



Subject card

Subject name and code	Numerical methods in thermal problems, PG_00055946						
Field of study	Power Engineering, Power Engineering, Power 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	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 Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Ziółkowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	30.0	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		8.0		37.0	75
Subject objectives	Presentation of the basics of computer modelling of systems and applications from the area of heat technology so that the student could be able to understand and interpret the results obtained using commercial numerical codes.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_U06] is able to use the basic knowledge on the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, combustion engines, compressors and rotating machines to assess the technical condition of the system		Students will be able to use basic knowledge of the operation of power equipment in the field of thermal power plants, thermal power and heating systems, internal combustion engines and compressors and rotating machinery to assess the technical condition of the system.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject	
	[K6_W11] has knowledge of known technologies and non-technical aspects to solve simple engineering tasks in the field of energy systems and devices		The student has the knowledge of the known technologies and non-technical aspects to solve simple engineering tasks in the field of energy systems and equipment.			[SW1] Assessment of factual knowledge	
	[K6_U08] can design the basic parameters of the selected technology related to energy conversion and select auxiliary devices and evaluate the project in terms of technical and economic		Students will be able to design the basic parameters of a selected energy conversion technology and select auxiliary equipment and evaluate the design from a technical point of view.			[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment	
Subject contents	Presentation of capabilities Aspen Plus or Epsilon of commercial packages						
Prerequisites and co-requisites	mathematics, physics, fluid mechanics, solid mechanics						
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade	
	Final assessment on the basis of reports or presentations		56.0%			100.0%	
Recommended reading	Basic literature		P. Ziółkowski, Learning materials.				
	Supplementary literature		1. Patankar S.V. Numerical Heat Transfer and Fluid Flow, Taylor and Francis, 1980. 2. Minkowycz W. J., Sparrow E. M., Schneider G. E., Pletcher R. H., Handbook of Numerical Heat Transfer, Wiley, 1988				
	eResources addresses						

Example issues/ example questions/ tasks being completed	Analysis of the physical phenomenon and the possibility of analysis in the numerical code.Solving engineering problems using advanced commercial tools.
Work placement	Not applicable