



Subject card

Subject name and code	Pumps, Compressors and Fans, PG_00040113						
Field of study	Mechanical Engineering						
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	Part-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	Zakład Maszyn Przepływowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marian Piwowarski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	22.0	0.0	0.0	0.0	0.0	22
	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	22	6.0		22.0		50
Subject objectives	The purpose of the course is to familiarize students with the principle of operation of flow impeller machines, their construction and cooperation with the installation.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning		The student has a basic knowledge of centrifugal pumps, compressors and fans.		[SW1] Assessment of factual knowledge		
	[K6_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria		The student can pre-design a typical pump or compressor structure.		[SU1] Assessment of task fulfilment		
Subject contents	Division and brief discussion of the different types of rotating machinery. Common features and differences in construction and operation of pumps, fans and compressors. Construction diagrams and scope of application. Basic Concepts and definitions in accordance with the PN. Theoretical basis of operation of all centrifugal machines. Phenomena accompanying fluid flow in the rotor and flow channels. Methods of calculation and construction of rotors and flow channels. Cooperation of rotating machines with installations, characteristics of cooperation. Methods of operating point control, scope of application, advantages disadvantages, economy. Phenomenon Cavitation and its impact on the operation and characteristics of centrifugal pumps.						
Prerequisites and co-requisites	Fundamentals of fluid mechanics, fundamentals of mechanical engineering.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Colloquium		50.0%		100.0%		
Recommended reading	Basic literature		-				
	Supplementary literature		-				
	eResources addresses						

Example issues/ example questions/ tasks being completed	Please, based on the basic pump equation, explain why, among centrifugal pumps, the pump centrifugal allows you to achieve the highest lift heights? In what range of speed differentiator are the stages of axial compressors designed, and in what radial?
Work placement	Not applicable