COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics

Course

Field of study
Biomedical engineering
Area of study (specialization)
-
Level of study
First-cycle studies
Form of study
full-time
Year/Semester
1/1
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
15
Other (e.g. online)
0
Tutorials
15
Projects/seminars
0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
Dr. Krzysztof Łapsa

Responsible for the course/lecturer:

Prerequisites

The student in begining should have basic knowledge of physics and mathematics at high school level. He should also have the skills to solve elementary problems in physics based on his knowledge, obtain information from specified sources and be willing to cooperate within a team.

Course objective

Providing students with basic knowledge of physics. Developing skills to solve simple physical problems,

perform experiments and analyze measurement results based on knowledge obtained. Self-education and teamwork skills shaped at students.

Course-related learning outcomes

Knowledge

1. is able to define and explain physical concepts to the extent covered by program content and provide examples of their applications in technology.

2. has basic knowledge in the field of physical measurement and analysis of results.

Skills

1. is able to work individually and in a team.

2. has the ability to self-study.

3. can perform simple experiments, interpret obtained results and draw conclusions.

Social competences

1. is able to cooperate within the team and demonstrate co-responsibility for the effects of the work of the team.

2. understands the need and knows the possibilities of continuous training.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: acquired knowledge is verified during a 90-minute written exam (carried out during the exam session) consisting of 8 - 9 open questions, various scores. Passing threshold: 50% of points.

Exercises: acquired knowledge and skills are verified on the basis of two written tests and activity in the classroom. There are a total of 6-7 tasks to be calculated on the tests, variously scored. Passing threshold: 50% of points.

Laboratory exercises: checking the learning outcomes on the basis of oral or written answers regarding the content of the laboratory exercises (50% pass mark) and written reports. The condition of passing the subject is passing a minimum of 85% of all the exercises planned for the student (positive evaluation of responses and reports).

Programme content

Lecture:

1. Classical mechanics: classification of movements; kinematics and dynamics of translational and rotational movement; work; power; energy; conservation rules: energy, momentum, angular momentum.

2. Harmonic movement: free, damped, forced (resonance phenomenon)

3. Wave motion: mechanical waves; basics of acoustics; electromagnetic waves; coherence of waves; phenomena of diffraction, interference and polarization of waves

4. Heat transfer mechanisms (thermal radiation, thermal conductivity, convection)

5. Gravity field with elements of general theory of relativity

6. Electric and magnetic field: electrostatics; electric current; electrodynamics; magnetostatics; electromagnetic induction, Maxwell equations

7. Light, geometric optics

8. Basics of quantum physics: corpuscular properties of light; wave properties of matter; elementary issues of atomic structure.

9. Elements of solid state physics

Tutorials:

Selected issues related to the topic of lectures.

Laboratory exercises:

During the semester, the student performs 6 -7 exercises out of 24 exercise sets on topics from various branches of physics such as mechanics, vibrating motion, wave motion, heat, electromagnetism, optics, modern physics. Analysis of measurement results: linear regression method, normal distribution, arithmetic average, standard deviation, calculation of complex errors, rounding of results, making charts.

Teaching methods

Lecture: multimedia presentation supplemented with demonstrations and examples on the board.

Tutorials: solving tasks, discussion.

Laboratory exercises: performing experiments, solving tasks, discussion, teamwork.

Bibliography

Basic

1. Lecture materials made available to students by the lecturer

2. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN Warszawa 2003

3. S. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

Additional

1. Fizyka dla szkół wyższych – free textbook available on the internet www.openstax.pl

2. C. Bobrowski, Fizyka , PWN PWN 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	62	2,5
Student's own work (literature studies, preparation for tutorials/laboratory exercises, preparation of written reports on laboratory exercises, preparation for tests/exam) [1]	63	2,5

[1] delete or add other activities as appropriate