COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics for computer scientists [N1Inf1>FIZ]

Course

Field of study
Computing

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
part-time

Requirements
compulsory

Number of hours

Lecture
16

Laboratory classes
0

Other (e.g. online)
0

Tutorials
12

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of physics (the secondary school curriculum, primary level). Knowledge of mathematics (first semester of first-cycle engineering studies level). Skill in elementary physical problem solving, skill in acquiring information from listed sources. Understanding the necesity of personal competence development.

Course objective

1. Introduction of basic knowledge in physics within the scope of curriculum content specific for the field of study 2. Development of skills in simple problem solving 3. Self-education ability development

Course-related learning outcomes

Knowledge:
1. Student, who has completed the course, is able to define basic physics terms within the scope of curriculum content specific for the field of study and give simple examples of their application in real world
2. Student, who has completed the course, is able to formulate and explain basic physics laws within the scope of curriculum content specific for the field of study, explain the range of application and give

examples of their application to real world problems
3. Student, who has completed the course, is able to explain purpose and importance of simplified models in physical phenomena description

Skills:
1. Student, who has completed the course, is able to make use of the listed sources of knowledge (basic literature list) and acquire information from other sources
2. Student, who has completed the course, is able to integrate information acquired during participation in the course, from listed literature and other sources as well as to formulate general conclusions within the scope of the course curriculum content
3. Student, who has completed the course, is able to describe simple physical system with the use of analytical methods

Social competences:
1. Student, who has completed the course, is able to actively involve in solving problems, develop and expand personal competence

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture - assessment of knowledge and skills during written examination (knowledge of basic physical terms, practical use of acquired knowledge for simple computational problem solving, ability to explain meaning and application scope of physics laws). Credit threshold: 50% of maximum score.
Classes - assessment of knowledge and skills based on written works score. Assessment of skills in problem solving in the scope of simple physical effects modeling. Credit threshold: 50% of maximum score.

Programme content

1. Kinematics and dynamics of translational and rotational motion
2. Oscillations and waves
3. Fundamental physical forces - motion of a particle in gravitational, elelectric and magnetic field
4. Selected problems concerning constitution of matter
5. Thermodynamics
6. Electric current
7. Electromagnetism - generation of magnetic field, induction, electromagnetic waves
8. The fundamentals of quantum physics

Course topics

1. Classical mechanics
- motion classification
- kinematics and dynamics of translational motion (including Newton"s laws, conservation of energy and linear
momentum)
- kinematics and dynamics of rotational motion (including Newton"s laws, conservation of angular momentum)
- elastic properties of solids
- simple and forced harmonic oscillations (resonance)
- mechanical waves
2. Fundamental physical forces
- motion of a particle in gravitational, elelectric and magnetic field
3. Slected problems concerning constitution of matter
4. Thermodynamics
- temperature, the zeroth law of thermodynamics
- heat and work, the first law of thermodynamics
- elements of the kinetic theory of gases
- entropy, the second law of thermodynamics
5. Electric current

- conduction of solids, liquids and gases
- basic laws concerning passage of electric current
6. Electromagnetism
- generation of magnetic field
- induction (Faraday’s law)
- Maxwell’s equations, electromagnetic waves
7. The fundamentals of quantum physics
- quantum nature of light
- wave properties of matter

Teaching methods

Lecture: multimedia presentation during lecture and electronic documents containing presentation content in a condensed form made available to the students via on-line system eKursy.
Classes: practical teaching by quantitative and qualitative physical problem solving. Students work for their own and at a balckboard with the help of a teacher.

Bibliography

Basic
1. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki t 1-5, Wydawnictwo Naukowe PWN, Warszawa 2015
2. S.J. Ling, J. Sanny, W. Moebs i in., Fizyka dla szkół wyższych. Tom 1 - 3, OpenStax Polska, www.openstax.pl
Additional
1. J. Massalski, M. Massalska, Fizyka dla inżynierów t.1, Wydawnictwa Naukowo-Techniczne, Warszawa 2006
2. J. Massalski, Fizyka dla inżynierów t.2, Wydawnictwa Naukowo-Techniczne, Warszawa 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	86	3,00
Classes requiring direct contact with the teacher	28	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	58	2,00