COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [N1Bud1>FIZ]

Course

Field of study
Civil Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
0

Other
0

Tutorials
20

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

1. Knowledge in physics and mathematics (core curriculum for secondary schools, basic level). 2. Ability to solve elementary problems in physics based on the acquired knowledge. 3. Ability to use available information sources to obtain information from the indicated sources. 4. Understanding the necessity of education in order to obtain qualifications appropriate for the future profession and performing social functions.

Course objective

1. Provide students with basic knowledge in physics, within the scope defined by the program content appropriate for the field of study: Construction. 2. Developing students" skills in solving simple problems in the field of physics and analyzing the results based on the acquired knowledge. 3. The ability to interpret the observed phenomena in the surrounding world based on the known laws of physics and their practical use in the field of construction.

Course-related learning outcomes

Knowledge:
W01 has knowledge of selected issues in: classical mechanics, gravity, oscillating and wave motion,

acoustics, thermodynamics, electricity and magnetism, electromagnetic waves, optics and modern physics KB_W01
W02 knows the application of the basic laws of physics in the field of selected issues of: classical mechanics, gravity, oscillating and wave motion, acoustics, thermodynamics, electricity and magnetism, electromagnetic waves, optics and modern physics to describe phenomena in the surrounding world. KB_W01, KB_W12

Skills:
U01 is able to apply the basic laws of physics and simplified models to solve simple problems in the field of: classical mechanics, gravity, oscillating and wave motion, acoustics, thermodynamics, electricity and magnetism, electromagnetic waves, optics and modern physics KB_U01
U02 is able to perceive and explain physical phenomena in the surrounding world on the basis of theoretical knowledge on selected issues of physics KB_U03
U03 can use the indicated sources of knowledge to understand (list of basic literature) and is active in acquiring knowledge from other sources KB_U01

Social competences:
K01 is actively involved in solving the problems posed, independently developing and extending its competences KSB_K01, KB_02, KB_K03
K02 understands the need to expand knowledge of selected issues in physics in order to apply them in innovative solutions to technological and engineering problems in the field of construction KB_K05
K03 is responsible for the reliability of the results of its work, it follows the principles of ethics KB_K09

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
written or oral examination - open questions, W01-W02, K01-W03

Programme content

1. Basics of classical mechanics:
• kinematics and dynamics of progressive motion (including the principles of dynamics, the principles of conservation of energy and momentum),
• kinematics and dynamics of rotational motion (including the principles of dynamics, the principle of conservation of angular momentum),
• free, damped and forced harmonic vibrations (including the phenomenon of resonance),
• mechanical waves,
• selected issues in acoustics.
2. Gravitational interactions.
3. Thermodynamics:
• laws of thermodynamics,
• kinetic-molecular theory of gases,
• mechanisms of energy and heat transport,
• thermal insulation.
4. Electricity and magnetism:
• electrostatics (Gauss"s law),
• magnetostatics (Ampere"s law),
• movement of the charge in an electric and magnetic field,
• electromagnetic induction (Faraday"s law),
• Maxwell"s equations,
• electromagnetic waves (transmission of UV, VIS and IR waves),
• electrical and magnetic properties of matter.
5. Optics:
• elements of geometric optics (basic optical instruments)
• wave optics (dispersion, interference, diffraction and polarization of light)
• interaction of light with matter.
• transmission of waves in the UV, VIS and IR range - optical fibers,
• lasers - applications.
6. Elements of special relativity.

7. Selected issues of modern physics:
• quantum nature of light (photoelectric effect, Compton effect),
• matter waves (de Broglie waves),
• potential well, Schrödinger equation,
• tunnel effect - passage of a particle through the potential barrier,
• properties of matter on the nano-scale, quantum effects,
• low-dimensional structures (graphene, quantum dots).

Course topics

none

Teaching methods

Presentation of the above-mentioned lecture issues in the form of a lecture presentation and experimental demonstrations.
Practice on the above-mentioned issues by solving problems for precisely defined conditions and data.

Bibliography

Basic
1. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki tom: 1-5, PWN Warszawa 2003.
2. K.Jezierski, B.Kołodka, K.Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta, Wrocław.
Additional
J.Masalski, Fizyka dla inżynierow t.1-2, WNT Warszawa 1980.
FIZYKA Tom 1: https://openstax.org/details/books/fizyka-dla-szkół-wyższych-polska
FIZYKA Tom 2: https://openstax.org/details/books/fizyka-dla-szkół-wyższych-tom-2-polska
FIZYKA Tom 3. https://openstax.org/details/books/fizyka-dla-szkół-wyższych-tom-3-polska

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	32	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	58	2,00