SYLLABUS

Name: Physics for engineers
Name in Polish: Fizyka dla inżynierów
Name in English: Physics for engineers

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bachelor's degree, Full-time
Term:	winter and summer semester 2022/2023
Coordinator of course edition:	Dr Marcin Wojtyniak

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma.polsl.pl/roz/

ECTS

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Short description:

The course aims to familiarize students with physical phenomena and the fundamental laws of classical and modern physics. The student should learn the principles of correct analysis of specific problems, develop the skills of a correct description of physical phenomena occurring in simple systems, and use the principles and methods of physics to solve physical problems and typical engineering tasks. In addition, the students can perform simple experiments and analyze them.

Description:

Introduction:
The first semester is designed as a reminder of high-school physics for students with different backgrounds. It is focused on kinetics, dynamics, and introduction to thermodynamics. It governs principles of physical observations, working with vectors, and calculating simple problems.
Lectures:
A classical lecture in the form of a multimedia presentation governing several topics. The role of numbers in physics, small and large numbers. Basic physical constants. Fundamental interactions. Dimensional analysis. Vector algebra. Motion along a straight line, circular motion. Inertia Forces. Newton's laws of motion. Work. Principles and laws of conservation in mechanics. Rotational motion of a rigid body. Simple and damped harmonic oscillator. Forced vibrations and the phenomenon of resonance. Wave movement. Diffraction and wave interference. Basics of thermodynamics, heat transfer mechanisms, thermodynamic laws, heat engine. Introduction to electricity, magnetism, optics, and quantum physics. Basic principles of electromagnetic wave propagation, light, and related phenomena.
Exercises:
Classical exercises in front of a blackboard. The exercises are devoted to practical aspects of understanding selected physical phenomena by solving sample tasks. The tasks follow the topics presented in the lectures. Students were given a set of problems in advance for each exercise.
Laboratories:
Classical student laboratory. Students can perform several fundamental physical experiments. The focus is put on the manual approach to experiments and their theoretical background. The uncertainty analysis is also introduced to familiarize students with real-life engineering problems.

Bibliography:

Authors: Paul Peter Urone, Roger Hinrichs
Publisher/website: OpenStax
Book title: College Physics 2e
Publication date: Jul 13, 2022

Authors: William Moebs, Samuel J. Ling, Jeff Sanny
Publisher/website: OpenStax

Book title: University Physics Volume 1,2 and 3
Publication date: Sep 19, 2016

Learning outcomes:

Students obtain knowledge covering basic issues in physics and the ability to use the principles and methods of physics to solve typical engineering tasks. The first part of the course is a high-school-level physics reminder.
K1A_W1, K1A_U1, K1A_K1

Assessment methods and assessment criteria:

First semester:
Written tests (2 per semester). Passing criterion: over 50% of possible points.
Second semester:
The final grade is related to the lecture, exercise, and laboratory by a set of points.
Lecture:
Written exam in the form of a test. Maximum points: 30. Passing criterion: over 50% of correct answers.
Exercises:
Written test. Maximum points: 15. Passing criterion: over 50% of possible points.
Laboratory (several experiments – typically 5):
Written reports from each performed experiment. Maximum points: 30. Passing criterion: over 50% of possible points.

Practical placement:

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