COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1EiT1>FIZ]

Course

Field of study
Electronics and Telecommunications

Year/Semester
1/2

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
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
30

Projects/seminars
0

Number of credit points

6,00

Coordinators

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Lecturers

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Prerequisites

A student starting this subject should have basic knowledge of physics and mathematics to the extent specified by the curriculum content appropriate for secondary schools and knowledge of mathematics to the extent specified by the curriculum content for the first semester of studies. The student should have the ability to obtain information from the indicated sources, understand the need to expand his knowledge and be ready to cooperate within a team.

Course objective

Providing students with basic knowledge of general physics, within the scope determined by the curriculum content appropriate to the field of study. Developing students' ability to use and understand popular science sources describing the achievements of modern physics. Developing students' skills in solving simple physical problems and performing simple experiments and analyzing measurement results based on the acquired knowledge. Developing teamwork skills in students.

Course-related learning outcomes

none

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified in the form of a written exam in the form of a test single choice.
The test consists of 30 tasks, for each task there are 4 possible answers and only one answer is correct correct. Each correct answer is worth +5 points, an incorrect answer is worth -1 point, and no answer is worth 0 points. Everyone receives 25 points at the beginning. The maximum possible number of points is 150 and the minimum number of points is 0. The presented scoring requires the student to analyze each task and prevents thoughtless answer choices.
Assessment criteria:
below 50% grade 2.0
50.1%-60.0% rating 3.0
60.1%-70.0% rating 3.5
70.1%-80.0% rating 4.0
80.1%-90.0% rating 4.5
over 90.1% rating 5.0
Sample exam tasks are presented and discussed together after each lecture.
The knowledge acquired during accounting exercises is tested on the basis of two tests,
carried out in the middle and at the end of the semester. Each colloquium consists of 5 accounting tasks, a each task is scored for 5 points. : 5 tasks × 10 points = 50 points. Absence
unexcused during the colloquium = 0 points, bonus for activity at the board: up to 10 points.
Assessment criteria:
below 50% grade 2.0
50.1%-60.0% rating 3.0
60.1%-70.0% rating 3.5
70.1%-80.0% rating 4.0
80.1%-90.0% rating 4.5
over 90.1% rating 5.0
Sample tasks on the basis of which students can prepare for the colloquium will be sent by e-mail using the university e-mail system.
The skills acquired during laboratory classes are verified on the basis of: oral or written answers regarding the theory of a given experiment, correctness of measurements and assessment of the implementation of the laboratory exercise,
a prepared report on the exercise, which includes measurement results, calculations of the values of physical quantities, analysis of measurement errors and formulated conclusions.
Based on the grades obtained, an average grade is calculated for each experience performed.
Passing threshold: obtaining a grade of 3.0.

Programme content

Basic issues that constitute the subject of physics research: dynamics, thermodynamics, electricity and magnetism, optics, modern physics, including quantum physics.

Course topics

Topics covered during the lecture:
1. Classical mechanics, including:
• classification of movements

• kinematics and dynamics of translational motion (including: principles of dynamics, principles of energy conservation and
momentum)
• kinematics and dynamics of rotational motion (including: principles of dynamics, conservation principle angular momentum)
• balance and resilience
• fluids
• free and forced harmonic vibrations (including: resonance phenomenon)
• mechanical waves
• gravitational interactions
2. Thermodynamics, including:
• temperature, 0th law of thermodynamics
• heat and work, 1st law of thermodynamics
• elements of the kinetic theory of gases
• entropy, 2nd law of thermodynamics
3. Electromagnetism, including:
• electrostatics (including Gauss's law)
• electric current
• magnetostatics (including Ampere's law)
• electromagnetic induction (Faraday's law)
• electromagnetic waves (including energy and momentum, polarization)
4. Optics including:
• geometric optics (including the laws of reflection and refraction of light)
• wave optics (including interference and diffraction)
5. Basics of special relativity
6. Basics of quantum physics, including:
• quantum nature of light
• wave properties of matter
The content covered during calculus exercises concerns solving physics problems discussed during the lectures and presented in detail above.
The content carried out in the laboratories concerns the performance of selected experiments in the field mechanics, electromagnetism and optics at the Physical Laboratory of the Faculty of Materials Science and Physics
Technical. There are 8 different exercises in each section. Students perform exercises in teams of two. A list of experiments with their description and useful analysis programs measurement results are posted on the department's website at: https://www.phys.put.poznan.pl/pracowniafizyczna

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given in the presentation and on the board, engaging listeners in discussion while using the knowledge provided in previous lectures.
2. Accounting exercises: solving tasks on the board given by the teacher.
3. Laboratories: conducting simple experiments regarding basic measurements
quantities characterizing physical phenomena based on ready-made laboratory sets - exercises practical.

Bibliography

Basic
1. D. Halliday, R. Resnick, J. Walker, Fundamentals of physics, volume 1-5, Wydawnictwo Naukowe PWN, Warszawa
2006.
2. K. Jezierski, B. Kołodka, K. Sierański, Physics. Problems with solutions, parts I and II, Publishing House Scripta, Wrocław 2000.
3. St. Szuba, Laboratory exercises in physics, Poznań University of Technology Publishing House, Poznań 2007.
Supplementary
1. OpenStax Manual available at:
https://openstax.org/details/books/fizyka-dla-szkół-wszych-tom-1
https://openstax.org/details/books/fizyka-dla-szkół-wszych-tom-2

https://openstax.org/details/books/fizyka-dla-szkół-wszych-tom-3
2. J. Kalisz, M. Massalska, J. M. Massalski, Collection of exercises in physics, parts I and II, PWN Scientific Publishing House,
Warsaw 1987
3. K. Łapsa, Laboratory exercises in physics, Poznań University of Technology Publishing House, Poznań 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	90	3,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,50