COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S1-ME-305**
	part-time programme:	
Course title in Polish	**Mechanika ogólna II**	
Course title in English	**Engineering Mechanics II**	
Valid from (academic year)	**2024/2025**	

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**first-cycle**
Type of education	**academic**
Mode of study	**full-time programme**
Specialism	**all**
Department responsible	**Department of Mechanics and Heat Transfer**
Course leader	**dr Małgorzata Błasiak**
Approved by	**dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering**

COURSE OVERVIEW

Course type		**programme-specific**
Course status		**compulsory**
Language of instruction		**English**
Semester of delivery	full-time programme	**Semester III**
	part-time programme	
Pre-requisites		
Examination required (YES/NO)		**YES**
ECTS value		**4**

Mode of instruction		**lecture**	**class**	**laboratory**	**project**	**seminar**
No. of hours per semester	full-time programme	**15**	**30**			
	part-time programme					

LEARNING OUTCOMES

Category of outcome	**Outcome code**	**Course learning outcomes**	**Corresponding programme outcome code**
Knowledge	W01	The student has advanced knowledge of mathematics necessary to write and solve dynamic equations in the vibrating, translational and rotational motion of a rigid body.	MiBM1_W01

	W02	Student has organized, theoretically based knowledge of statics, rigid body systems and rigid body kinematics and dynamics.	MiBM1_W02 MiBM1_W12
	W03	Has organized and advanced knowledge of dynamic reactions in rotating bearings necessary to solve technical problems related to mechanics and machine construction.	MiBM1_W02 MiBM1_W04 MiBM1_W11
Skills	U01	The student is able to use the acquired knowledge to solve problems in the field of general mechanics, analyze and synthesize the obtained research results.	MiBM1_U01 MiBM1_U04
	U02	The student is able to use analytical and numerical methods to solve problems in technical physics.	MiBM1_U12
Competence	K01	The student is ready to critically evaluate his/her knowledge and the need to improve professional qualifications (through second- and third-cycle studies, postgraduate studies, vocational courses).	MiBM1_K01 MiBM1_K03
	K02	Is aware of the need to obtain new information by independently supplementing and expanding knowledge of issues related to mechanics.	MiBM1_K01 MiBM1_K03 MiBM1_K04

COURSE CONTENT

Type of instruction lecture	Topics covered
lecture	Mass geometry of a rigid body. Moments of inertia of rigid body. Centrifugal moments. Steiner's theorem. Basics of rigid body kinematics. Classification of solid movements. Multi-stage gears. Plane motion of a rigid body. Description of the linear translational motion of a rigid body. Constant force. Newton's law as a differential equation. Classification of variable forces. Rectilinear translational motion as a result of a force dependent on time and speed. The movement of a body as a result of a position-dependent force. Spring force, damped harmonic oscillator. Kinetic energy and work in translational motion. Potential energy. Power. The principle of the mechanics of the translational motion of a solid. Description of the rotational motion of a solid around a fixed axis. Dynamic equation. Constant torque. Rotational movement of a solid around a fixed axis as a result of a moment of force depending on time, speed and position. Kinetic energy and work in rotation. Moment of momentum. Principles of rotational mechanics. Plane motion of a rigid body. Equations of motion, energy and work in this motion. d'Alembert's principle. Dynamic reactions in rotating bearings.
class	Solving tasks in the scope of the lecture: determining moments of inertia and centrifugal moments, multi-stage gears, translational motion, rotational motion and plane motion of a rigid body, work and energy in translational and rotational motion, harmonic vibrations, principles of translational and rotational mechanics, d' Alembert's principle. Dynamic reactions in rotating bearings.

ASSESSMENT METHODS

Outcome code	Methods of assessment *(Mark with an X where applicable)*					
	Oral examination	Written examination	Test	Project	Report	Other
W01		X				
W02		X				
W03		X				
U01			X			
U02			X			

K01		X				
K02		X	X			

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	examination assessment	Successful completion of the final exam. Obtaining at least 50% of points.
class	non-examination assessment	The pass mark is a minimum of 50% for all the in-class tests

OVERALL STUDENT WORKLOAD

ECTS weighting												
No.	Activity type	Student workload										Unit
		full-time programme					part-time programme					
1.	Scheduled contact hours	L	C	Lb	P	S	L	C	Lb	P	S	h
		15	30									
2.	Other contact hours (office hours, examination)	4	2									h
3.	**Total number of contact hours**	**51**										h
4.	**Number of ECTS credits for contact hours**	**2,0**										ECTS
5.	**Number of independent study hours**	**49**										h
6.	**Number of ECTS credits for independent study hours**	**2,0**										ECTS
7.	**Number of practical hours**	**67**										h
8.	**Number of ECTS credits for practical hours**	**2,7**										ECTS
9.	**Total study time**	**100**										h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**4**										ECTS

READING LIST

1) Leyko J.: *Mechanika ogólna*, tom II, PWN Warszawa 2015.
2) Leyko J, Szmelter J.: *Zbiór zadań z mechaniki ogólnej*, tom I i II, PWN Warszawa 2015.
3) Engel Z., Giergiel J: *Mechanika ogólna* tom II (zbiór zadań z rozwiązaniami). PWN, Warszawa 1990.
4) Giergiel J., Głuch Z., Łopata A.: *Zbiór zadań z mechaniki*, AGH, Kraków 2001
5) Nizoł J.: *Metodyka rozwiązywania zadań z mechaniki*, PWN Warszawa 2019.