



Subject card

Subject name and code	Modelling of Structures for Strength Analysis, PG_00045096						
Field of study	Ocean Engineering, Ocean Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
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. Wojciech Puch				
	Teachers		dr inż. Wojciech Puch mgr inż. Leszek Samson				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	45.0	0.0	0.0	45
	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	45		5.0		25.0	75
Subject objectives	Becoming familiar with the formulation of structural computational models of stress state, buckling and frequency of vibrations of structural elements of the hull of the ship; familiarizing themselves with the methods of preparing the data and perform calculations using specialized programs and commercial FEA system.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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		Student analyzes the state of stress, buckling and natural vibrations in beam and rod-shell models of hull structure of the ship.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	[K6_W06] has an organized knowledge on engineering methods and design tools allowing the conducting of projects within the construction and operation of ocean technology objects and systems		Student identifies interactions between the elements hull structure of the ship and with enviroment and formulates boundary conditions.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems		Student identifies the strength phenomena endangering safety of the structure and defines the necessary scope of the structural calculations.		[SW1] Assessment of factual knowledge		
Subject contents	Structural models of strength phenomena in loaded structure: elastic deformations and state of stress; yielding; buckling; fatigue; vibrations; ultimate limit state. Analysis process: identifying of demands, data acquisition, modelling, calculations, displaying and interpreting results, report. Finite Element model building: identyfication of strength phenomena and their parameters, assumptions and simplifications, geometric model, boundary conditions, meshing. Solving the model: methods, interpretation of messages. Results: visualization, quality inspection and verification. Report: common rules, contents, demands of Classification Societes. Exercises: Stress analysis of shells and stiffened panels. Buckling of panels. Modal analysis of ship hull.						

Prerequisites and co-requisites	Basic technical English. Basics of Strength of Materials. Basics of Finite Element Analysis.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports	56.0%	80.0%
	Test	0.0%	20.0%
Recommended reading	Basic literature	1. Introductions to exercises accessible in student" computer network in folder "wspolny". 2. O.C.Zienkiewicz, R.L.Taylor, J.Z.Zhu: The Finite Element Method: Its Basis and Fundamentals. Elsevier, 2005. 3. P.M.Kurowski, Finite Element Analysis for Design Engineers, SAE International, 2004.	
	Supplementary literature	1. R.D.Cook, Finite Element Modeling for Stress Analysis. Wiley, 1995. 2. V.Adams, A.Askenazi, Building Better Products with Finite Element Analysis. OnWord Press, 1999.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Stresses in double bottom primary supporting members, beam model. Stresses in stiffeners and primary supporting members of stiffened panel, shell model.		
Work placement	Not applicable		