



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elements of Modern Physics [S1ETI1>EFW]

Course

Field of study

Education in Technology and Informatics

Year/Semester

2/3

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

30

Projects/seminars

0

Number of credit points

6,00

Coordinators

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Lecturers

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

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

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:

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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	6,00
Classes requiring direct contact with the teacher	65	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00