DESCRIPTION OF THE COURSE OF STUDY

Course code	**0719-2ID-C20-F2**	
Name of the course in	polskim	***Fizyka 2***
	angielskim	***Physics 2***

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
1.5. Person/s preparing the course description	Dr inż. Paweł Jagodziński
1.6. Contact	pawel.jagodzinski@ujk.edu.pl

2. **GENERAL CHARACTERISTICS OF THE course of study**

2.2. Język wykładowy	English
2.3. Wymagania wstępne	Mathematics: vectors, differential and integral calculus, a physics course in mechanics

3. **DETAILED CHARACTERISTICS OF THE COURSE OF STUDY**

3.1. **Form of classes**		Lectures, seminars
3.2. **Place of classes**		Classes held in UJK teaching rooms (on campus)
3.3. **Form of assessment**		exam(lecture), passing with a note (seminar)
3.4. **Teaching methods**		lecture - seminar lecture, seminar - group discussion, subject exercises
3.5. **Bibliography**	**Required reading**	1. D. Halliday, R. Resnick, „Principles of Physics”,John Wiley & Sons Inc 2. W. Moebs, University Physics, OpenStax Polska, available online: https://openstax.pl/podreczniki
	Further reading	1. R. P. Feynman, „Feynman lectures of Physics”, Basic Books, 2013

4. **OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES**

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

Lecture:

C1. To understand the fundamental laws and concepts of electromagnetism and their significance for the analysis and modeling of physical processes relevant to information technologies.

C2. To learn the physical quantities describing electromagnetic fields, waves, and light, and to understand their applications in data processing and imaging.

C3. To learn about the electrical and magnetic properties of matter and examples of their use in computational technologies and data processing systems.

C4. To understand the wave nature of light and the basics of classical and geometrical optics as the foundation of modern methods of information acquisition and analysis.

C5. To become familiar with the fundamentals of relativity theory, quantum mechanics, and atomic physics as the source of modern computational technologies and methods of information analysis.

Seminar:

C1. To practice solving quantitative problems in electromagnetism, optics, and modern physics in order to develop analytical competencies.

C2. To develop the ability to interpret computational results in the context of practical applications in data analysis and processing.

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

Lecture, Seminar:

Point charges, Coulomb's law, principle of superposition of fields. Electrostatic field and potential, field lines and equipotential surfaces. Gauss's law. Electrostatics in a medium. Steady electric current and Ohm's law. Magnetostatics. Biot–Savart and Ampère's laws. Magnetic properties of matter. Faraday's law of induction, electric generator and motor. Maxwell's four equations. Electromagnetic waves. Wave classification. Interference, diffraction, and reflection of waves. Huygens' principle. Light as a wave. Diffraction and polarization of light. Fundamentals of geometrical optics. Elements

of the theory of relativity. Elements of quantum mechanics. Elementary particles and atomic nuclei. Atoms and molecules. Structure of macroscopic matter.

4.3. **Przedmiotowe efekty uczenia się**

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	Knows the laws of electromagnetism and can explain their significance for the description and analysis of physical processes, as well as recognize analogies between these laws and methods of information processing.	ID1A_W03 ID1A_W04
W02	Knows wave and optical phenomena and can identify their practical applications in information technologies and data analysis systems..	ID1A_W03 ID1A_W04
W03	Knows the concepts and laws of modern physics, including phenomena related to the interaction of electromagnetic radiation with matter, and recognizes their significance for the development of computational technologies and modern methods of information processing and data analysis.	ID1A_W03 ID1A_W04
within the scope of ABILITIES:		
U01	Can analyze and interpret phenomena of electromagnetism and modern physics and to explain their applications in information technology and data analysis..	ID1A_U02 ID1A_U09
U02	Canplan and carry out research and calculations concerning the physical phenomena covered by the course, and to analyze the obtained results in the context of applications in data engineering.	ID1A_U02 ID1A_U09
within the scope of SOCIAL COMPETENCE:		
K01	Is responsible for independently planning and organizing work and completing tasks, using various sources, assessing their reliability, and critically interpreting the obtained results in the context of practical applications in data engineering.	ID1A_K01

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*					
	Form of classes			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*					
	L	*C*	...	*L*	*C*	...	*L*	*C*	...	*L*	*C*	...	*L*	*C*	...	*L*	*C*	...			
W01	+																				
W02	+																				
W03	+																				
U01					+						+										
U02					+						+										
K01										+	+										

1. 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 assessment requirements
	3,5	achievement of **<60 -70) %** of the assessment requirements
	4	achievement of **<70 - 80) %** of the assessment requirements
	4,5	achievement of **<80 - 90) %** of the assessment requirements
	5	achievement of **<90 -100> %** of the assessment requirements
classes (C)* (including e-learning)	**3**	achievement of **<50 - 60) %** of the assessment requirements
	3,5	achievement of **<60 -70) %** of the assessment requirements
	4	achievement of **<70 - 80) %** of the assessment requirements
	4,5	achievement of **<80 - 90) %** of the assessment requirements
	5	achievement of **<90 -100> %** of the assessment requirements

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**	30	
*Preparation for the exam/test**	20	
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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