GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Technical Mechanics 1, PG_00056413		
Field of study	Ocean Engineering		
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. Beata Zima dr hab. inż. Tomasz Mikulski 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	0.0	0.0	0.0	60

E-learning hours included: 0.0

Adresy na platformie eNauczanie:
Mechanika techniczna I, WC, Oce, sem. 2, letni 21/22 (PG_00056413) - Moodle ID: 23021
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23021

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_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 ocean technology	The student acquired the skills solving technical problem based on the law mechanics.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[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 recognize the problem of technical mechanics allowing to assess the behavior of structural systems and marine 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

Subject contents	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. 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. DYNAMICS: Dynamics of a particle, direct and inverse problems, differential equations of motion, integration of a planar motion analytical solutions, dAlambert 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.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam	50.0%	40.0%
exercise	50.0%	60.0%

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	Mechanika techniczna I, WC, Oce, sem. 2, letni 21/22 (PG_00056413) - Moodle ID: 23021 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23021
Example issues/ example questions/ tasks being completed	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. Detremine 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. Ignere the air resistance. 8. Determine the mass moments of inertia of the flat system with respect to the given axes.
Work placement	Not applicable