



## Subject card

Subject name and code	Mechanics, PG_00038082						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			blended-learning		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Katedra Biomechatroniki -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Łukasz Doliński				
	Teachers		dr inż. Łukasz Doliński				
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: 30.0						
MECHANIKA [2021/22] - Moodle ID: 16941 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=16941">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=16941</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		4.0		36.0	100
Subject objectives	To learn the basic principles of solid mechanics and their practical applications						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U02		Students will be able to solve simple problems in statics and strength of materials independently.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W02		The student determines equilibrium conditions of basic force systems and defines types of stresses		[SW1] Assessment of factual knowledge		
Subject contents	<p>Basic concepts. The axioms of statics. Original concepts: force as a vector, zero two, the theorem on moving the vector along the acting line, resultant of two non-parallel forces in the plane, decomposition of force to the two components of given directions. The principle of action and reaction, types of bonds, equilibrium of convergent set of forces, different sets of forces. Analytical representation of force. Main vector. Conditions of equilibrium of convergent flat and spatial set of forces. Three forces theorem. A pair of forces. Moment of pair of forces. Concatenation of two parallel forces. Pair of forces theorem. Concatenation of pair of forces in one plane. Moment of force with respect to the point and axis. Moment of a force with respect to the point (pole) and axis. Parallel moving forces theorem. Equilibrium of free, planar and spatial set of forces. Reduction of planar and spatial set of forces typical cases. Condition of equilibrium of planar and spatial set of forces. Centre of gravity. Centre of parallel forces. Centre of gravity of solids, plane figures and lines. Friction, static friction, the force of static friction, kinetic friction, string friction, rolling friction. Basic assumptions and hypotheses of the strength of materials, types of loads, deformations and stresses. Elements of elasticity theory. Loads classification. The de Saint-Venant principle. Fundamentals of designing structures. Moments of inertia of planar figures. Tension and compression of straight bars. Technological Shear. Torsion of rods. Bending. Strength. Bending with tension or compression. Bending and torsion. Fatigue strength. Basic concepts of fatigue strength, fatigue strength the cycles of symmetrical and asymmetrical. Factors influencing the change of fatigue strength.</p>						
Prerequisites and co-requisites	Knowledge of basic algebra and trigonometry						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Theory knowledge test		50.0%		50.0%		
	Colloquia during the semester		50.0%		50.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Krawczuk M.: Mechanika ciała stałego wybrane zagadnienia. Wydawnictwo PG, Gdańsk, 2005.</li> <li>2. Niezgodziński T.: Mechniak ogólna. WNT, Warszawa, 2008.</li> <li>3. Misiak J.: Mechanika techniczna. Statyka i wytrzymałość materiałów. WNT, Warszawa, 2006.</li> </ol>
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Bąk.R.,Stawinoga.A.: Mechanika dla niemechaników. WNT, Warszawa 2009.</li> <li>2. Niezgodziński M.E., Niezgodziński T.: Wytrzymałość materiałów. WNT, Warszawa, 2010.</li> <li>3. Osiński Z.: Mechanika ogólna. PWN, Warszawa, 1994.</li> </ol>
	eResources addresses	
Example issues/ example questions/ tasks being completed	Solids Systems of forces Stresses/strains Constitutive equations Torsion Bending Fatigue strength	
Work placement	Not applicable	