



COURSE SPECIFICATION

Course code	M#1-S1-ME-406
Course title in Polish	Teoria Maszyn i Mechanizmów
Course title in English	Theory of Machinery and Mechanisms
Valid from (academic year)	2019/2020

GENERAL INFORMATION

Programme of study	MECHANICAL ENGINEERING
Level of qualification	first-cycle
Type of education	academic
Mode of study	full-time
Specialism	all
Department responsible	Department of Mechanics
Course leader	Phd Andrzej Bąkowski
Approved by	

COURSE OVERVIEW

Course type	basic
Course status	compulsory
Language of instruction	English
Semester of delivery	semester 4
Pre-requisites	Engineering Mechanics
Examination required (YES/NO)	NO
ECTS value	2

Mode of instruction	lecture	class	laboratory	project	seminar
No. of hours per semester	15	15			

LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	The student knows and understands the basic principles of building the structure of mechanisms.	MIBM_W08 MIBM_W09
	W02	The student has knowledge of the kinematic analysis of plane mechanisms. He knows the methods: the speed plot and acceleration plot, and the analytical method.	MIBM_W08 MIBM_W09 MIBM_W14
	W03	The student has knowledge of the static and kinetostatic analysis of planar mechanisms. He knows the graphical and graphoanalytical methods.	MIBM_W08 MIBM_W09 MIBM_W14
	W04	The student has knowledge of static and dynamic balancing of plane mechanisms	MIBM_W08 MIBM_W09 MIBM_W14
Skills	U01	Student is able to perform a structural analysis of the mechanism.	MIBM 1_U01 MIBM 1_U07 MIBM 1_U12
	U02	Is able to perform a kinematic analysis of the mechanism, determine the speed and acceleration of individual links and points of the mechanism using graphical and analytical methods.	MIBM 1_U01 MIBM 1_U07 MIBM 1_U12
	U03	Student is able to calculate the balancing force or the balancing moment on the drive link of the mechanism for the given working force or the working moment on the drive link of the mechanism. Can calculate reactions in kinematic pairs. He can determine the efficiency of a mechanism.	MIBM 1_U01 MIBM 1_U07 MIBM 1_U12
Competence	K01	Student understands the need and knows the possibilities of continuous training (2nd and 3rd degree studies, postgraduate studies, courses), aimed at improving professional, personal and social competences.	MIBM 1_K01

COURSE CONTENT

Type of instruction*	Topics covered
lecture	Basic concepts: link, kinematic pair, kinematic chain, mechanism. Classification of kinematic pairs. Structural analysis of mechanisms. Mobility of planar and spatial mechanisms. Classification of flat mechanisms. Passive restraints and local degrees of freedom. Mechanisms of rational construction. Kinematic analysis of plane mechanisms by the relative velocities and relative accelerations method. Analytical method for determining the speed and acceleration of selected points of the flat mechanisms. Kinematic analysis of wheel gears. Static and kinetostatic analysis of mechanisms without friction. Determination of reactions in kinematic pairs. Determination of balancing torque. Sample analysis of the grab mechanism. Static and kinetostatic analysis of mechanisms with friction. Efficiency of mechanisms. Balancing mechanisms.

class	Structural analysis of mechanisms. Determination of mobility of mechanisms. Mechanisms of rational construction. Kinematic analysis of lever mechanisms by the relative velocities and relative accelerations method. Analytical method for determining the speed and acceleration of selected points of mechanisms. Static analysis of mechanisms, determination of the balancing moment without taking into account friction in kinematic pairs. Determination of the inertial forces applied to the links of flat mechanisms. Kinetostatic analysis of planar mechanisms. Balancing the flat mechanisms.
-------	---

*) Please delete rows in the table above that are not applicable.

ASSESSMENT METHODS

Outcome code	Methods of assessment <i>(Mark with an X where applicable)</i>					
	Oral examination	Written examination	Test	Project	Report	Other
W01			X			
W02			X			
W03			X			
W04			X			
U01			X			
U02			X			
U03			X			
K01						X

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	non-examination assessment	<i>The pass mark is a minimum of 50% for the final in-class test.</i>
class	non-examination assessment	<i>The pass mark is a minimum of 50% for all the in-class tests. Project.</i>

*) Please delete rows in the table above that are not applicable.

OVERALL STUDENT WORKLOAD

ECTS weighting							
	Activity type	Student workload					Unit
		L	C	Lab	P	S	
1.	Scheduled contact hours	15	15				h
2.	Other contact hours (office hours, examination)	2	2				h
3.	Total number of contact hours	34					h
4.	Number of ECTS credits for contact hours	1,4					ECTS
5.	Number of independent study hours	16					h

6.	Number of ECTS credits for independent study hours	0,6	ECTS
7.	Number of practical hours	25	h
8.	Number of ECTS credits for practical hours	1,0	ECTS
9.	Total study time	50	h
10.	ECTS credits for the course <i>1 ECTS credit = 25-30 hours of study time</i>	2	ECTS

READING LIST

1. Uicker, J. J., Pennock, G. R., Shigley, J. E., & McCarthy, J. M. (2003). *Theory of machines and mechanisms* (Vol. 3). New York: Oxford University Press.
2. Vinogradov, Oleg. *Fundamentals of kinematics and dynamics of machines and mechanisms*. CRC press, 2000.
3. Khurmi, R. S., and J. K. Gupta. *Theory of machines*. New Delhi: Eurasia publishing house, 2005.