COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S1-ME-203**
	part-time programme:	
Course title in Polish	**Mechanika ogólna I**	
Course title in English	**Engineering Mechanics I**	
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 inż. Jan Kyzioł**
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 II**
	part-time programme	
Pre-requisites		
Examination required (YES/NO)		**YES**
ECTS value		**5**

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

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	The student knows and understands the basic principles of interactions between rigid bodies. Understands the phenomenon of friction. Knows the concepts: force, moment of force, couple of forces, moment of couple of forces, constraints, active force, reaction force, internal force, friction force. Has knowledge of the reduction and equilibrium conditions of convergent and arbitrary force systems and methods of determining centers of gravity.	MiBM1_W01 MiBM1_W02
	W02	The student has knowledge of the description of point motion. Knows the concepts: equation of motion, linear velocity and linear acceleration.	MiBM1_W01 MiBM1_W02
	W03	The student knows the methods of measuring basic mechanical quantities, knows the computational methods and IT tools necessary to analyze the experimental results.	MiBM1_W01 MiBM1_W02 MiBM1_W12
Skills	U01	The student is able to determine internal forces and reaction forces in plane and spatial systems of convergent and arbitrary forces, including cases involving friction and rolling resistance, and is able to determine centers of gravity.	MiBM1_U01 MiBM1_U03
	U02	The student is able to determine the velocities and accelerations of a point whose motion is determined by equations in rectangular coordinates or the equation of motion on a track.	MiBM1_U01 MiBM1_U03
	U03	Is able to organize a work station in the laboratory and operate instruments and devices in accordance with the principles of safety, environmental protection, ergonomics and fire protection regulations, and is able to work independently and in a team.	MiBM1_U17 MiBM1_U20
Competence	K01	The student is ready to critically assess 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	The student is aware of the need to obtain new information by independently supplementing and expanding knowledge in the field of mechanics and measurement of mechanical quantities.	MiBM1_K01 MiBM1_K03 MiBM1_K04

COURSE CONTENT

Type of instruction lecture	Topics covered

lecture	Basic concepts of mechanics. Definitions of terms: rigid body, force, force systems, constraints, structure, mechanism. Axioms of statics. Force as a vector. Moment of force about a point and about an axis. Couple of forces. Force systems, reduction of force systems. Reduction and equilibrium conditions of a plane and spatial system of convergent forces. General plane system of forces: reduction and equilibrium conditions. General spatial system of forces: reduction and equilibrium conditions. The phenomenon of friction. Friction force. Rolling resistance. Cable friction. Mechanisms using the phenomenon of friction. Reduction and equilibrium conditions of the system of parallel forces. Center of gravity. Kinematics of a material point. Equations of point motion in rectangular coordinates. Equation of motion of a point on a track.
class	Solving tasks related to: reduction and equilibrium of a plane and spatial system of convergent forces, reduction and equilibrium of general plane system of forces, reduction and equilibrium of any spatial system of forces, friction, friction of cables, rolling resistance, determining the centers of gravity of lines, plane figures and solids. Solving problems in the field of point kinematics: determining the path, velocity and acceleration of a point whose equations of motion are defined in a rectangular coordinate system; determining the speed and acceleration of a point in natural coordinates.
laboratory	Performing 6 laboratory exercises including the following topics: measurement of forces in the rods of a flat truss; measurement of reaction forces in general plane system of forces; determining the coefficient of static and kinetic friction using an inclined plane; studies of the equilibrium of moments of force; experimental determination of the value of the moment of inertia; investigation of free vibrations of a damped linear oscillator.

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		X	
U02			X		X	
U03					X	
K01		X				
K02					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 two in-class tests.
laboratory	non-examination assessment	Positive completion of course reports. The final grade is the arithmetic average.

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	15								
2.	Other contact hours (office hours, examination)	4	2	2								h
3.	**Total number of contact hours**	**68**										h
4.	**Number of ECTS credits for contact hours**	**2,7**										ECTS
5.	**Number of independent study hours**	**57**										h
6.	**Number of ECTS credits for independent study hours**	**2,3**										ECTS
7.	**Number of practical hours**	**94**										h
8.	**Number of ECTS credits for practical hours**	**3,8**										ECTS
9.	**Total study time**	**125**										h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**5**										ECTS

READING LIST

1. Dietmar Gross • Werner Hauger Jörg Schröder • Wolfgang A. Wall Nimal Rajapakse Engineering Mechanics 1 Statics, Springer Science+Business Media Dordrecht 2013
2. R Douglas Gregory Classical Mechanics Cambridge University Press 2006
3. J Wittenburg Kinematics Theory and Applications Springer 2016