

Subject card

Subject name and code	Construction and stability of a watercraft (Lecture), PG_00182382						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
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	3		ECTS credits		1.0		
Learning profile	practical		Assessment form		credit		
Conducting unit	Faculty of Oceanography and Geography -> Rector						
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	21.0	0.0	0.0	0.0	0.0	21
	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	21		1.0		8.0	30
Subject objectives	Familiarizing students with the concepts of buoyancy, ship stability, hull geometry and construction, performing calculations related to ship stability and strength.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[HML3-U04] use analytical, simulation and experimental methods to identify, formulate and solve engineering tasks	can: - Determine emergency stability in the event of water ingress into the hull using the assumed mass method or the constant buoyancy method; - Use methods for calculating buoyancy and coordinates of the ship's center of mass; - Determine the angle of dynamic heeling from the wind on the dynamic arm 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; - Apply the method of determining and checking overall strength	[SU4] test/exam - oral or written
	[HML3-U08] independently use the professional literature available in traditional and electronic form, make an assessment, critical analysis and synthesis as well as the correct interpretation of the information obtained	is able to: - Use ship documentation and stability information for the captain; - Check the criteria for initial stability, righting arm curve, and dynamic stability curve according to selected regulations, use the curve of permissible center of gravity elevations, check the stability of the ship when transporting grain; - Read and use ship stability documentation ; perform calculations related to ship stability; assess the ship's loading condition in terms of strength and stability.	[SU4] test/exam - oral or written
	[HML3-W10] shipbuilding and construction of the ship and systems and equipment, including propulsion systems, as well as the rules of their operation and maintenance	knows: - Theoretical foundations in the field of ship stability; elements of documentation in the field of ship construction and stability - Materials used in hull construction, their basic mechanical characteristics, ranges of application and joining technologies, basic hull connections and their classification, hull construction in the bottom area, sides, decks, bow, stern, foundations for machinery and equipment, - Concepts of hull equipment and its classification, types of selected hull equipment elements, types of steering gear and propulsion units, including propellers, the phenomenon of corrosion of materials used for hulls and methods of preventing it during ship operation.	[SW4] test/exam - oral or written

	Course outcome	Subject outcome	Method of verification
	[HML3-U05] when identifying, formulating and solving engineering tasks, integrate knowledge from various fields and disciplines and perceive their systemic and non-technical aspects, including ethical aspects	is able to: Read and use ship stability documentation; perform calculations related to ship stability; assess the ship's loading condition in terms of strength and stability; - 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 varying density using documentation; - Accurately determine the ship's displacement, the weight of cargo loaded or unloaded during ship operation, and plan the loading condition.	[SU4] test/exam - oral or written
	[HML3-W16] engineering standards and norms specific to the field of study, in particular those recommended by IHO and IMO	knows: - Theoretical basics in the field of ship stability; elements of documentation in the field of ship construction and stability; - Concepts of stability criteria, knows stability criteria according to IMO regulations for selected types of ships	[SW4] test/exam - oral or written
	[HML3-W11] 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: - Methods for determining the angle of dynamic trim on the straightening arm curve and dynamic arm curve; - The effect of water density on ship draft; - Theoretical foundations in the field of ship stability; elements of documentation in the field of ship design and stability.	[SW4] test/exam - oral or written

Subject contents	Introductory classes. 1. HULL CONSTRUCTION 1. Classification societies, scope of activity. 2. Hull geometry, main dimensions, fullness coefficients, theoretical hull lines. 3. Basic operational characteristics of a ship. 4. Materials used in ship hull construction, types, rules of use, classification requirements. 5. Classification requirements for watertightness and weathertightness of closures. 6. Hull strength, shear forces, bending moments, torsional moments, hull deflection, local strength. 6. Hull strength, shear forces, bending moments, torsional moments, hull deflection, local strength. 7. Hull strength in rough seas. 2. SHIP KNOWLEDGE 1. Ship maintenance. 2. Hull equipment, cargo hold and between-deck closures, anchoring and mooring devices, chains, ropes, anchor securing, mast steps, masts, booms, and deck cranes, operating principles. 3. Systems: ballast, bilge, ventilation, sounding.		
Prerequisites and co-requisites	This subject is required by the Regulation of the Minister of Infrastructure and Development of 5 February 2014 on framework training programs and examination requirements for deck department seafarers (consolidated text: Journal of Laws of 2023, item 1566): attendance at all classes is mandatory. The Polish Naval Academy allows students to make up up to 20% of excused absences from these classes in a form that allows them to acquire missing knowledge and skills. Students who have passed the course but, due to absences exceeding 20% of classes or who did not make up the classes in a form that allows them to acquire missing knowledge and skills, will not receive an entry in the supplement confirming completion of studies recognized at the operational level in coastal navigation.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	100.0%
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.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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