



UNIwersYTET  
IM. ADAMA MICKIEWICZA  
W POZNANIU

## Physics

### Educational subject description sheet

#### Basic information

<b>Study programme</b> Chemia (General Chemistry) <b>Speciality</b> - <b>Organizational unit</b> Faculty of Chemistry <b>Study level</b> First-cycle programme <b>Study form</b> Full-time <b>Education profile</b> General academic		<b>Didactic cycle</b> 2024/25 <b>Subject code</b> 02CENS.12K.01817.24 <b>Lecture languages</b> English <b>Course type</b> Obligatory <b>Block</b> Major subjects	
<b>Subject coordinator</b>	Maciej Kubicki		
<b>Lecturer</b>	Maciej Kubicki, Rafał Górniak		
<b>Period</b> Semester 2	<b>Activities and hours</b> • Lecture: 30, Exam • Laboratories: 45, Graded credit		<b>Number of ECTS points</b> 6

## Goals

Code	Goal
C1	Transfer of knowledge in the field of physics basics.
C2	Development of the ability to describe basic physical phenomena.
C3	Development of the ability to analyze physical phenomena using the acquired knowledge.
C4	Familiarization with the basics of vector calculus.
C5	Development of the ability to perform actions on vectors.
C6	Development of the ability to use literature sources.
C7	Developing communication and teamwork skills.

## Entry requirements

No prerequisites required.

## Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
<b>Knowledge - Student:</b>			
W1	knows and understands basic physical laws.	CEN_K1_W02	Written exam
W2	knows and understands the essence of basic physical phenomena.	CEN_K1_W02, CEN_K1_W03	Written exam
W3	knows and understands the basics of vector algebra.	CEN_K1_W02, CEN_K1_W03	Written exam
<b>Skills - Student:</b>			
U1	can explain the essence of basic physical phenomena.	CEN_K1_U08, CEN_K1_U09	Test
U2	can analyze and predict the course of physical processes.	CEN_K1_U08, CEN_K1_U10	Test
U3	can solve problems using knowledge of vector algebra.	CEN_K1_U08, CEN_K1_U09, CEN_K1_U10	Test
U4	can describe gravitational, electric and magnetic fields and electromagnetic waves.	CEN_K1_U10, CEN_K1_U25	Test
U5	can determine how electric, magnetic and electromagnetic fields interact with matter.	CEN_K1_U08, CEN_K1_U10	Test
U6	can use literature sources.	CEN_K1_U20, CEN_K1_U21	Test
<b>Social competences - Student:</b>			
K1	is ready to solve problem tasks by cooperating with the group.	CEN_K1_K06	Report

## Study content

No.	Course content	Subject learning outcomes	Activities
1.	Basics of classical mechanics.	W1, W2, W3, U1, U2, U6, K1	Lecture, Laboratories
2.	Elements of special relativity.	W1, W2, U1, U2, U4, U6, K1	Lecture, Laboratories
3.	Vibrations and waves in elastic media.	W1, W2, U1, U2, U6, K1	Lecture, Laboratories
4.	Electrical and magnetic properties of matter.	W1, W2, U4, U5, U6, K1	Lecture, Laboratories
5.	Electromagnetic waves.	W1, W2, W3, U3, U4, U5, U6, K1	Lecture, Laboratories
6.	Polarization, interference and diffraction of waves.	W1, W2, W3, U4, U6, K1	Lecture, Laboratories
7.	Elements of wave and geometric optics.	W1, W2, W3, U5, U6, K1	Lecture, Laboratories
8.	Elementary acoustics.	W1, W2, W3, U1, U6, K1	Lecture, Laboratories
9.	Basics of the solid state physics.	W1, W2, W3, U1, U6, K1	Lecture, Laboratories
10.	Radioactivity.	W1, W2, W3, U4, U5, U6, K1	Lecture, Laboratories

## Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues, Discussion
Laboratories	Discussion, Case study, Classes method, Activating method - "brainstorming"

Activities	Credit conditions
Lecture	<p>Components of the final grade:            5 open-ended questions (maximum 50 points)            Assessment from the laboratory (maximum 10 points - bdb 10 points, db + 8 points, db 6 points, dst+ 4 points, dst 2 points)            Grading scale with percentage distribution:</p> <ul style="list-style-type: none"> <li>• Very good (bdb; 5.0): achievement of the assumed learning outcomes by the student at the level of at least 95.0%</li> <li>• Good plus (+db; 4.5): achievement by the student of the assumed learning outcomes in the range of 86.0% - 94.9%</li> <li>• Good (db; 4.0): achievement of the assumed learning outcomes by the student in the range of 76.0% - 85.9%</li> <li>• Sufficient plus (+DST; 3.5): achievement by the student of the assumed learning outcomes in the range of 67.0% - 75.9%</li> <li>• Satisfactory (DST; 3.0): achievement by the student of the assumed learning outcomes in the range of 60.0% - 66.9%</li> <li>• Insufficient (NDST; 2.0): Student failure to achieve the expected learning outcomes score below 60.0%</li> </ul>

Activities	Credit conditions
Laboratories	<p><u>The necessary condition for classification is attendance at a minimum of 60% of classes.</u></p> <p>Components of the final assessment from the laboratory:</p> <p>Knowledge test before each exercise - maximum 5 points, minimum 1 point from the experimental part of the exercise.</p> <p>Evaluation of the exercise report - maximum 1 point.</p> <p>Grade for the exercise - maximum 1 point.</p> <p>Grading scale with percentage distribution:</p> <ul style="list-style-type: none"> <li>• Very good (bdb; 5.0): achievement of the assumed learning outcomes by the student at the level of at least 95.0%</li> <li>• Good plus (+db; 4.5): achievement by the student of the assumed learning outcomes in the range of 86.0% - 94.9%</li> <li>• Good (db; 4.0): achievement of the assumed learning outcomes by the student in the range of 76.0% - 85.9%</li> <li>• Sufficient plus (+DST; 3.5): achievement by the student of the assumed learning outcomes in the range of 67.0% - 75.9%</li> <li>• Satisfactory (DST; 3.0): achievement by the student of the assumed learning outcomes in the range of 60.0% - 66.9%</li> <li>• Insufficient (NDST; 2.0): Student failure to achieve the expected learning outcomes score below 60.0%</li> </ul>

## Literature

### Obligatory

1. Halliday-Resnick-Walker „Fundamentals of physics”, Wiley
2. <https://openstax.org/details/books/university-physics-volume-1>

### Optional

1. <https://www.feynmanlectures.caltech.edu>

## Calculation of ECTS points

Activities	Activity hours*
Lecture	30
Laboratories	45
Preparation for classes	20
Report preparation	30
Reading the indicated literature	10
Preparation for the exam	30
Preparation for the assessment	15
<b>Student workload</b>	<b>Hours</b> 180
<b>Number of ECTS points</b>	<b>ECTS</b> 6

\* academic hour = 45 minutes

## Efekty uczenia się dla kierunku

Kod	Treść
CEN_K1_K06	The graduate is ready to formulate precise questions to deepen his/her own understanding of a topic or to find missing pieces of reasoning
CEN_K1_U08	The graduate can apply mathematical methods in chemical and physicochemical calculations
CEN_K1_U09	The graduate can select and apply statistical methods to describe chemical and physicochemical processes and analyse data
CEN_K1_U10	The graduate can interpret and analyse quantitative descriptions of basic physical and chemical phenomena
CEN_K1_U20	The graduate can use databases to retrieve information needed in the chemist's work
CEN_K1_U21	The graduate can independently obtain information from both Polish and foreign literature, physicochemical tables and other available sources
CEN_K1_U25	The graduate can create a presentation of a specific chemical or physicochemical problem and propose a solution to it
CEN_K1_W02	The graduate knows and understands basic physics and their relationship to chemical laws
CEN_K1_W03	The graduate knows and understands techniques of higher mathematics for the formal description of basic physical and chemical processes