



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 hab. inż. Jacek Barański				
	Teachers		dr hab. inż. Jacek Barański				
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.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
	[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.		[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools		
Subject contents	Presentation of capabilities ANSYS Fluent of commercial package CFD						
Prerequisites and co-requisites	mathematics, physics, fluid mechanics, heat transfer						
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		1. 1.Patankar S.V. Numerical Heat Transfer and Fluid Flow, Taylor and Francis, 1980. 2. 2.Minkowycz W. J., Sparrow E. M., Schneider G. E., Pletcher R. H., Handbook of Numerical Heat Transfer, Wiley, 1988 3. ANSYS - User's Guide				

	Supplementary literature	1. Pope, Stephen B. Turbulent Flows. Cambridge University Press 2000.
	eResources addresses	Adresy na platformie eNauczenie: Metody numeryczne w zagadnieniach cieplnych, P, E, sem.6, letni 23/24 - Moodle ID: 38462 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=38462
Example issues/ example questions/ tasks being completed	<p>Analysis of the physical phenomenon and the possibility of analysis in the numerical code.</p> <p>Solving engineering problems using advanced commercial tools.</p>	
Work placement	Not applicable	