GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Heat and mass transport, PG_00057434		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2022	Academic year of realisation of subject	2021/2022
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	Part-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Zakład Ekoinżynierii i Silników Spalinowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Dawidowicz	
	Teachers	dr inż. Bartosz Dawidowicz dr inż. Paweł Dąbrowski dr inż. Blanka Jakubowska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	20.0	10.0	0.0	0.0	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	62.0	100

Subject objectives

Presentation of theoretical basics of heat and mass transfer processes.Paying attention to the analogy ofheat and mass transfer processes. Supporting theoretical considerations with examples of calculations.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] possesses a profound knowledge on thermodynamic processes and their simulation, knows simulation methods and programs aiding the design and operation of power generating machines and process equipment, including renewable energy sources, air conditioning and cooling renewable energy sources, air conditioning and cooling	The student knows the procedures for calculating heat and mass flux.	[SW1] Assessment of factual knowledge
[K7_W08] possesses widened knowledge within the range of design methods of hydraulic systems, heating and fluid-flow machines and transport devices	The student knows and understands the mechanisms of heat and mass transport.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U08] is able to design a procedural equipment or device compliant with the specifications using a design aid system in the form of a design documentation, selecting the appropriate model, performing critical analysis with the proper selection of tools and technologies	The student knows the procedures for calculating surface area of heat and mass exchangers	[SU4] Assessment of ability to use methods and tools

Subject contents

A. Heat transfer: 1. Conduction, convection, radiation, 2. Common heat transfer, 3. Heat transfer with phase change, 4. Heat exchangers
B. Mass transfer: 1. Diffusion, convection,2. Analogy between heat and mass transfer, 3. Simultaneous heat and mass tarnsfer

Prerequisites and co-requisites	Applied thermodynamics, heat transfer		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Numerical exercises	56.0%	50.0%
	Lecture	56.0%	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, 4.Serth R.W., Lestina T.G.: Process heat transfer, Elsevier, 2014, 5.Gupta J.P.: Heat exchanger and pressure, Hemisphere Publishing Corporation, 1986.	
	Supplementary literature	1. Brodowicz K.: Wymienniki ciepła i masy, Wydawn. PW, 1980	
	eResources addresses		
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 layers. 4. Lewis law. 5. Lewis number. 6. Peclet's law. Mean log temperature.		
Work placement	Not applicable		