results of task			
	K7_W02		student can implement a control system using an analog-digital converter to measure plant's outputs			[SW3] Assessment of knowledge contained in written work and projects			
Subject contents	State equations, PID regulators, cascade control, poles placement, numerical methods for differential equations, control systems implementation on a microcontroller, usage of DSP instructions/functions								
Prerequisites and co-requisites	Essentials of automatic control and electrical engineering, ability to write simple code in C language.								
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade			
	Laboratories		60.0%		50.0%				
	Lectures		60.0%			50.0%			

Recommended reading	Basic literature	 Nise, N. S. (2020). Control Systems Engineering (8th ed.). Wiley. Holmes, Mark H., Introduction to Numerical Methods in Differential Equations (2021). Springer. Ibrahim, D. (2013). Practical Digital Signal Processing using Microcontrollers. Elektor Verlag. 			
	Supplementary literature	Grover, D., & Deller, J. R. (1998). <i>Digital Signal Processing and the</i> <i>Microcontroller</i> . Prentice Hall. Nagrath, I. J., & Gopal, M. (2021). <i>Control Systems Engineering (Third</i> <i>Edition)</i> (3rd ed.). New Age International Plubishers.			
	eResources addresses	Adresy na platformie eNauczanie:			
Example issues/ example questions/ tasks being completed	Prepare a state-space representation of a water heater. Propose and implement a control system on a microcontroller.				
Work placement	Not applicable				