



## Subject card

Subject name and code	Mechanics I, PG_00039866						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2020/2021	
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				6.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Edmund Wittbrodt					
	Teachers	mgr inż. Katarzyna Pytka prof. dr hab. inż. Edmund Wittbrodt mgr inż. Grzegorz Banaszek					
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 I; M:31691W0; PG_000501; M:31533W0; PG_000502263 - Moodle ID: 11544 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11544">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11544</a>						
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	6.0		84.0	150	
Subject objectives	Theoretical lectures and exercises in technical mechanics						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	<p>[K6_U06] is able to use mathematical and physical models for analysing the processes and phenomena occurring in mechanical devices within the range of material strength, thermodynamics and fluid mechanics</p>	<p>Student describes real systems using physical and mathematical models. Student recognizes meanings: ideal rigid body, dimension-less point, concentrated force. Student presents basic Newton's principles, primitive notions and axiom's of mechanics. Student differentiates equilibrant forces; systems. Student characterizes the resultant force and the resultant momentum systems of forces. Student describes degrees of freedom, strengths and their reactions, and also statically determinate and indeterminate of systems. Student characterizes conditions of equilibrium of spatial force system, and particular systems: coplanar, concurrent, and parallel. Student defines substitute conditions of equilibrium. Student characterizes types of forces, and their sources, describes active and reactivity forces, as well as external and internal forces. Student characterizes gravity force and coordinates of the centre of gravity. Student describes friction forces, rolling resistance, and belt drive friction. Student characterizes forces in bars of truss. Student recognizes basic meanings of kinematics of point: position coordinates, velocity and acceleration. Student recognizes: vector, Cartesian, normal, and polar co-ordinates of point kinematics. Student characterizes parameters of kinematics of particular systems: linear track motion, circle and ellipse track motion, uniform and uniformly accelerated motion, harmonic motion, crank-shaft system motion</p>	<p>[SU1] Assessment of task fulfilment</p>
	<p>[K6_U01] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion</p>	<p>Student defines substitute conditions of equilibrium</p>	<p>[SU1] Assessment of task fulfilment</p>
	<p>[K6_W04] possesses knowledge on mechanics, including the processes of modelling mechanical systems, statics, kinematics and dynamics of rigid objects and basic knowledge on vibrations</p>	<p>Student describes real systems using physical and mathematical models. Student recognizes meanings: ideal rigid body, dimension-less point, concentrated force.</p>	<p>[SW1] Assessment of factual knowledge</p>
<p><b>Subject contents</b></p>	<p>Students are acquainted with organization of the course, expected knowledge, conditions to complete the course, and suggested literature. Introduction to the subject: historical feature, mechanics and its division. Modeling in mechanics: real system, physical and mathematical models, and also meanings of: ideal rigid body, dimension-less point, concentrated force. The basic Newton's principles, and primitive notions and axioms of mechanics. Equibrant systems of forces. Resultant force of concurrent system of forces. Momentum of pair of forces. Resultant force and resultant momentum of spatial system of forces. Degrees of freedom, strains and their reaction forces. Statically determinate and in determinate systems. Conditions of equilibrium of system of forces, and particular systems: coplanar, concurrent, and parallel. Substitute conditions of equilibrium. Formulas of superposition, and independence of force acting. Forces, and their sources. Division of forces: reactive and active, external and internal. Gravity force and coordinates of centre of gravity. Friction forces, rolling resistance and belt drive friction. Analysis of forces in bars of truss. Basic meanings in kinematics of point: position coordinates, velocity, acceleration, and equations of motion. Description of motion of point in: vector, Cartesian, normal, and polar coordinates. Analysis of kinematics parameters of particular systems: linear track motion, circle and ellipse track motion, uniform and uniformly accelerated motion, harmonic motion, crank-shaft system motion.</p>		
<p><b>Prerequisites and co-requisites</b></p>	<p>Physics and mathematics on the secondary level school, including in particular: geometry, trigonometry, and also vector calculus.</p>		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	56.0%	50.0%
	Written exam	56.0%	50.0%
Recommended reading	Basic literature	Wittbrodt E., Sawiak S.: Mechanika ogólna. Teoria i zadania. Wyd. PG, Gdańsk 2012	
	Supplementary literature	Osiński Z.: Mechanika ogólna. T. I i 2, PWN, Warszawa 1987  Nizioł J.: Metodyka rozwiązywania zadań z mechaniki. WNT, Warszawa 2002  Sawiak S., Wittbrodt E.: Mechanika. Wybrane zagadnienia. Teoria i zadania. Wyd. PG, Gdańsk 2007	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		