



Subject card

Subject name and code	, PG_00056132						
Field of study	Mechatronics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
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	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Wiktor Sieklicki				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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		0.0		0.0	30
Subject objectives	Providing students with knowledge about various types of transducers of physical quantities (sensors) used in mechatronic systems, methods of processing physical quantities, possibilities and limitations of sample sensors, and possibilities of using sensors for specific purposes.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W10] has a basic knowledge about development trends in terms of engineering and technical sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering, adequate for Mechatronics course		Student presents types of sensors utilized in modern mechatronics systems		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W08] knows and understands design and production processes of elements and simple mechatronic devices		Student describes process of elements selections and conditions that must be met by measurement systems dedicated to a given task		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W11] has a basic knowledge about the life cycle of mechatronic systems and objects		Student presents phases of design and development of measurement systems		[SW1] Assessment of factual knowledge		
	[K6_U05] is able to use properly chosen tools to compare design solutions of elements and mechatronics systems according to given application and economic criteria (e.g. power demand, speed, costs)		Student chooses suitable types of sensors according to the given measurement task		[SU1] Assessment of task fulfilment		
	[K6_U06] is able to identify and formulate specification of simple, practical engineering tasks, distinctive for mechatronics		Student formulates specification of simple measurement system		[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	Presentation of the principles of operation, construction and application of the most important types of transducers/sensors, including: displacements, velocities, accelerations, distances, stresses, temperatures. Introductory discussion of signal processing methods for data acquisition from sensors. Laboratory: Discussion of the types of sensors, typical parameters of selected sensors, power supply systems for digital and analog sensors, applications of selected sensors, limitations of the use of sensors.						
Prerequisites and co-requisites	Knowledge of topics from "Metrology and measurement systems", "Basics of digital signal processing" and "Elements of mechatronic systems" courses						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Finishing task given during laboratory classes	56.0%	35.0%
	Written test	56.0%	65.0%
Recommended reading	Basic literature	J. Fraden, Handbook of Modern Sensors: Physics, Designs, and Applications, Springer, 2016	
	Supplementary literature	Technical documentation of various types of sensors	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	For a given physical parameters (distance, humidity, temperature, flow, acceleration, position, orientation):- determine the features of the physical quantity such as: range of values, expected characteristics of the variability of the measured value over time, influence of other factors on the measured value, required measurement resolution, possibility of potential change of the measured value as a result of the measurement- determine the type of sensor most suitable for carrying out measurements- determine the sensor parameters necessary to perform the measurement- select the rest of the components of the measuring system necessary to carry out the measurements (electrical system, power supply, communication of digital sensors, mounting elements, etc.)- prepare software that allows you to receive information from the selected sensor- prepare a method for collecting measurement data- take the measurements- describe the measurement results- interpret the measurement results- describe the methodology of the measurement in the report		
Work placement	Not applicable		