GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Introduction to Ship Design, PG_00060537						
Field of study	Naval Architecture and Offshore Structures						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
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	3		ECTS credits		7.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	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		dr inż. Cezary Żrodowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	0.0	0.0	30.0	0.0	75
	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	75		8.0	92.0		175
Subject objectives	Introduction to: 1. Naval architecture and hull structure design theory 2. Practical implementation of the design process 3. Professional vocabulary in Polish and English 4. Most important software tools Implementation of a parametric project at the concept level.						

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 formulate equations of basic design balances, based on descriptive functional requirements.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems	The student knows and implements the ship design process, described by the Evans spiral and hers younger derivatives (V-model)	[SW3] Assessment of knowledge contained in written work and projects
[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	The student is able to choose the appropriate CAD program for the implementation of the indicated phase of the design process, and describe its advantages and disadvantages in relation to other available solutions.	[SW2] Assessment of knowledge contained in presentation
[K6_U01] can obtain information from literature, databases and other sources, can verify and organize the obtained information, interpret them and form conclusions and justified opinions	The student is able to analyze the constrains of the shipping route of the designed vessel, based on independently selected, publicly available sources.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents

Course content – lecture

1. Organization of the maritime industry, activities of IMO and TK, legal aspects of shipbuilding and operation (conventions, local law).
2. Systematics of types of vessels, functional requirements and constrains.
3. Genesis of ship design theory methods and design evaluation criteria
4. Mathematical modelling, idealization of problems and algorithmizing of the methodology of the ship design process.
5. Tools useful to support design work.
6. Iterative nature of the initial design process of ships design spiral stages of parametric and geometric design.
7. Professional terminology used in the Polish shipbuilding industry, defining basic concepts and parameters used in ship design.
8. Principles of ship design calculations, units of measurement, mathematical structural and non-structural models, clear presentation of calculations and charting.
9. Selected physical laws, theoretical and empirical analytical relationships used in the methodology of preliminary design of ships and yachts.
10. Introduction to the issues of determining design solutions that meet the criteria of functionality and technical safety of ships and yachts.
11. Formulation of basic balance equations and design constraints for cargo ships and recreational yachts.
12. Designing the main parameters of the ship on the example of a multipurpose general cargo ship.
13. Principles of dividing the hull interior into compartments.
14. Calculations checking the buoyancy, initial stability and registered tonnage of the designed ship
15. Materials used in hull construction, corrosion and corrosion protection, welded joints
16. Construction of popular ship types
17. Ship hull loads. Stresses in structural elements (local, general and zone strength)
18. Other strength criteria (fatigue life, buckling of structural elements)
19. Construction of particular areas of the hull (bottom, decks, sides, bulkheads, extreme parts of the hull, other selected elements (e.g. foundations))

Prerequisites and co-requisites

Basic ability to use MS Office programs (Word and Excel) and the ability to make a drawing of the General Plan in any CAD program.Knowledge of one of the parametric 3D CAD systems recommended

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	75.0%	50.0%
Written test passing the lecture	50.0%	50.0%

Recommended reading	Basic literature	1. Papanikolaou A.: Ship Design, Methodologies of Preliminary Design, Springer Netherlands, 2014 2. Michalski J.P.: Podstawy teorii projektowania okrętów. Wydawnictwo PG, 2013 3. Staszewski J., Paczesniak J.: Projektowanie Okretów, I, II, III tom, skrypt Politechniki Gdańskiej. 4. Buczkowski L.: Podstaw Budownictwa Okrętowego, I, II, III tom, skrypt Politechniki Gdańskiej. 5. Milewski J.: Projektowanie i budowa jachtów żaglowych. Gdynia 1998
	Supplementary literature	1. Watson D.: Practical ship design , Amsterdam, Elsevier, 1998 2. Schneekluth H.: Ship design for efficiency and economy, London,Butterworths, 1987. 3. Piskorz-Nałecki J.: Projektowanie statków morskich. Szczecin, Wyd. PS, 1982. 4. Semenov I., Sanecka K.: Teoria projektowania statków, Szczecin, Wyd. PS, 2001.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Test: 1. Podaj definicję i nazwę w języku angielskim: owrężą, tonażu rejestrowego, podoblenia. 2. Jaki wpływ ma kształt dziobu na dzielnośc morksą statku? 3. Co projektant może zrobić w przypadku braku/nadmiaru wolnej burty?	
Practical activites within the subject	Not applicable	

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