



Subject card

Subject name and code	Technical mechanics I, PG_00056151						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2021/2022		
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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
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. Tomasz Mikulski				
	Teachers		dr hab. inż. Bogdan Rozmarynowski dr hab. inż. Tomasz Mikulski mgr inż. Pawel Bielski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Mechanika techniczna I, C (PB), TiL, sem. 2, letni 21/22, (PG_00056413) - Moodle ID: 22638 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22638						
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	60		10.0		55.0	125
Subject objectives	Knowledge and understanding of the problems of statics, kinematics and dynamics of the material point, the system of particles and rigid bodies.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task		The student is able to perform mechanical analyzes of behavior of structural system components and marine equipment		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task		
	[K6_W02] has a basic knowledge in physics, including technical mechanics, fluid mechanics, solid-state physics, optics and acoustics necessary to understand basic physical phenomena occurring in transport		The student acquired the skills of solving technical problems found in transport based on the basic laws of mechanics.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>STATICS: Force projection on to an axis. Moment of a force about a point and an axis. Parallel shifting of a force, reduction of a set of forces. Equilibrium conditions and equations for a plane and space rigid body systems. Reactions of a simply supported beam loaded with generalized forces. Centers of gravity of solid, flat and linear systems. Determination of internal forces in flat truss systems. Resistance forces: sliding friction and rubbing of the rope with a roller.</p> <p>KINEMATICS: Kinematics of a material point, track of motion, velocity, acceleration, motion along a straight line, circular track, normal and tangential components of acceleration. Compound motion, absolute and relative motion analyses. Description of the motion of a rigid body. Planar kinetics of a rigid body, temporary center of the rotation, planar mechanisms.</p> <p>DYNAMICS: Dynamics of a particle, direct and inverse problems, differential equations of motion, integration of a planar motion analytical solutions, d'Alembert principle, momentum and angular momentum conservation laws, energy conservation law, constrained motion. Dynamics of a set of particles, equations of motion of the mass center. Dynamics of continuous systems, planar motion of a rigid body, rotation about a fixed axis, moments of inertia, parallel-axis theorem.</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>exercise</td><td>50.0%</td><td>60.0%</td></tr><tr><td>exam</td><td>50.0%</td><td>40.0%</td></tr></table>	Subject passing criteria	Passing threshold	Percentage of the final grade	exercise	50.0%	60.0%	exam	50.0%	40.0%		
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Recommended reading	<table><tr><td>Basic literature</td><td>Hibbeler R.C.: Engineering Mechanics Statics, Dynamics. Prentice Hall 2010.</td></tr><tr><td>Supplementary literature</td><td>Hibbeler R.C.: Statics and mechanics of materials. Prentice Hall 2004.</td></tr><tr><td>eResources addresses</td><td>Mechanika techniczna I, C (PB), TiL, sem. 2, letni 21/22, (PG_00056413) - Moodle ID: 22638 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22638</td></tr></table>	Basic literature	Hibbeler R.C.: Engineering Mechanics Statics, Dynamics. Prentice Hall 2010.	Supplementary literature	Hibbeler R.C.: Statics and mechanics of materials. Prentice Hall 2004.	eResources addresses	Mechanika techniczna I, C (PB), TiL, sem. 2, letni 21/22, (PG_00056413) - Moodle ID: 22638 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22638					
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Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none">1. Reduce the flat system of forces acting on the rectangular shield.2. Determine reactions in a simply supported beam loaded with generalized forces.3. Determine inner forces in flat truss structure.4. Determine the magnitudes of P_{max} and P_{min} for the limit equilibrium state of a block on the sloping row including the combination of cases with the sliding friction.5. Defined is the equation of movement of a material point. Determine the path, speed and acceleration at a given moment t.6. The wheel of radius r is moving with a constant velocity of the center. What is the velocity and acceleration of a circumference point.7. Determine the path equation and the flight range of the fired bullet at a given angle and at a predetermined initial velocity. Ignore the air resistance.8. Determine the mass moments of inertia of the flat system with respect to the given axes.											
Work placement	Not applicable											