



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elements of Modern Physics

Course

Field of study

Year/Semester

Education in Technology and Informatics

2/3

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

Tutorials

Projects/seminars

30

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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Wydział Inżynierii Materiałowej i Fizyki

Technicznej

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Prerequisites

Basic knowledge of general physics in the field of technical and IT education. The ability to solve elementary problems in general physics based on the acquired knowledge. Understanding the need to expand one's own competences.

Course objective

- Familiarization students with selected issues of modern physics.
- Developing students' skills in analyzing physical phenomena and solving technical problems based on the achievements of modern physics.



Course-related learning outcomes

Knowledge

1. Knowledge of physical concepts within the scope of Elements of Modern Physics course program. - [K1_W02]
2. Knowledge of the laws of physics and their explanations within the scope of the course program and knowledge of the scope of application of these laws. - [K1_W02]
3. Understanding the current state of research advancement and the latest development trends in physics. - [K1_W17]

Skills

1. The application of laws and formulas relating to physical quantities to solve simple problems within the scope covered by the course program. - [K1_U01]
2. Formulating conclusions based on the obtained calculation results. - [K1_U01]
3. Using understanding of the indicated sources of knowledge (list of basic literature) and acquiring knowledge from other sources. - [K1_U01, K1_U02]

Social competences

1. Active involvement in solving given problems. - [K1_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning effect	Form of evaluation	Evaluation criteria	
W02	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
W017	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
U01	test	3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
U02	test	3	50.1%-70.0%
		4	70.1%-90.0%



5 od 90.1%

K01 oral answers during exercises

The student independently seeks a solution based on the acquired knowledge and shows great commitment to solving problems - the student receives an additional point to the result of the test for each presentation of the solution to the problem at the blackboard.

Programme content

1. Elements of relativistic mechanics.
2. Photons and matter waves.
3. Elements of quantum mechanics.
4. The atomic structure of matter.
5. Fundamentals of laser physics.
6. Metals and semiconductors.
7. Applications of semiconductors.
8. Elements of nuclear physics.
9. Elementary particles and the quark model.

Teaching methods

Lecture: multimedia presentation, solving sample tasks on the blackboard.

Exercises: problem solving, practical exercises, discussion, team work.

Bibliography

Basic

1. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, tom 4 i tom 5, Wydawnictwo Naukowe PWN, Warszawa, 2005.

Additional

1. J. Orear, Fizyka, tom 2, Wydawnictwa Naukowo - Techniczne, Warszawa, 2004.

2. J. Massalski, Fizyka dla inżynierów. Część II. Fizyka współczesna, Wydawnictwa Naukowo - Techniczne, Warszawa, 2005.



Breakdown of average student's workload

	Hours	ECTS
Total workload	130	6,0
Classes requiring direct contact with the teacher	65	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	50	2,0

¹ delete or add other activities as appropriate