



Subject card

Subject name and code	, PG_00071595						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
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		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Optoelectronics -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mateusz Ficek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	5.0	0.0	20.0	0.0	0.0	25
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=5461						
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	25		0.0		0.0	25
Subject objectives	The aim of the micro-course is to familiarize students with the basics of designing Arduino-based electronic components and their integration with 3D printed modelsselecting sensors, actuators, and power supplies, as well as the principles of prototyping and safetyas well as acquiring practical skills in CAD design of mounts and enclosures, assembling and commissioning simple systems, and testing and verifying operation in the model.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] he/she has basic knowledge in the fields of automatics and mechanical system robotics or electrical engineering and electronics		The student is able to design and implement a simple electronic circuit based on the Arduino platform—selecting appropriate sensors, actuators, and power supply methods—and subsequently integrate it with a 3D-printed model.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U08] he/she is able to assess whether proposed methods and tools can be used in practice to solve simple engineering task related to machine design, manufacturing and utilization		The student is able to develop a basic CAD model of an enclosure or mount for electronic components, assemble the system, and conduct testing and functional verification using a 3D-printed model, while observing basic safety principles.		[SU1] Assessment of task fulfilment		
Subject contents	Course content – lecture						
	The lecture portion of the course focuses on the theoretical foundations of modern rapid prototyping techniques. Arduino basics, including sensor and actuator selection, power supply, and safety principles, will be covered. Students will learn the operating principles, material selection, and technological limitations of additive manufacturing (3D printing) and photothermal laser processing (engraving and cutting). Embedded system design methodology is also discussed, including microcontroller architecture using the Arduino platform as an example, and the principles of 3D modeling and electronic circuit simulation in the Tinkercad environment.						
	Course content – laboratory						
	The course will cover CAD design of enclosures and mounting hardware, including tolerances, cable management, and assembly methods, print preparation, and prototype assembly on a breadboard. Programming basics, testing and diagnostics, and integration of electronics with a 3D model will also be covered. This is related to the IPI project.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	50.0%	20.0%
	Laboratory	50.0%	80.0%
Recommended reading	Basic literature	Chlebus E., Technologie szybkiego prototypowania, WNT, Warszawa. Monk S., Arduino dla początkujących. Podstawy i szkice, Wydawnictwo Helion. Banzi M., Shiloh M., Arduino. Przewodnik dla początkujących, Wydawnictwo Helion.	
	Supplementary literature	Technical documentation for the Autodesk Tinkercad (www.tinkercad.com) and Arduino (www.arduino.cc) platforms	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Practical activities within the subject	Not applicable		

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