GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced Methods of Hull Design, PG_00070356		
Field of study	Naval Architecture and Offshore Structures		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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	4.0
Learning profile	general academic profile	Assessment form	exam
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. Tomasz Hinz	
	Teachers	dr inż. Tomasz Hinz	

Lesson types

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	5.0	20.0	100

Subject objectives

Demonstration of modern ship design methods

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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_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_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
[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

<table>
<tr><td>Subject contents</td><td colspan="2">Course content – lecture
• 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)
• Model Based Systems Engineering</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">Presents a well-established knowledge of the fundamentals of ocean engineering with particular emphasison ship design</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Project</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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,</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Conduct and present selected design calculations.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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