GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechanics, PG_00060638		
Field of study	Transport and Logistics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Mikulski	
	Teachers		

Lesson types

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

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	5.0	60.0	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 well structured knowledge of physics, including technical mechanics, fluid mechanics, solid state physics, optics and acoustics necessary to understand the basic physical phenomena occurring in transport	The student has knowledge of statics, kinematics and dynamics of a material point and a rigid body, analysis of internal forces and reactions in a structure.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K6_U02] can work individually and in a team, communicate using various techniques in a professional environment, as well as document, analyze and present the results of his work; can estimate the time needed to complete a given task	The student identifies, classifies and defines computational tasks illustrating the lecture material in the field of statics, kinematics and dynamics of material points and rigid, non-deformable bodies.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task

Subject contents	Course content – lecture 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	
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.
Practical activites within the subject	Not applicable

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