



Subject card

Subject name and code	Technical Mechanics 1, PG_00056412						
Field of study	Design and Construction of Yachts						
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		
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	practical 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. Tomasz Mikulski dr inż. Beata Zima					
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						
Mechanika Techniczna I, W,C, PiBJ , sem.2, letni 21/22, (PG_00056412) - Moodle ID: 23070 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23070							
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	8.0	57.0	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	The student is able to recognize mechanics technical to evaluate behavior of layouts construction 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	The student has acquired skills problem solving technical based on the law 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	Subject passing criteria	Passing threshold	Percentage of the final grade
	exercise	50.0%	60.0%
	exam	50.0%	40.0%
Recommended reading	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		
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		