GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00062020		
Field of study	Mechanical and Naval Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	8.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Marine Power Plants -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Zbigniew Korczewski	
	Teachers	dr inż. Dominik Kreft dr hab. inż. Damian Bocheński	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	36.0	0.0	9.0	18.0	0.0	63

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	63	0.0	0.0	63

Subject objectives

Explain the theoretical basis of the construction and operation of selected marine machinery and equipment. Teach the principles of their designing.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W11] has knowledge of analysis, design, technology and manufacturing of selected technical systems, machinery and equipment, metrology and quality control, knows and understands methods of measurement and calculation of basic quantities describing the operation of technical systems, knows basic calculation methods used to analyse experimental results	Student knows basic principles on designing, manufactoring and operation of the main marine machinery and devices.	[SW3] Assessment of knowledge contained in written work and projects
[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	Student is able to identify in terms of construction and parameters the selected marine machinery and devices on the basis of their technical documentation, as well as experimental examination conducted.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U14] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria	Student knows the design and principle of operation of the basic machinery and auxiliary equipment of the engine room.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W08] has a knowledge of the analysis and design of selected technical systems, machines and technical equipment, selection of construction materials, manufacturing and operation, including their life cycle	Student knows calclulation and selection methods within the designing process of the functional systems of the marine power plant.	[SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Lecture: Introductory knowledge: the concept of a machine, device, system and technical system. Pumps: classification, construction, principle of operation, characteristics, capacity regulation, cooperation in pumping systems, cavitation phenomenon, application in ship installations. Compressors: classification, construction, principle of operation, characteristics, cooperation with the network, capacity control, the phenomenon of pumping in centrifugal compressors, application in ship installations. Working media purification devices: filtering, gravitational and dynamic sedimentation (centrifugation). Marine environment protection devices. Heat exchangers. Devices for desalination of sea water (evaporators, osmotic desalination plants). Ship devices for the protection of the marine environment. Ship steering devices (ship power hydraulics). Laboratory: Determination of the characteristics of the centrifugal pump on the laboratory stand of the pump system. Capacity adjustment of the piston compressor. Oil purification at the MAB104 centrifuge station - selection of the selective cover. Study of the plate heat exchanger. Project: Design of a marine pumping system: calculations of tanks and pipelines, selection of components and fittings.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Well-established knowledge of physics, fluid mechanics and the basics of mechanical engineering.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Test</td><td>50.0%</td><td>70.0%</td></tr>
<tr><td>Raports on labs</td><td>100.0%</td><td>10.0%</td></tr>
<tr><td>Design task</td><td>100.0%</td><td>20.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Z. Górski: Ship Machinery and Auxiliary Devices, Volumes I and II, TRADEMAR, Gdynia 2010.(in Polish)

Z. Górski: Construction and operation of marine pumps, TRADEMAR, Gdynia 2010. (in Polish)

Z. Górski: Construction and operation of marine hydraulic devices, TRADEMAR, Gdynia 2008. (in Polish)

Z. Górski: Construction and operation of ship's steering gear, adjustable propellers and stern tubes, (in Polish)TRADEMAR, Gdynia, 2009.

M. Giernalczyk, Z. Górski: Z. Górski: Power plants Cz. 2. Ship installations, Gdynia Maritime University, Gdynia 2016. (in Polish)</td></tr>
<tr><td>Supplementary literature</td><td>H. D. McGeorge, Marine Auxiliary Machinery, Butterworth-Heinemann, UK, 1998.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>A cooperation profile of centrifugal pumps in a series and parallel configuration.

Design the bulk carrier ballast system.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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