COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics

Course

Field of study
Power Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
20	20	
Tutorials	Projects/seminars	

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
dr Andrzej Jarosz
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Wydział Inżynierii Materiałowej i Fizyki
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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of physics and mathematics (the secondary school curriculum, primary level). Skill in elementary physical problem solving, skill in acquiring information from listed sources. Understanding the necesity of personal competence development, readiness to cooperate in a team.

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, carying out simple experiments and results analysis
3. Team work 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 prepare and carry out standard measurements of basic physical phenomena, identify basic sources of measurement errors
4. Student, who has completed the course, is able to present results of simple physical experiments and perform qualitative and quantitative analysis of these results

Social competences

1. Student, who has completed the course, is able to actively involve in solving problems, develop and expand personal competence
2. Student, who has completed the course, is able to work in a team, carry out tasks arising from dividing up of work in a team, to take responsibility for team work results

Methods for verifying learning outcomes and assessment criteria

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.
Laboratory classes - continuous assessment of knowledge of current exercise and ability to make use of the listed literature, performed in written or oral form. Continuous assessment of planning and carrying out standard measurements of basic physical quantities ability with the use of information from the listed literature. Assessment of team work skill. Assessment of skill in analysis of measurements and presentation of results in written reports.

Programme content

1. Classical mechanics
- motion classification
- kinematics and dynamics of linear motion (including Newton's laws, conservation of energy and linear momentum)
- kinematics and dynamics of circular motion (including Newton's laws, conservation of angular momentum)

- elastic properties of solids
- simple and forced harmonic oscillations (resonance)
- mechanical waves
- gravity

2. The fundamentals of fluid mechanics
3. 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

4. Electromagnetism
- electrostatics
- electric current
- magnetostatics
- induction (Faraday's law)
- electromagnetic waves (including energy, linear momentum and polarization)
- wave optics (including interference and diffraction)
- geometric optics (including reflection and refraction of light)

5. The fundamentals of quantum physics
- quantum nature of light
- wave properties of matter
- elementary problems concerning atomic, molecular and solid state structure

Teaching methods

Lecture: multimedia presentation and electronic documents comprising selected content of the presentation made available to students via e-mail. Laboratory classes: hands-on experiments with the use of training sets available in the Physics Laboratory, carried out by the students under the university teacher supervision.

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

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

3. H. Szydłowski, Pracownia fizyczna wspomagana komputerem, Wydawnictwo Naukowe PWN, Warszawa 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	127	5,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (preparation for laboratory classes, preparation of written reports on laboratory classes, preparation for exam) [1]	82	3,0

[1] delete or add other activities as appropriate