GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced methods of hull design, PG_00064905						
Field of study	Naval Architecture and Offshore Structures						
Date of commencement of studies	February 2025		Academic year of realisation of subject	2025/2026			
Education level	second-cycle studies		Subject group	Specialty 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	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	5.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Tomasz Hinz				
	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	45.0	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		12.0	38.0		125
Subject objectives	Demonstration of modern ship design methods						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] demonstrates knowledge encompassing selected issues in the field of advanced knowledge, particularly in the scope of methods, techniques, tools, and algorithms specific to Naval Architecture and Ocean Engineering	The student has an in-depth knowledge of advanced ship design methods	[SW1] Assessment of factual knowledge
[K7_U13] evaluates the feasibility and potential for utilizing new technical and technological achievements in accomplishing tasks characteristic for the field of study	The student is able to adopt various design methods for a given task.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_U01] applies acquired analytical, simulation, and experimental methods, as well as mathematical models for analysis and evaluation of shipborne and offshore systems and processes	The student is able to use analytical and simulation methods in the ship design process.	[SU4] Assessment of ability to use methods and tools
[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Naval Architecture and Ocean Engineering, the construction and principles of operation of marine systems, processes and their components, as well as methods and means of their design and operation	Students will be able to discuss complex design procedures and ship systems.	[SW1] Assessment of factual knowledge
[K7_U04] creatively designs or modifies, either entirely or in part, a shipborne or offshore system or process according to a given specification, considering both technical and non-technical aspects, estimating costs and adopting design techniques representative for the field	Students is capable to apply various design methods to the given task.	[SU1] Assessment of task fulfilment
[K7_U02] formulates and tests hypotheses concerning problems related to shipborne and offshore systems/processes, as well as simple research problems	The student is able to explore the possibilities of innovative approaches to ship design	[SU2] Assessment of ability to analyse information

Subject contents

- Top-down approach, including similar ships, regressions and previous projects
- Bottom-up approach, including Design Building Blocks, Packing approach and system-based approaches
- "What-if" scenarios (epoch-era matrix
- Risk Based Ship Design

Prerequisites and co-requisites

Presents a well-established knowledge of the fundamentals of ocean engineering with particular emphasison ship design

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	50.0%	100.0%

Recommended reading	Basic literature	Papanikolaou, Apostolos, ed. Risk-Based Ship Design. Berlin,Heidelberg: Springer Berlin Heidelberg, 2009. https://doi.org/10.1007/978-3-540-89042-3.Ship Design under Uncertainty. PhDThesis, Norwegian University of Science and Technology, 2018.Oers,Bart van, Douwe Stapersma, and Hans Hopman. A 3D PackingApproach for the Early Stage Configuration Design of Ships. In 9thInternational Conference on Computer and IT Applications in theMaritime Industries. Gubbio, Italy, 2010.Papanikolaou, Apostolos, ed. AHolistic Approach to Ship Design: Volume 1: Optimisation of ShipDesign and Operation for Life Cycle. Cham: Springer InternationalPublishing, 2019. https://doi.org/10.1007/978-3-030-02810-7., ed. AHolistic Approach to Ship Design: Volume 2: Application Case Studies.Springer International Publishing,
	Supplementary literature	Papanikolaou, Apostolos. Ship Design Methodologies of PreliminaryDesign. Dordrecht: Springer Netherlands, 2014. https://doi.org/10.1007/978-94-017-8751-2.Roh, Myung-Il, and Kyu-Yeul Lee.Computational Ship Design. Singapore: Springer Singapore, 2018.https://doi.org/10.1007/978-981-10-4885-2.Andrews, David. 100 Things(or so) a Ship Designer Needs to Know. In Day 2 Mon, June 27, 2022,D021S001R001. Vancouver, Canada: SNAME, 2022. https://doi.org/10.5957/IMDC-2022-230.Andrews, D.J. A ComprehensiveMethodology for the Design of Ships (and Other Complex Systems).Proceedings of the Royal Society of London. Series A: Mathematical,Physical and Engineering Sciences 454, no. 1968 (January 8, 1998):187211. https://doi.org/10.1098/rspa.1998.0154.Kondratenko,Aleksander, and Pentti Kujala. A Framework for Multi-ObjectiveOptimization of Arctic Offshore Support Vessels, A Risk-BasedApproach to Optimal Margins in Ship Design. PhD Thesis,MASSACHUSETTS INSTITUTE OF TECHNOLOGY, 2002.Mermiris,Georgios Apostolou. A RISK-BASED DESIGN APPROACH TO SHIPSHIP COLLISION. PhD Thesis, Universities of Glasgow andStrathclyde, 2010.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Conduct and present selected design calculations.	
Work placement	Not applicable	

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