



Subject card

Subject name and code	Heat and mass transport, PG_00064824						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject				2024/2025	
Education level	second-cycle studies	Subject group				Obligatory subject group in the field of study 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	1	Language of instruction				English English	
Semester of study	1	ECTS credits				4.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Janusz Cieśliński				
	Teachers		prof. dr hab. inż. Janusz Cieśliński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	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	45		15.0		40.0	100
Subject objectives	Presentation of the theoretical foundations of heat and mass transfer processes. Pointing out the analogy heat and mass transfer processes. Supporting theoretical considerations with examples of calculations						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice	The student demonstrates knowledge of the impact of technology on the understanding of beauty and elegance			[SW2] Assessment of knowledge contained in presentation		
	[K7_U11] communicates and justifies opinions on specialized topics in a manner understandable to diverse audiences, including the use of modern techniques, including information technology	The student is able to explain the choice of calculation procedure			[SU5] Assessment of ability to present the results of task		
	[K7_K12] is ready for fulfilling social commitment and initiation of actions for public interest including entrepreneurial thinking and acting	The student demonstrates knowledge of the relationship between the calculations performed and the consumption of raw materials			[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_W03] demonstrates a well-structured and theoretically grounded knowledge of the key issues in Mechanical Engineering to enable the design and diagnosis of mechanical systems, processes and devices	The student demonstrates knowledge of calculation procedures of the surface area of the heat and mass exchangers			[SW1] Assessment of factual knowledge		
Subject contents	A. Heat transport 1. Conduction, convection, radiation 2. Heat transfer 3. Heat transfer with phase change 4. Heat exchangers B. Mass transport 1. Diffusion, convection 2. Analogy between heat and mass transfer 3. Simultaneous heat and mass transfer						

Prerequisites and co-requisites	Applied thermodynamics, heat transfer		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Numerical exercises	50.0%	50.0%
	Lecture	50.0%	50.0%
Recommended reading	Basic literature	1. Bergman T.L., Lavine A.S., Incropera F.P., Dewitt D.P.: Fundamentals of heat and mass transfer, J. Wiley&Sons, 2011 2. Bird R.B., Stewart W.E., Lightfoot E.N.: Transport phenomena, John Wiley&Sons, 1960 3. Kreith F., Manglik R.M., Bohn M.S., Tiwari S.: Principles of heat transfer, Cengage Learning, 2011	
	Supplementary literature	1. Serth R.W., Lestina T.G.: Process heat transfer, Elsevier, 2014 2. Gupta J.P.: Heat exchanger and pressure vessel technology, Hemisphere Publishing Corporation, 1986	
	eResources addresses	Adresy na platformie eNauczanie: Heat and mass transport - Moodle ID: 43829 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43829">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43829</a>	
Example issues/ example questions/ tasks being completed	1. Diffusion mechanism of heat and mass transport. 2. Equation of conservation of energy and mass. 3. Thermal and concentration boundary layer. 4. Lewis's law 5. Lewis number 6. Peclet's law. Logarithmic mean temperature difference		
Work placement	Not applicable		

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