



Subject card

Subject name and code	, PG_00065429						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
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 Due to a trip to a foreign conference, part of the course is conducted in English		
Semester of study	2		ECTS credits		3.0		
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 inż. Paweł Ziółkowski				
	Teachers		dr inż. Paweł Ziółkowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	5.0	0.0	0.0	0.0	15
	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	15		15.0		45.0	75
Subject objectives	The aim of the course is to present numerical methods in heat conversion and conduction in biological materials in particular using CFD tools.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	The student is prepared to actively participate in lectures, seminars, laboratories conducted in a foreign language including research internships in the USA and conferences related to heat conduction analysis.	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work [SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness
	[K7_W11] possesses organized knowledge useful in understanding ex-technical conditioning connected with performing the profession of an engineer and taking it into consideration in engineering practice; possesses well-established knowledge within the range of intellectual property, management and organization of manufacturing processes, including the management and life-cycle of a product	The student has a structured knowledge useful for understanding non-technical considerations related to the engineering profession and their consideration in engineering practice including the realisation of work trips to conferences and scientific internships. In addition, the student has a well-established knowledge of the organisation of manufacturing processes (generation of CFD results), including quality management (discretisation mesh tests) and product life cycle (reference to design calculations).	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)	The student has the ability to efficiently acquire and process information in a foreign language at the B2+ level of the Common European Framework of Reference for Languages (English) concerning the field of study and the academic environment, in particular when going to a scientific conference and on internship.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K7_K02] correctly identifies professional problems and is able to define the priorities and hierarchy using knowledge in solving problems	The student correctly identifies professional problems in terms of CFD calculations. He/she is able to prioritise and hierarchise successive stages of model preparation for calculations using previously acquired knowledge in an experiment in solving numerical problems.	[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
Subject contents	The content of the course is to learn how to carry out numerical calculations in particular related to heat conduction in biological materials and the conversion of electromagnetic energy into heat. The course content also includes the presentation of results at a foreign conference.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lab classes	60.0%	50.0%
	Presentation of results during the conference	100.0%	50.0%
Recommended reading	Basic 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	
	Supplementary literature	J. Badur: Pięć wykładów ze współczesnej termomechaniki płynów. Gdańsk 2005 https://www.imp.gda.pl/fileadmin/doc/o2/z3/publications/2005_piecwykladow.pdf	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Analysis of physical phenomenon and analysis capabilities in numerical code.Solving engineering problems using advanced commercial tools.Numerical model creation in ANSYS preprocessor - main stepsDiscretisation of the numerical model in the ANSYS preprocessor - types of meshes and their main featuresWays of defining thermal and flow conditions in the ANSYS solverAnalysis of the obtained results of numerical calculations and their interpretationPresentation of results at a conference		
Work placement	Not applicable		

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