COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

Course

Field of study

Logistics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

10

Laboratory classes

10

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr Maciej Kamiński

email: maciej.kaminski@put.poznan.pl

tel.: +48 61 6653184

Faculty of Materials Engineering and Technical Physics

ul. Piotrowo 3A 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

A student has basic knowledge of physics, chemistry and mathematics in the field of secondary school; the ability to solve elementary problems of technical process on the basic of their knowledge; the ability to acquire information from recommended sources and be ready to cooperate within a team.

Course objective

The goal of this course is to inform students about basic physical phenomena and their theoretical description on an academic level. Teaching in physical terms to think like an engineer.

Course-related learning outcomes

Knowledge

1. A student has basic knowledge of secondary school (program basis for high school level);

2. He/she has knowledge about the importance of the laws of physics used in industrial technologies [P6S_WG_03].

Skills

1. Knowledge of the basics of experimental physics (high school);

2. The ability to solve elementary physics problems based on his/her knowledge [P6S_UW_03];

3. The ability to obtain information from indicated sources [P6S_UU_01].

Social competences

1. Ability to work in a team;

2. Understanding to increase his/her competences [P6S_KO_02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: the knowledge acquired during the lecture is verified by one 90-minute test in the last lecture. The test consists of 3 open (descriptive) questions and 10 (closed), differently scored. The pass threshold: 50.1% points.

Score:

<50% D

50,1 - 60% C

60,1 - 70% C plus

70,1 - 80% B

80,1 - 90% B plus

90,1 - 100% A

Laboratory: the skills obtained in the laboratory classes are verified on the basis of the results of the exercises performed. Passing laboratory exercises for positive marks (satisfactory minimum) consists in passing at least 85% of all exercises planned for a given semester.

Programme content

Issues discussed during the lecture:

- SI base units;

- Eratosthenes' measurement of the Earth's circumference;

- Newton's laws of motion;

- Galileo Galilei experiment - free fall of bodies of different masses;

- kinematics and dynamics of the material point and rigid body;

- Galileo Galilei experiment - observation of the movement of bodies rolling down from inclined ramp;

- the principles of conservation of energy, momentum and mass;

- Kepler's laws of planetary motion, Solar System;

- potential energy in the homogeneous and central field;

- Galileo Galilei' pendulum experiment;

- electromagnetic waves, geometric and wave optics;

- Newton's experiment - dispersion light using a prism;

- electricity;

- low/high-temperature superconductors;

- basic principles of scanning probe microscopy (scanning tunneling microscope and atomic force microscope);

- highly oriented pyrolytic graphite (HOPG).

Analysis of measurement results in the laboratory:

- classification of uncertainty and measurement errors;

- basic concepts of measurement statistics;

- calculation of arithmetic mean and standard deviation

- counting the partial derivative and the logarithmic derivative for a single measurement;

- principles rounding of arithmetic mean and standard deviation

- the method of linear regression;

- principles of graphical processing of measurement results.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the blackboard.

2. Laboratory classes: presentation illustrated with examples given on the blackboard and performance of exercises designated by the teacher.

Bibliography

Basic

1. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki t 1-5, PWN Warszawa 2004

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

Additional

1. J. Orear, Fizyka, WNT 1990

2. J. Masalski, Fizyka dla inżynierów t.1-2, WNT Warszawa 1980

3.Robert P. Crease, The Prism and the Pendulum: The Ten Most Beautiful Experiments in Science – Random House 2003

4. Rebecca Howland i Lisa Benatar STM / AFM mikroskopy ze skanującą sondą, elementy teorii i praktyki (Park Scientific Instruments) pdf

5. F. Rozpłoch, J. Patyk and J. Stankowski, Graphenes Bonding Forces in Graphite, Acta. Phys. Polon. A Vol. 112, 557-562, 2007

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	10	0,8
Student's own work (literature studies, preparation for laboratory work - preparation of reports from the exercises performed/ preparation for the final test from the lecture - preparation of open and closed questions/ [1]	80	3,2

[1] delete or add other activities as appropriate