DESCRIPTION OF THE COURSE OF STUDY

Course code	**0719-2ID-C12-FZ1**	
Name of the course in	Polish	**Fizyka 1**
	English	**Physics 1**

1. LOCATION OF THE COURSE OF STUDY within the system of studies

1.1. Field of study	**Data Engineering**
1.2. Mode of study	**Full-time**
1.3. Level of study	**First-cycle engineering studies**
1.4. Profile of study*	**General academic profile**
1.5. Person/s preparing the course description	**Łukasz Jabłoński**
1.6. Contact	**l.jablonski@ujk.edu.pl**

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	**Polish**
2.2. Prerequisites*	**None**

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. **Form of classes**		**Lecture, tutorial**
3.2. **Place of classes**		**Classes in UJK teaching rooms**
3.3. **Form of assessment**		**Lecture – exam; Tutorial – graded credit**
3.4. **Teaching methods**		**Lecture – multimedia presentation, discussion; Tutorial – problem solving, discussion**
3.5. **Bibliography**	**Required reading**	**1. A.K. Wróblewski, J.A. Zakrzewski, *„Wstęp do fizyki”* (*Introduction to Physics*), PWN, Warszawa, 1981** **2. D. Halliday, R. Resnick, J. Walker, *„Podstawy fizyki”* (*Fundamentals of Physics*), PWN, Warszawa, 2015** **3. W. Moebs, *„Fizyka dla szkół wyższych”* (*University Physics*), OpenStax Polska, available online: https://openstax.pl/podreczniki** **4. J. Walker, *„Zbiór zadań”* (*Collection of Problems*), 2017**
	Further reading	**R.P. Feynman, *„Feynmana wykłady z fizyki”* (*The Feynman Lectures on Physics*), PWN, Warszawa, 2004**

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1 Course objectives ***(including form of classes)***

Lecture:

C1. Understanding the mathematical description of motion.
C2. Understanding the concept of force, Newton's laws, and motion under force.
C3. Understanding conservation laws for systems of bodies.
C4. Understanding rotational and harmonic motion.
C5. Understanding macroscopic description of thermodynamic systems and laws of thermodynamics.
C6. Understanding the kinetic theory of gases.
C7. Understanding phase transitions and energy transport phenomena.

Tutorial:

C1. Developing skills in mathematical description and interpretation of physical phenomena.
C2. Developing skills in solving basic problems in classical physics.

4.2 **Detailed syllabus** ***(including form of classes)***

Lectures, tutorials:

1. Reference frames (Cartesian, spherical). Scalars and vectors. Derivative and integral in physics.
2. Motion of a particle – position, displacement, velocity, acceleration. Equation of motion.
3. Newton's laws of motion. Mass and inertia. Inertial and non-inertial frames.
4. Motion at high speed: Lorentz vs. Galilean transformation.
5. Work and kinetic energy. Conservative and non-conservative forces. Potential energy.
6. Momentum. Conservation of energy and momentum. Center of mass.
7. Rotational motion. Kinetic energy of rotation. Moment of inertia. Steiner's theorem.
8. Dynamics of rigid bodies. Work and energy in rotational motion.
9. Harmonic motion. Energy and pendulum motion.
10. Thermodynamic equilibrium. Zeroth law, temperature, heat, thermal expansion.
11. Heat transfer mechanisms. Specific heat. Phase transitions.
12. Kinetic theory of gases. Molecular model. Equipartition of energy. Velocity distribution.

13. First law of thermodynamics. Work, heat, internal energy. Thermodynamic processes. 14. Reversible and irreversible processes. Heat engines. Second law. Carnot cycle. Entropy.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of **KNOWLEDGE:**		
W01	Knows and is able to explain selected issues in classical mechanics, translational, rotational and harmonic motion. Knows and is able to explain selected issues in phenomenological thermodynamics and the kinetic theory of gases.	ID1A_W03 ID1A_W04 ID1A_W12
W02	Knows the mathematical apparatus and the applications of the laws of physics in selected areas of classical mechanics, translational, rotational and harmonic motion, phenomenological thermodynamics, and the kinetic theory of gases for describing phenomena in the surrounding world.	ID1A_W03 ID1A_W04 ID1A_W12
within the scope of **ABILITIES:**		
U01	Is able to apply the mathematical apparatus to solve simple problems in physics within the scope of classical mechanics, translational, rotational and harmonic motion, phenomenological thermodynamics, and the kinetic theory of gases.	ID1A_U01 ID1A_U02
U02	Is able to describe qualitatively and quantitatively physical phenomena in the surrounding world, based on knowledge of selected issues in physics.	ID1A_U02 ID1A_U03
U03	Is able to use indicated sources of knowledge and to acquire new ones; understands the need for continuous self-education.	ID1A_U11
within the scope of **SOCIAL COMPETENCE:**		
K01	Is responsible for the reliability of the results of their work and acts in accordance with ethical principles. Is able to define priorities necessary for the accomplishment of a task.	ID1A_K01 ID1A_K02

4.4. **Methods of assessment of the intended learning outcomes**

Teaching outcomes *(code)*	Method of assessment (+/-)																				
	Exam oral/written*			Test*			Project*			Effort in class*			Self-study*			Group work*			Others* e.g. standardized test used in e-learning		
	Form of classes			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*			Lecture, tutorial		
	L	*C*	..	*L*	*C*	..	*L*	*C*	..	*L*	*C*	..	*L*	*C*	..	*L*	*C*	..	*L*	*C*	..
W01	+																				
W02	+																				
U01					+						+										
U02					+						+										
U03					+						+										
K01										+	+										

**delete as appropriate*

4.5. **Criteria of assessment of the intended learning outcomes**

Form of classes	Grade	Criterion of assessment
lecture (L) (including e-learning)	3	Achievement of <50–60)% of the requirements specified in the assessment methods
	3,5	Achievement of <60–70)% of the requirements specified in the assessment methods
	4	Achievement of <70–80)% of the requirements specified in the assessment methods
	4,5	Achievement of <80–90)% of the requirements specified in the assessment methods
	5	Achievement of <90–100)% of the requirements specified in the assessment methods
classes (C)* (including e-learning)	3	Achievement of <50–60)% of the requirements specified in the assessment methods
	3,5	Achievement of <60–70)% of the requirements specified in the assessment methods
	4	Achievement of <70–80)% of the requirements specified in the assessment methods
	4,5	Achievement of <80–90)% of the requirements specified in the assessment methods
	5	Achievement of <90–100)% of the requirements specified in the assessment methods

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload	
	Full-time studies	Extramural studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	***75***	
*Participation in lectures**	*30*	
*Participation in classes, seminars, laboratories**	*45*	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	***50***	
*Preparation for the classes, seminars, laboratories**	*25*	
*Preparation for the exam/test**	*25*	
TOTAL NUMBER OF HOURS	***125***	
ECTS credits for the course of study	***5***	

delete as appropriate

Accepted for execution *(date and legible signatures of the teachers running the course in the given academic year)*

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