



Subject card

Subject name and code	Ship Resistance and Stability, PG_00060539						
Field of study	Naval Architecture and Offshore Structures						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		Optional 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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		9.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Zakład Projektowania Okrętu -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Przemysław Krata				
	Teachers		mgr inż. Katarzyna Warnke-Olewniczak dr inż. Maciej Reichel dr hab. inż. Przemysław Krata dr inż. Michał Krężelewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	30.0	30.0	15.0	0.0	120
	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	120		12.0		93.0	225
Subject objectives	The aim of the course is to provide a solid foundations of knowledge in ship stability, hull resistance and propulsion.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] has knowledge in the field of technical mechanics, fluid mechanics, strength of materials, necessary to understand the basic physical phenomena occurring in ocean engineering		A student gains knowledge of the phenomena relevant to ship stability assessment and contemporary methods for modeling of them.		[SW1] Assessment of factual knowledge		
	[K6_W03] has knowledge of hydromechanics, thermodynamics, machine design, ecology, materials science necessary to understand the principles of construction and operation of ocean engineering facilities and equipment		A student gains knowledge of the phenomena relevant to ship hull resistance and propulsion as well as the contemporary methods for modeling of them.		[SW1] Assessment of factual knowledge		
	[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		A student is able to assess the stability of an intact ship and determine the hull resistance for design purposes and select a proper screw propeller.		[SU1] Assessment of task fulfilment		

Subject contents	<p>Equilibrium of a free-floating vessel.</p> <p>Measures of initial stability of a ship; determination of small static angle of heel.</p> <p>Static stability at large angles of heel; determination of large static angle of heel.</p> <p>Dynamic stability of a ship; determination of dynamic heel angle.</p> <p>Effects of suspended loads and free surfaces of fluids on ship stability.</p> <p>Intact ship stability assessment based on prescriptive criteria.</p> <p>Longitudinal forces on a ship sailing with a steady course.</p> <p>Components of hull resistance.</p> <p>Methods of determination of hull resistance.</p> <p>Theory behind screw propellers.</p> <p>Ship screw propellers characteristics.</p> <p>Propeller selection for a vessel with given characteristics.</p> <p>Design of screw propellers.</p>		
Prerequisites and co-requisites	<p>Background of physics and mathematics.</p> <p>Well-established in the basics of ship hydrostatics.</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	50.0%	100.0%
Recommended reading	Basic literature	<p>Ruponen P., Principles of Ship Buoyancy and Stability.</p> <p>Derrett D. R., Barrass C. B., Ship Stability for Masters and Mates</p> <p>Rawson K.J., Tupper E. C., Basic Ship Theory.</p>	
	Supplementary literature	<p>Matusiak J., Dynamics of a Rigid Ship - with applications.</p> <p>Lewis, E. V. (ed): Principles of Naval Architecture.</p> <p>Hirdaris, S., Lecture Notes on Basic Naval Architecture.</p>	
	eResources addresses	<p>Podstawowe https://aaltodoc.aalto.fi/handle/123456789/61 - Aalto University textbooks repository Uzupełniające Adresy na platformie eNauczanie: Opór i stateczność okrętu - Moodle ID: 44118 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44118 </p>	

Example issues/ example questions/ tasks being completed	<p>Assess whether a vessel in a given loading condition meets the IS Code criteria.</p> <p>Determine the resistance curve of a given ship's hull.</p> <p>Derive thrust and torque curves for a Wageningen B-series propeller.</p>
Work placement	Not applicable

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