COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1Teleinf1>FIZ]

Course

Field of study
Teleinformatics

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
0

Tutorials
15

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

The student starting the course should have basic knowledge of physics and mathematics at the secondary school level. He should also have the skills to solve elementary problems in physics based on his knowledge and obtain information from indicated sources.

Course objective

Getting acquainted with selected concepts, laws and methods of physics to the extent necessary for the quantitative and qualitative description of basic physical phenomena. Getting to know examples of the application of physical laws and phenomena in technology.

Course-related learning outcomes

Knowledge
The student can
1. define and explain physical concepts in the scope covered by the program content and give examples of their applications in technology.
2. indicate the laws of physics allowing to build models of real physical phenomena
3. analyze the measurement results

Skills
The student can
1. solve basic physical tasks
2. perform simple physical experiments, calculate given physical quantities and their measurement uncertainties, make graphs, draw conclusions
3. acquire knowledge from various sources
Social competences
1. The student is aware of the importance of knowledge in solving engineering problems
2. The student is able to cooperate within the team, fulfill the assigned duties, demonstrate responsibility for the results of the team's work

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: acquired knowledge is verified during final test. Passing threshold: 51% of points. Final issues and sample test questions are posted on the eKursy platform.
Tutorials: written test at the end of the semester consisting in solving tasks. Passing threshold: 51% 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
2. Harmonic motion
3. Wave motion
4. Mechanisms of heat transfer
5. Gravitational field
6. Electromagnetism
7. Optics
8. Basics of quantum physics

Tutorials:
Tasks related to the lecture

Laboratory exercises:
1) Classical mechanics,
2) Vibrating movement,
3) Wave motion,
4) Electromagnetism,
5) Optics.
Analysis of measurement results

Course topics

Lecture:
1. Classical mechanics: classification of movements; kinematics and dynamics of translational and rotational motion (including: principles of dynamics, principles of conservation of energy, momentum, angular momentum)
2. Harmonic motion (free, undamped and damped, forced motion, resonance phenomenon)
3. Wave motion (mechanical waves; basics of acoustics; electromagnetic waves; diffraction and interference phenomena)
4. Mechanisms of heat transfer (conduction, convection, radiation)
5. Gravitational field and outline of general relativity
6. Electromagnetism (electrostatics; electric current; magnetostatics; Lorenz force, electrodynamic force, electromagnetic induction, generalized Ampere's law)

7. Optics (phenomena of reflection, refraction, splitting, interference, diffraction, polarization of light)
8. Basics of quantum physics (particle properties of light)

Tutorials:
Tasks related to the lecture topic (kinematics, dynamics of translational and rotational motion, principles of conservation of momentum, angular momentum, energy, harmonic motion)

Laboratory:
During the semester, the student performs 6-7 exercises from 24 sets of exercises on topics from various branches of physics, such as:
1) mechanics (determination of the moment of inertia, stiffness modulus, Young's modulus, coefficient of friction, coefficient of linear expansion, coefficient of viscosity),
2) oscillating motion (determination of acceleration due to gravity using mathematical and physical pendulums),
3) wave motion (determination of the speed of sound in air),
4) electromagnetism (determination of the ferromagnetic hysteresis loop, electrodynamic force, Lorenz force, capacitor capacity, examination of thermocouple, transformer, electrical conductivity of conductors and semiconductors),
5. optics (determination of the refractive index, focal lengths of lenses, luminous efficiency of light sources, study of the photoelectric effect, diffraction and interference of light, optical spectra).
Issues related to the development of measurement results: arithmetic mean, standard deviation of the mean, normal distribution, determining the uncertainty of simple and complex measurements, linear regression method, graphical presentation of measurement results.

Teaching methods

Lecture: a lecture with a multimedia presentation (including: drawings, photos, animations, films) supplemented with examples given on the blackboard and demonstrations. The content presented in the slides is placed on the eKursy platform.
Tutorials: during the course students together with the teacher count tasks associated with the physics theme of the lecture.
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. Lecture materials sent to students by the lecturer
2. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki t 1-4, PWN Warszawa 2003
3. K. Jezierski, B. Kołodka, K. Sieranski, Fizyka. Zadania z rozwiazaniami, t 1-2, Oficyna Wydawnicza Scripta, Wrocław
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	116	5,00
Classes requiring direct contact with the teacher	60	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	56	2,00