GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Thermal Devices Design, PG_00055512		
Field of study	Mechanical 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	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	dr inż. Paweł Ziółkowski	
	Teachers		

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	30.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	The aim of the course is to present the possibilities of numerical tools for the design of thermal equipment and the collaboration between them

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U03] is able to identify, formulate and develop the documentation of a simple design or technological task, including the description of the results of this task in Polish or in a foreign language and to present the results using computer software or other aiding tools	The student is able to identify a problem or design issue to be performed taking into account the operating conditions of the device. The student is able to formulate and prepare documentation for a simple design task, providing basic dimensions, boundary conditions, powers and other quantitative parameters. The student presents the results of the task in Polish or English both during progress classes and at the end of the project in the form of a results presentation, using computer programs and other tools for the analysis and interpretation of results.	[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment
	[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning	The student is able to design a turbine stage or heat exchanger using basic knowledge of thermodynamics and fluid mechanics, construction and operation of thermal energy devices and process equipment. The student is able to analyze operating parameters and select the appropriate power of thermal devices using classic, nuclear and renewable energy sources. Knows the difference between clockwise and counterclockwise cycle for refrigeration and air conditioning.	[SW1] Assessment of factual knowledge
	[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments	The student has knowledge of the design of machine parts, distinguishing issues related to flow and thermodynamic parameters and their impact on the strength of the structure, and machine details introduced in terms of technology and ease of manufacturing machine parts. The student knows and understands the calculations of basic quantities describing the operation of mechanical systems, such as power, force, efficiency, mechanical and thermal losses. The student knows basic computational methods, including those necessary to analyze experimental results and validate numerical models.	[SW1] Assessment of factual knowledge

Subject contents	Design of selected flow devices e.g.: turbine stages, heat exchangers. Interaction design of individual devices, ability to select boundary conditions and operating range of the component.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Wykład	56.0%	50.0%
	Projekt	56.0%	50.0%

Recommended reading	Basic literature	1. S. Perycz: Turbiny parowe i gazowe, Wydaw. Politechniki Gdańskiej, Gdańsk, 1988 2. J. Madejski: Teoria wymiany ciepła, Wydaw. Politechniki Szczecińskiej, Szczecin 1998.
	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, Whiley, 1988
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Balances necessary for the design of equipment Quantitative and qualitative parameters Threshold conditions Boundary conditions
Work placement	Not applicable