Subject card

Subject name and code	Mechatronics in industrial flow installations , PG_00043691					
Field of study	Mechatronics					
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024	
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	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology					
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Zbigniew Kneba			
	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	The aim of teaching students is to introduce them to the methods of designing piping systems with fittings.					

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W06] has detailed, supported by the theory knowledge in terms of mechatronic design, mechatronic systems and machines, devices and process where they are used	Is able to select installation equipment for stationary power stations, heating substations and the like from catalogs.	[SW1] Assessment of factual knowledge
	[K7_W10] knows development trends and most important new achievements in technical sciences and science disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering and related: Informatics and Materials Engineering	He knows new types of electronically controlled industrial fittings.	[SW1] Assessment of factual knowledge
	[K7_U04] is able to utilise known methods and mathematical models, as well as computer simulations for analysis and evaluation of non-stationary continuous and discrete mechatronic systems and processes	He knows the calculation methods of pipelines, both flows and the strength of pipes and tanks.	[SU4] Assessment of ability to use methods and tools
	[K7_W01] has extended knowledge in terms of selected areas of mathematics, including discrete and applied mathematics, optimisation methods, mathematical and numerical methods essential for: 1) modelling and analysis of nonstationary mechatronics, continuous and discrete time systems as well as physical phenomena; 2) description and analysis of mechatronic systems that include programmable devices 3) description and analysis of signal processing algorithms 4) synthesis of non-stationary mechatronic systems	Uses specialized computer programs.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Factors flowing in industrial installations. Installation diagrams on the example of a combustion engine with piston engines. Pipe materials. Strength calculations. Connections and sealing joints of pipe sections. Fittings and accessories. Calculation of pressure losses. Programming of heat substations in heating systems. Analysis of the operation of a large air compressor station.
Prerequisites and co-requisites	Fluid mechanics. Durability of materials. Electrotechnics.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	100.0%

Recommended reading	Basic literature	.
	Supplementary literature	.
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Sketch a diagram of the natural gas pipeline culvert under the railway line.Sketch the devices protecting fuel tanks against environmental pollution and fire.Sketch a fresh water cooling system for a high-power engine.
Work placement	Not applicable