

**COURSE SPECIFICATION**

Course code	full-time programme:	M#2-S1-ME-106
	part-time programme:	
Course title in Polish	Fizyka Techniczna	
Course title in English	Technical Physics	
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		basic
Course status		compulsory
Language of instruction		English
Semester of delivery	full-time programme	Semester I
	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	15	15		
	part-time programme					

LEARNING OUTCOMES



Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	The student has structured advanced knowledge of mathematics needed to solve physical problems in the field of mechanical engineering, has knowledge of operations on vectors and derivatives of functions.	MiBM1_W01
	W02	The student has structured advanced knowledge in the field of classical physics, including general principles of physics, physical quantities and their units.	MiBM1_W02 MiBM1_W09
	W03	The student has systematic knowledge of the mechanics of a material point, the laws of electrostatics, current flow and electric circuits, magnetism, thermodynamics and relativistic mechanics	MiBM1_W04
	W04	The student knows at an advanced level the methods of measuring basic physical, mechanical and electrical quantities, knows the computational methods and IT tools necessary to analyze experimental results..	MiBM1_W03 MiBM1_W09 MiBM1_W12
Skills	U01	The student is able to use the acquired knowledge to solve problems in the field of physics, perform measurements of physical quantities, analyze and synthesize the obtained research and measurement results; is able to maintain technical documentation	MiBM1_U01 MiBM1_U02 MiBM1_U04 MiBM1_U11
	U02	The student is able to use analytical and numerical methods to solve problems in technical physics..	MiBM1_U12
	U03	Is able to organize a workplace 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 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 in the field of physical issues and measurement of physical quantities.	MiBM1_K01 MiBM1_K03 MiBM1_K04

COURSE CONTENT

Type of instruction	Topics covered
lecture	History of physics and technology. Dimensions of physical quantities, scalars, vectors, SI system. Kinematics of a material point - kinematic equations of motion. Vector description of motion. Speed as a derivative. Dynamics of a material point. Classical mechanics and relativistic mechanics. Inertial and non-inertial reference frames. Postulates of special relativity. System transformations. The twin paradox. Basic electrical, magnetic and thermal phenomena, ideal gas. Wave motion..





class	Solving problems within the scope of the lecture.
laboratory	Performing 6 laboratory exercises: - determining the viscosity coefficient of liquids based on Stokes' law, - determining the acceleration due to gravity, - determining the density of solids, - thermoelectric phenomena in solids, - resistance measurement using the technical method, - determining the focal length of lenses. Optional: - measurement of the dependence of semiconductor resistance on temperature.

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		X	
U02			X		X	
U03					X	
K01		X				
K02					X	

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	examination assessment	The pass mark is a minimum of 50% for the final in-class test.
class	non-examination assessment	Obtaining at least 50 points for 2 tests.
laboratory	non-examination assessment	Obtaining positive ratings for all reports. The final grade is the arithmetic mean.

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	15	15								
2.	Other contact hours (office hours, examination)	4	2	2								h
3.	Total number of contact hours	53										h





4.	Number of ECTS credits for contact hours	2,1		ECTS
5.	Number of independent study hours	47		h
6.	Number of ECTS credits for independent study hours	1,9		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 <i>1 ECTS credit = 25-30 hours of study time</i>	4		ECTS

READING LIST

1. Halliday D., Resnick R., Walker J.: Podstawy Fizyki. PWN 2015.
2. Orear J.: Fizyka. WNT 2015.
3. Feynman R. P., Leighton R. B., Sands M.: Feynmana wykłady z fizyki. PWN 2019.
4. Błasiak M., Takosoglu J.: Materiały do laboratorium z fizyki, PŚk 2022.

