GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00056290		
Field of study	Ocean Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	5	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Faculty of Ocean Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Bogdan Rozmarynowski	
	Teachers	dr inż. Wojciech Puch dr hab. inż. Bogdan Rozmarynowski mgr inż. Paweł Bielski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	15.0	0.0	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	15.0	60.0	150

Subject objectives

Student learns methods of internal forces and stress analysis of ship structure elements and can apply its in numerical examples. Student should known methods of stregth calculations and stability analysis of ship structure elements. Student learns basis of finite element method and its applications.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student identyfies, classyfies and defines events related to ocean engineering facilities and systems. The student is able to use mathematical knowledge related to static and dynamic solutions of structural models	[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	The student has the knowledge to use beam and plate strength models to solve the problem of the analysis of the structure of an ocean engineering facility.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U06] in compliance with a formulated specification and with the aid of appropriate tools and methods, is able to complete a simple engineering task within the range of design, construction and operation of ocean technology objects and systems	The student has the skills to apply beam, disk and plate strength models to solve the problem of analysis of the structure of an ocean engineering facility, using available computer programs, e.g. RARUS	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents

1. Classification of structure elements
2. Elements of theory of discs, plates and shells: rectangular disc, boundary conditions, internal forces, stress and strain states; rectangular plates, internal forces, stress and strain states, fundamental differential equation, boundary conditions; shells, internal forces, boundary conditions, stress state, methods of static analysis.
3. Ship structure elements interaction: effective width.
4. Stability: types of instability points; beams; plates.
5. Fundamentals of finite elements method: introduction; statics, rod systems, beams, plates and shells; stability; free and enforced harmonic vibrations.
6. Ship structure vibration: enforcements; shear and inertia effects.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basic knowledge of strength of materials.
Basic knowledge of finite element method.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Lecterure test</td><td>25.0%</td><td>40.0%</td></tr><tr><td>Lab reports</td><td>10.0%</td><td>20.0%</td></tr><tr><td>Test</td><td>25.0%</td><td>40.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Z.Dyląg, A.Jakubowicz, Z.Orłoś: Wytrzymałość Materiałów, WNT, 1983.
2. S.P.Timoshenko, S.Woinowsky-Krieger: Teoria płyt i powłok, Arkady 1962.
3. S.P.Timoshenko, J.M.Gere: Teoria stateczności sprężystej, Arkady, 1963.
4. Z.Kacprzyk, G.Rakowski: Metoda Elementów Skończonych, Politechnika Warszawska, 2005.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">The Instruction of program RARUS (in Polish).</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:
Mechanika konstrukcji okrętu (PG_00056290), W, sem5, Istop, 2024-2025 - Moodle ID: 40943
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40943</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">The strength calculation of the bottom using the model of beam on elastic foundation.
The strength calculations of the shell plating of the watertight bulkhead.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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