GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00056314		
Field of study	Ocean 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	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Ocean Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Roman Liberacki	
	Teachers	dr inż. Roman Liberacki mgr inż. Dominik Kreft	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	15.0	15.0	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	5.0	50.0	100

Subject objectives

To teach the basic processes and heat flow laws and to teach the structure and principles of the usage of boilers and heat exchangers used on ships.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and systems	The student is able to perform basic calculations in order to select a heat exchanger.	[SU1] Assessment of task fulfilment
[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems	The student has knowledge of the construction and operation of the marine boilers and heat exchangers.	[SW1] Assessment of factual knowledge
[K6_W06] has an organized knowledge on engineering methods and design tools allowing the conducting of projects within the construction and operation of ocean technology objects and systems	Student has knowlege about application of similarity theory in designing of heat exhangers	[SW1] Assessment of factual knowledge

Subject contents

Basic processes and laws of heat flow: conduction, convection, radiation. Convection and overall heat transfer. Properties of materials used in heat exchangers. Conductors and heat isolators. Functioning of coolers, heaters, condensers and evaporators. Construction of heat exchangers: shell- and-tube, plate and others. Determination of heat exchangers surface. Operation of marine steam boilers: fuel fired and exhaust gas boilers. Heat exchange in boilers. Boilers construction. Work safety of boilers and heat exchangers.

Prerequisites and co-requisites

Knowledge trom Thermodynamics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Completation of laboratory tasks	100.0%	50.0%
Written test	50.0%	50.0%

Recommended reading	Basic literature	Balcerski A.: Siłownie okrętowe. Skrypt PG 1990 Górski Z., Perepeczko A.: Okrętowe kotły parowe. Skrypt WSM Gdynia 2002 Górski Z., Perepeczko A.: Okrętowe maszyny i urządzenia pomocnicze. Wyd. TRADEMAR 1998
	Supplementary literature	Pudlik W.: Wymiana i wymienniki ciepła. Skrypt PG 1980 Szargut J.: termodynamika. WN PWN. Warszawa 2000
	eResources addresses	Adresy na platformie eNauczanie: Kotły i wymienniki ciepła, L, OCE, sem.5, zima 23/24 PG_00056314 - Moodle ID: 32570 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32570 Kotły i wymienniki ciepła, L, OCE, sem.5, zima 23/24 PG_00056314 - Moodle ID: 32570 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32570
Example issues/ example questions/ tasks being completed	1. List and briefly describe heat transfer mechanisms.2. Write and explain the Peclet equation3. Explain the difference between fire tube and water tube boilers.4. Determine the heat transfer coefficient of the tested heat exchanger.	
Work placement	Not applicable	