



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Issues of modern physics [S1MiBP1>ZFW]

Course

Field of study

Mechanical and Automotive Engineering

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

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

1,00

Coordinators

dr inż. Michał Kotkowiak

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Lecturers

Prerequisites

Knowledge: Basics of mathematics, chemistry and physics. Skills: Using literature (textbooks, internet), the ability to perceive lecture content Social competences: Awareness of the need to deepen engineering knowledge and its place in everyday life

Course objective

Providing students with basic knowledge of the physical aspects of the functioning of the world around us in the scope defined by the curriculum content appropriate for the field of study.

Course-related learning outcomes

Knowledge:

Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.

Has ordered basic knowledge of the main divisions of technical mechanics: statics, kinematics and dynamics of a material point and a rigid body.

Has a basic knowledge of the methods of linear measurements, measurements of stresses, strains, velocities, temperatures and fluid streams, including measurements of these quantities by electrical means.

Skills:

Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.

Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.

Social competences:

Is ready to critically assess his knowledge and received content.

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.

Is ready to initiate actions for the public interest.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Written credit based on orally asked questions. In case of doubts related to the assessment, an oral exam is allowed.

Programme content

1. Electromagnetic radiation and quanta
2. Wave-particle nature of matter, structure of the atom
4. Nuclear physics, thermonuclear reactions on the Sun
6. Elements of the band theory of solids
7. Physical foundations of laser operation and their use in mechanics
8. Hydrogen, fuel cells and their use in transport
9. High-resolution microscopy

Course topics

In addition to a theoretical introduction to modern physics, specific applications of quantum effects in the broadly understood automotive industry will be presented.

Teaching methods

Lecture with multimedia presentation

Bibliography

Basic

1. Paul. A. Tipler - Fizyka współczesna
2. Jerzy Ginter - Wstęp do fizyki atomu, cząsteczek i ciała stałego

Additional

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Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50