COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics

Course

Field of study
Power Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	30	
Tutorials	**Projects/seminars**	
0	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. Exam issues and auxiliary materials on the basis of which questions are developed are sent to students by e-mail using the university e-mail system.

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 motion (including: principles of dynamics, principles of energy conservation, momentum, angular momentum); free and forced harmonic vibrations (including resonance phenomenon)

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

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

4. Heat transfer mechanisms

5. Gravity field

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

7. Geometric optics

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

Laboratory exercises:

During the semester, the student performs 13 -14 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. The classes are aimed at: checking in a practical way the learned physical phenomena, learning how to use a variety of measuring apparatus and acquiring the ability to analyze and develop measurement results.

Exercise sets are very diverse thematically and in terms of equipment. Some of them allow the determination of basic constants and physical dependencies, others are focused on the practical aspect of measurements, e.g. determination of the light efficiency of selected light sources, photocell testing. During the course, students can practically use simple measuring instruments, e.g. caliper, micrometer sensor, power supply, multimeter. They also have contact with more advanced devices such as measuring computer sets, oscilloscopes, generators, spectrometers.

Teaching methods

Lecture: lecture with multimedia presentation (including drawings, photos, animations, films) supplemented with examples on the board and demonstrations. The content presented on the slides is sent to students after the lecture by e-mail using the university e-mail system.

Laboratory exercises: exercises are performed in pairs, monitoring students' progress on an ongoing detailed reviews of reports by the laboratory leader, discussion of calculations and conclusions.

Bibliography

Basic

1. Materials for lectures sent 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	137	5,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory, preparation of written reports on laboratory exercises, preparation for tests/exam) [1]	67	2,0

[1] delete or add other activities as appropriate