GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Theory of mechanisms and machines dynamics, PG_00008954		
Field of study	Mechatronics, Mechatronics		
Date of commencement of studies	October 2020	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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Krzysztof Lipiński	
	Teachers	dr hab. inż. Krzysztof Lipiński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	15.0	0.0	0.0	0.0	30

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

Teoria mechanizmów i dynamika maszyn, PG_00008954 - Moodle ID: 23736
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23736

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	30	5.0	15.0	50

Subject objectives

Familiarize students with the major concepts of the theory of mechanisms and machines. Review of the types of mechanisms. The introduction of the main concepts of structural analysis. Presentation of selected methods used for determining the position, velocity and acceleration. Presentation of methods of dynamics of mechanisms. Introduction to the free and forced vibration of discrete systems.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W04	The student knows the most important concepts of the theory of mechanisms and machines. The student can recognizes the main types of mechanisms. The student can conduct a structural analysis of mechanisms and he can determine their mobility. Student knows the most important concepts and methods of kinematics of mechanisms. The student is able to designate position, speed and acceleration of elements fo mechanisms. The student knows selected concepts and methods of dynamics of mechanisms. Student can determine equations of kinetostatics and determine the associated forces in kinematic pairs. The student is able to determine free and forced vibrations of discrete systems of one and of many degrees of fredom.	[SW1] Assessment of factual knowledge
	K6_U03	The student independently acquires knowledge of the most important concepts of theories of mechanisms i machines. The student can independently conduct a structural analysis of mechanism and he can determine their mobility. Student can designate independently position, speed and acceleration of elements of mechanisms. The student can independently determine equations of kinetostatics and the associated forces in kinematic pairs. The student can independently determine free and forced vibrations of discrete systems of one and of many degrees of fredom.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	K6_U01	the student independently acquires knowledge of the most important concepts of theories of mechanisms and machines. The student can independently conduct an analysis of structural mechanism and determine its mobility. Student can designate independently position, speed and acceleration of of elements of planar mechanisms. The student can independently determine equations kinetostatics and determine associated forces in kinematic pairs. The student can independently determine free vibrations and forced vibrations of discrete systems of one and of many degrees of freedom	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
Subject contents	Elements of machins and mechanisms, open chains, closed kinematic chains, classification of kinematic pairs and kinematical sets. Types of mechanisms – an overview. Structural analysis, mobility of mechanisms - structural equation for mechanisms, degrees of freedom, method used to determine positions, velocities and accelerations of components of mechanisms. The dynamics of mechanisms - kinetostatyki equation, determination of forces in kinematic pairs, differential equations of motion of mechanisms. The solution of equations of motion of the mechanism. Balancing of planar mechanisms - static and dynamic. Free and forced vibration of discrete systems.		

Prerequisites and co-requisites	Mechanics including statics, kinematics, dynamics of mechanical systems. Mathematics including algebra, matrix calculus, differential and integral calculus, linear differential equations.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
final test of the theory	56.0%	50.0%
colloquia with solving practical problems	56.0%	50.0%

Recommended reading	Basic literature	1. Morecki A., Knapczyk J., Kędzior K.: Teoria mechanizmów i manipulatorów WNT 2002 2. Olędzki A.: Podstawy teorii maszyn i mechanizmów. WNT 1978
	Supplementary literature	1. Miller S.; Teoria maszyn i mechanizmów – analiza układów kinematycznych; Oficyna Wydawnicza Politechniki Wrocławskiej; Wrocław 1996 2. Młynarski T., Listwan A., Pazderski E.; Zbiór zadań z teorii mechanizmów i maszyn do analizy kinematycznej mechanizmów; skrypt Politechniki Krakowskiej; Kraków 1992
	eResources addresses	Teoria mechanizmów i dynamika maszyn, PG_00008954 - Moodle ID: 23736 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23736
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	