



## Subject card

Subject name and code	Power Management in Transport, PG_00060654						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	first-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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Division of Marine Power Plants -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Jacek Rudnicki				
	Teachers		dr inż. Jacek Rudnicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	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		60.0	125
Subject objectives	Introducing students to issues related to energy sources, examples of energy systems encountered in transport and economic aspects related to the efficiency of energy equipment and systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K03] understands non-technical aspects and effects of activity in the profession of an engineer and its impact on the environment; is aware of the responsibility for decisions made		Student is able to determine the influence of technical solutions applied in ship power system (e.g. type of main ship propulsion) on environmental risks.		[SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U05] can formulate a simple engineering task and its specification in the field of design, maintenance and operation of transport means and systems		The student explains the functioning of the basic elements of the selected, technical energy system. It describes the cooperation of system elements based on operational characteristics. Uses quantitative indicators characterizing the power system.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W04] has well established knowledge in the field of computer science, electronics, automation and control, information technology and computer graphics, useful for understanding the possibilities of applying them in transport		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 power systems.		[SW1] Assessment of factual knowledge		

Subject contents	Lecture: Energy. Types of energy. Renewable and non-renewable sources of energy. Classification of fuels. Energy system. Generation of mechanical, electrical and thermal energy. Efficiency of an energy device and energy system. Methods of improving energy efficiency. Ship power plant as an example of energy system. Influence of the type of cargo carried on the solution of the ship's power system. Basic issues of reliability and safety of selected power systems - classification monitoring. Diagnosis of the technical state of the system components.  Auditorium exercises: Technical and economic comparative analysis of typical solutions of the selected energy system due to their configuration and type of fuel used with particular emphasis on the possibility of waste heat utilization. Operational characteristics of the energy system and its selected elements.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	51.0%	70.0%
	Midterm colloquium	51.0%	30.0%
Recommended reading	Basic literature	Giernalczyk M., Górski Z.: Siłownie okrętowe. Cz. I, Gdynia 2011.  Kaźmierczak J.: Eksploatacja systemów technicznych. Wyd. Politechniki Śląskiej, Gliwice 2000.  Urbański P.: Gospodarka energetyczna na statkach, Wyd. Morskie 1978  Woud H. K., Stapersma D.: Design of propulsion and electric power generation systems. IMarEST, London 2002	
	Supplementary literature	Przepisy klasyfikacji i budowy statków morskich PRS, DNV.	
	eResources addresses	Adresy na platformie eNauczanie: Energetyka w transporcie, W, C, semestr letni 24/25 - Moodle ID: 43739 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43739">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43739</a>	
Example issues/ example questions/ tasks being completed	1. List and make a comparative analysis of renewable and non-renewable energy sources.  2. Calculate the efficiency of a specified energy system.  3. List and describe ways to generate electricity on a ship.  4. Identify the rationale for the use of diesel-electric propulsion systems.  5. Methods of reducing NOx and SOx emissions.		
Work placement	Not applicable		

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