



## Subject card

Subject name and code	Mechatronics II, PG_00047619						
Field of study	Automatic Control, Cybernetics and Robotics						
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	6		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Rafał Hein				
	Teachers		dr hab. inż. Rafał Hein  mgr inż. Artur Gańcza				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	15.0	0.0	30
	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	30		3.0		42.0	75
Subject objectives	The aim of the course is to acquire practical skills in designing and building hydraulic, pneumatic, electric, mechanical and mechatronic control systems. The subject consists of the design and laboratory parts. In the design part, students carry out assigned theoretical projects, and in the laboratory part, they carry out practical tasks for controlling mechatronic 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		The student has the knowledge in mechanics, construction and operation of machines, electronics, automation and control enabling modeling and design of mechatronic systems.		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation		
	[K6_W02] Knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study		The student has knowledge in mechanics, construction and operation of machines, electronics, automation and control as well as understands the laws and phenomena occurring at the stage of operation of the products and production processes designed by him.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		

Subject contents	The design part includes the plan of mechatronic system.		
	The following topics are realised in the laboratory part:		
	Synthesis and analysis of combinational and sequential logical control systems.		
	PLC programming in the application to the sequential control systems.		
	Laboratory investigation of servo-mechanism with state variable feedback.		
	Laboratory research of temperature control system using PID controller and D/A, A/D converter.		
	PLC programming module of assembly system MAS-200.		
Prerequisites and co-requisites	Ability to synthesize combinational and sequential control systems. Knowledge of languages and the basics of PLC and microcontroller programming. Basic knowledge of measurement systems, including the operation of physical quantity sensors and actuators.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	56.0%	50.0%
	Practical exercise	56.0%	50.0%
Recommended reading	Basic literature	1. Heiman B., Gerth W., Popp K.: Mechatronika, metody, przykłady, tł. Gawrysiak M., Wydawnictwo Naukowe PWN, Warszawa, 2001  2. Gawrysiak M.: Mechatronika i projektowanie mechatroniczne, Rozprawy Naukowe Nr 44, Polit. Białostocka, Białystok, 1997  3. Schmid D. i inni: Mechatronika, ISBN 83-7141-425-0, Warszawa 2002	
	Supplementary literature	1. Catalogues from FESTO, SMC, Rexroth, Siemens, Simex	
	eResources addresses	Adresy na platformie eNauczanie:	
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		