COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

Course

Field of study

Mechanical Engineering

Year/Semester

2/3

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

10

Laboratory classes

10

Other (e.g. online)

Tutorials

4

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr inż. Robert Hertmanowski

robert.hertmanowski@put.poznan.pl

Phone. +48 61 665 3324

Institute of Physics and Institute of Materials
Research and Quantum Engineering

Ul. Piotrowo 3

60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

1.Have fundamental knowledgein the physics; basic level according to the secondary school syllabus

2.Extended knowledge in mathematics, including differential and integral calculus

3.Are able to use mathematical tools and use them to solve physics tasks at high school level, the ability to learn comprehension and to obtain information from indicated sources

4.Understanding the need to broaden their competence, willingness to cooperate within the team

Course objective

1. Providing students with basic knowledge of physics, to the extent specified by the curriculum content appropriate to the field of study

2. Developing students' skills in solving simple problems and performing simple experiments as well as analyzing results based on the knowledge obtained

Course-related learning outcomes

Knowledge

1.Student has ordered, theoretically founded general knowledge in selected branches of physics, including general mechanics, acoustics, electricity and magnetism, and optics and elements of modern physics, including the knowledge necessary to understand the basic physical phenomena occurring in the elements and systems of automation and robotics, and their surroundings

2. Student is able to define and knows the basic concepts and physical laws and knows simple examples of their application in the surrounding world; has knowledge of the use of knowledge in physics to support the work of an engineer, knows the need to apply physics in engineering and technologies
3.Student has ordered theoretically founded and general knowledge in the field of general mechanics: kinematics and dynamics, including knowledge necessary to understand the principles of modeling and constructing simple mechanical systems

Skills

1.Student is able to use the recommended sources of information and understand the contents (list of fundamental literature) and and acquire knowledge from other sources

2. Student knows how to apply basic physical laws and simplified models in solving simple problems to the extent covered by the curriculum content specific to the field of study

Social competences

1.Student able to actively engage in solving the basic problems independently develop and expand their skills

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture: written exam 3 - 50.1%-70.0%, 4 - 70.1%-90.0%, 5 - od 90.1%

Classes: tests during the semester and colloquium 3 - 50.1%-70.0%, 4 - 70.1%-90.0%, 5 - od 90.1%

Laboratory: Credit based on oral or written response from the scope of content performed laboratory excersises and written raports. The prerequisite is to pass a minimum of 85% of total planned for student exercises.

Programme content

1. Classical mechanics: classification of the modes of motion, kinematics and dynamics of translatory motion (including: laws of dynamics, conservation laws for energy and momentum), kinematics and dynamics of rotary motion (including: laws of dynamics, conservation law for angular momentum), harmonic oscillations, simple and driven (including: resonance phenomenon), mechanical waves, gravity interactions

2.Thermodynamics: temperature, 0 thermodynamics law, heat and mechanical work, I thermodynamics law, elements of kinetic theory of gases, entropy, II thermodynamics law

3.Electromagnetism: electrostatics (including: Gauss law), electric current, magnetostatics (including: Ampere's law), electromagnetic induction (including: Faraday's law), electromagnetic waves

4.Optics: geometrical optics (including: reflection and refraction laws), wave optics (including: interference and diffraction)

5.Elements of modern physics: quantum nature of light, photoelectric effect, elementary problems of atomic structure, lasers

Teaching methods

Lectures: multimedia presentation, conversation with students

Classes: solving problems

Laboratory: laboratory exercises in the field of mechanics, electricity and optics

Bibliography

Basic

1. D.Halliday, R.Resnick, J.Walker, Fundamental of Physics, John Wiley & Sons Ltd, 2004

2. R Feynman, R. Leighton and M. Sands, The Feynman lecture of Physics (on-line edition)

3. K.Łapsa, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2008

Additional

1. J.Masalski, Fizyka dla inżynierow t.1-2, WNT Warszawa 1980

2. H. Szydłowski, Pracownia fizyczna, PWN, Warszawa 2003

4. . K.Sierański, K.Jezierski, B.Kołodka ?Fizyka? t. 1-3, Oficyna Wydawnicza Scripta Wrocław 2005

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	30	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	70	2

[1] delete or add other activities as appropriate