University of Gdańsk

Subject card

Subject name and code	Construction and Stability of a Ship II - laboratory classes , PG_00201113						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Subject group related to practical vocational preparation		
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		1.0		
Learning profile	practical		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Piotr Bekier				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		1.0		9.0	25
Subject objectives	Familiarizing students with the concepts of ship buoyancy, ship stability, hull geometry and structure, and performing calculations related to ship stability and strength						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[HML3-W11] knows and understands, at an advanced level, rules, regulations and procedures related to the carriage of cargo by sea, in particular the physico-chemical characteristics of cargoes accepted on board and the rules for their handling	knows at an advanced level: - theoretical foundations in the field of ship stability; elements of documentation regarding ship structure and stability; - methods for determining the dynamic heel angle on the righting arms curve and the dynamic arms curve; - the influence of water density on the ship's draft	[SW4] test/exam - oral or written [SW3] text preparation/written work
[HML3-W10] knows and understands, at an advanced level, shipbuilding and construction of the ship and systems and equipment, including propulsion systems, as well as the rules of their operation and maintenance	knows at an advanced level: - materials used to build the hull, their basic mechanical characteristics, areas of application and joining technologies, basic hull bonds and their division, hull structure in the area of the bottom, sides, decks, bow, stern, foundations of machines and devices; - concepts of hull equipment and its division, types of selected hull equipment elements, types of steering devices and propulsors, including propellers, the phenomenon of corrosion of materials used for hulls and methods of preventing it during ship operation; - theoretical foundations in the field of ship stability; elements of documentation regarding ship structure and stability	[SW4] test/exam - oral or written [SW3] text preparation/written work
[HML3-U04] is able to use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks	is able to: - use methods for calculating the buoyancy and coordinates of the ship's center of mass; - determine the angle of dynamic heel due to the wind on the dynamic arms curve using the ship's stability documentation; - use the method of determining the influence of free liquid surfaces on the position of the ship's center of mass and its stability; - use the method of determining and checking the overall strength; - determine emergency stability in the event of water ingress into the hull using the assumed mass method or the constant displacement method	[SU4] test/exam - oral or written
[HML3-U05] when identifying, formulating and solving engineering tasks, is able to integrate knowledge from various fields and disciplines and perceive their systemic and non-technical aspects, including ethical aspects	is able to: - determine emergency stability in the event of water ingress into the hull using the assumed mass method or the constant displacement method; - determine the ship's draft in water of different densities using documentation; - determine precisely the ship's displacement, the mass of cargo loaded or unloaded during the ship's operation and plan the loading condition	[SU4] test/exam - oral or written
[HML3-W16] knows and understands engineering standards and norms specific to the field of study, in particular those recommended by IHO and IMO	knows at an advanced level: - concepts of stability criteria, knows stability criteria according to IMO regulations for selected types of ships; - theoretical foundations in the field of ship stability; elements of documentation regarding ship structure and stability	[SW4] test/exam - oral or written [SW3] text preparation/written work

Subject contents	3. SHIP STABILITY AND SUBDIVISION Mass and coordinates of the ship's center of mass, calculation methods. Changes in buoyancy and coordinates of the ship's center of mass after loading, unloading, or shifting cargo. Influence of suspended cargoes, the effect of icing on the change in the position of the ship's center of mass. Transverse metacenter, transverse initial metacentric height. Methods for calculating metacentric height. Calculation of righting arms, the effect of ship shape on righting arms, the effect of the position of the center of mass on righting arms. The effect of free surfaces of liquids on stability, calculation methods. Calculation of the ship's static angle of heel. Heeling of the ship under the influence of an external dynamic heeling moment. Calculation of the ship's trim and draughts at the bow and stern, using hydrostatic data. The effect of seawater density on the equilibrium position and ship's stability. Calculation of ship's displacement based on draught measurements. Test.
Prerequisites and co-requisites	Subject required by the Regulation of the Minister of Infrastructure and Development of February 5, 2014, on framework training programs and examination requirements for deck department seafarers (i.e., Journal of Laws 2023, item 1566): attendance at all classes is mandatory. AMW allows students to make up for up to 20% of excused absences from these classes in a form that enables them to acquire the missing knowledge and skills. Students who have passed the course but, due to absences exceeding 20% of classes or failure to make up for classes in a form that allows them to obtain the missing knowledge and skills, do not receive an entry in the supplement confirming completion of studies recognized at the operational level in coastal shipping.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	50.0%
written stage assignment	51.0%	50.0%

Recommended reading	
Basic literature	1. Dudziak J.: Teoria okrętu. Oficyna morska., 2006
Supplementary literature	1. DERRETT D. R., BARRASS C. B.: Ship stability for Masters and Mates, 2012. 2. DOKKUM VAN K.: Ship Stability. 2010. 3. SEMIKONTENEROWIEC B-354, Stateczność i wytrzymałość wzdłużna statku materiały pomocnicze, 2009.
eResources addresses	
Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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