COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1MiKC1>FIZ]

Course

Field of study
Microelectronics and digital communications

Year/Semester
1/1

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
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Hanna Orlikowska-Rzeźnik
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Lecturers

Prerequisites

Basic knowledge of physics and mathematics (core curriculum for secondary schools, basic level). Ability to solve elementary physics problems based on acquired knowledge, as well as the ability to obtain information from specified sources. Understanding the necessity of expanding one's competencies, recognizing the need for learning and acquiring new knowledge.

Course objective

To provide students with basic knowledge of physics within the scope defined by the curriculum relevant to the field of study.

Course-related learning outcomes

Knowledge:
1. The student is able to define basic physical concepts within the scope covered by the curriculum and provide simple examples of their application in the surrounding world - [K_W03]
2. The student is able to formulate and explain fundamental physical laws within the scope covered by the curriculum relevant to the field of study, determine their basic limitations and applicability, and provide examples of their use in describing phenomena in the surrounding world - [K_W03]

Skills:
1. The student is able to analyze fundamental physical phenomena - [K_U04]
2. The student can apply basic physical laws and simplified models to solve simple problems within the scope covered by the curriculum relevant to the field of study - [K_U04]
3. The student is able to effectively use the specified sources of knowledge (list of basic literature) and acquire knowledge from other sources - [K_U04]

Social competences:
1. The student is able to independently expand their knowledge in the subject - [K_K01]
2. The student is aware of the importance of physics knowledge in engineering education - [K_K01]
3. The student can collaborate within a team, fulfill assigned responsibilities, and demonstrate accountability for the team's results - [K_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The acquired knowledge is assessed based on the results of a credit test (mixed format; multiple-choice questions and open-ended questions). The passing threshold is above 50% of the total points.
Laboratories: Credit is awarded based on written reports for each laboratory exercise according to the instructor's guidelines, as well as oral or written answers related to the content of the laboratory exercise. The condition for passing the course is completing at least 85% of all scheduled exercises with a positive grade for answers and reports.

Programme content

The program covers selected topics in electromagnetism, optics, mechanics, and modern physics, with particular emphasis on their applications in electronics and telecommunications.

Course topics

Lecture: applications of physics in electronics and telecommunications, elements of classical physics - kinematics and dynamics (concept of motion, Newton's laws of motion, conservation of momentum and energy), oscillatory motion, thermodynamics (laws of thermodynamics, thermal conductivity), electrostatic and magnetic fields, electromagnetic waves (frequency ranges and their applications in telecommunications), optical phenomena (interference and diffraction), elements of modern physics.
Laboratories: laboratory exercises in electromagnetism, optics, and mechanics, including, among others, determining the relationship between conductivity and temperature for semiconductors and conductors, studying optical emission spectra, and determining the coefficient of linear thermal expansion of solids.

Teaching methods

Lecture: Multimedia presentations, films, experiments, discussions.
Laboratories: Conducting experiments, preparing reports, discussions, reviewing the performed experiments and reports.

Bibliography

Basic:
University Physics:
https://openstax.org/details/books/university-physics-volume-1
https://openstax.org/details/books/university-physics-volume-2
https://openstax.org/details/books/university-physics-volume-3
S. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

Additional:
D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics, Extended, 10th Edition, Wiley and Sons, New York 2014
Materials provided by the lecturer during the semester

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00