GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00058657		
Field of study	Transport and Logistics		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
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
Semester of study	2	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład Siłowni Okrętowych -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jacek Rudnicki	
	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	0.0	0.0	60

Subject objectives

Introduce students to the technical, economic and environmental aspects of selecting and operating a ship's power system and typical solutions for the structural structure and major components of these systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U04] The student is able to use the known methods and mathematical models, as well as computer simulations to analyze, design and evaluate the functioning of transport systems or their components	Students is able to evaluate the efficiency and reliability of various structural solutions of ship's power system.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K7_K02] The student is aware of the importance of non-technical aspects and the effects of engineering activities, including its impact on the natural environment and the related responsibility for decisions made	Student is able to determine the influence of technical solutions applied in ship power system (e.g. type of main propulsion) on environmental risks.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U06] The student is able to notice their non-technical aspects, including environmental, economic and legal aspects when formulating and solving project tasks. Applies the principles of occupational health and safety	Student is able to find relations between efficiency, reliability and economic aspects of a ship's main propulsion system.	[SU5] Assessment of ability to present the results of task
[K7_U01] The student can obtain information from literature, databases and other, properly selected sources, also in English; is able to integrate the obtained information, interpret it, as well as draw conclusions and formulate and justify opinions	Student is able to use publicly available as well as specialized and dedicated web resources and software in the selection of criteria and comparative analysis of different types of marine power systems.	[SU4] Assessment of ability to use methods and tools
[K7_W02] The student has an extensive knowledge of modeling transport processes, including the knowledge necessary to describe and evaluate the functioning of selected elements of the transport system	Student describes and explains the adequacy of the applied solutions in relation to typical solutions of ship power systems.	[SW1] Assessment of factual knowledge

Subject contents	Lecture: Technical, ecological and economical requirements to ship's energy system. Structure and typical constructional solutions of marine power systems on transportation and special ships - basic elements. Ecological aspects of marine power plant operation. Selected reliability and safety issues of marine power systems - classification supervisions. Project: Comparative technical-economic analysis of typical solutions of main propulsion system and ship's power plant with respect to their configuration and kind of fuel used with special regard to waste heat utilization possibilities
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium	51.0%	60.0%
Project	75.0%	40.0%

Recommended reading

Basic literature	Balcerski A.: Siłownie okrętowe. Podstawy termodynamiki, silniki i napędy główne, urządzenia pomocnicze, instalacje. Wyd. PG 1990 r. Giernalczyk M., Górski Z.: Siłownie okrętowe. Cz. I, Gdynia 2011. Taylor D.a.: Introduction to Marine Engineering. Elsevier Butterworth-Heinemann, Oxford 2003. Urbański P.: Podstawy napędu statku. Fundacja rozwoju AM Gdynia 2005. Urbański P.: Gospodarka energetyczna na statkach, Wyd. Morskie 1978 r. Włodarski J.K.: Podstawy eksploatacji maszyn okrętowych, Akademia Morska, Gdynia 2006 r. Wojnowski W.: Okrętowe siłownie spalinowe. Skypt PG, Gdańsk, Część I 1991, cz. II 1992. Przepisy klasyfikacji i budowy statków morskich PRS, DNV.
Supplementary literature	Basic Principles of Ship Propulsion. MAN Diesel & Turbo. www.manbw.com, Copenhagen, 2020 Górski Z., Perepeczko A.: Okrętowe maszyny i urządzenia Pomocnicze. Wyd. TRADEMAR 1998 r. Van Dokkum K.: Ship Knowledge: A Modern Encyclopedia, Dokmar 2013. Woud H. K., Stapersma D.: Design of propulsion and electric power generation systems. IMarEST, London 2002
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Main ship's power systems - classification, functions. 2. Indicators of ship engine room complex evaluation - constructional and operational. 3. General propulsion efficiency vs. general energy efficiency - interpretation. 4. Typical solutions of propulsion systems on transportation ships. 5. NOx and SOx emission reduction methods. 6. Equipment redundancy in ship power systems.
Work placement	Not applicable