GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Strength of Materials, PG_00060536		
Field of study	Naval Architecture and Offshore Structures		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	3	ECTS credits	8.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Zakład Mechaniki Konstrukcji Oceanotechnicznych -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Mikulski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	30.0	15.0	0.0	0.0	90

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	90	9.0	101.0	200

Subject objectives

The aim of the course is to provide theoretical foundations of mechanics and strength regimes of one-dimensional structures (rods, beams). Student after the course should be able to:

- determine the distributions of internal forces and moments
- determine the stress distribution,
- calculate the displacements of one-dimensional structures,
- indicate the place of the greatest material effort at typical structure loads,
- calculate the effort of material using a variety of strength material hypothesis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student acquired knowledge about the construction of various structural elements and devices, which will enable the conscious operation of ocean engineering facilities and devices.	[SW3] Assessment of knowledge contained in written work and projects [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	The student is able to perform strength analyses of structure elements and ship equipment.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[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	The student has acquired skills troubleshooting law-based technology mechanics and basic analysis strength of materials.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	1. Basics assumptions and description of the Strength of Materials problems. 2. State of stress and strain: general state of stress and strains, plane stress and plane strain states. Physical relationships between stresses and strains. Hooke's law. 3. Axial tension and compression of the rod. 4. The internal forces. Statically determinate structures: beams , trusses and frames. Cross-sectional axial forces, shear forces, bending moments, torsional moments. 5. Moments of inertia of plane figures. 6. Bending of beams. 7. Torsion of monolithic and thin-walled bars. 8. Eccentric tension (compression) of the bar. 9. Shear stresses in bending problems. 10. Bending line of beam. Euler's equation. 11. Buckling of axially compressed rods. 12. Strength hypothesises. Complex stress problems.
Prerequisites and co-requisites	The student has passed the following subjects: - General Mechanics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exercise	50.0%	50.0%
laboratory	50.0%	20.0%
exam	50.0%	30.0%

Recommended reading

Basic literature	1. Hibbeler R.G.: Mechanics of materials, Prentice-Hall Int. Inc., 1994, ISBN 0-13-207028-6 2. Hibbeler R.G.: Statics and mechanics of materials, Prentice-Hall Int. Inc., ISBN 0023540915 3. Crayg Roy. R, Jr.: Mechanics of materials, John Willey & Sons, 1996, ISBN 0-471-50284-7 4. Beer F.P., Johnston E.R.: Mechanics of materials, Mc Graw-Hill Book Company, ISBN 0-07-004284-5 5. Ugural A.C., Fenster S.K.: Advanced Strength and Applied Elasticity, 1995, ISBN 0-13-137589-X 6. Muvdi B.B., McNabb J.W.: Egineering Mechanics of Materials, Macmillan Publ. Comp. 1984, ISBN 0-02385770-6 7. Popov E. P.: Introduction to mechanics of solids, 1968, Prentice-Hall Int. Inc., Library of Congress Catalog Card Number 68-10135 8. Gould L. Ph.: Introduction to Linear Elasticity, Springer-Verlag, 1983, ISBN 0-387-90876-5
Supplementary literature	no data available
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	What differs plane state of stresses of the plane state of strains? What determines elongation of the axially tensioned rod? In which case there is a beam skew bending problem? Describe and review strength hypotheses. What determines the critical force of the compressed rod?
Work placement	Not applicable