COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1IChiP1>FIZ2]

Course

Field of study
Chemical and Process 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
0

Laboratory classes
45

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

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Prerequisites

Presentation of fundamental knowledge of physics in the range determined by the syllabus of the subject of study.

Course objective

1. Students have fundamental knowledge in the following areas of physics mechanics, optics, electricity, magnetism. 2. Development ability to solve physical problems, to perceive potential applications in studied subject, doing experiments and analyze results based on acquired knowledge. 3. Mould student’s abilities within group cooperation.

Course-related learning outcomes

Knowledge:

student has the fundamental laws of physics and simplified models in solving simple problems in the range determined by the syllabus.
student has a basic knowledge in the field of electrical engineering, electronics, optics as well as the basics of control and automation, allowing to understand the principles of operation of measuring devices and research equipment.
student has a basic knowledge of metrology, knows and understands the methods of measuring physical quantities and analyzing measurement results.(k_w02)

Skills:
student is able to work individually and in a team, including being able to manage his time, make commitments and meet deadlines.
student is able to operate standard experimental infrastructure equipment: mechanical, electrical, cryogenic, vacuum, pressure, laser, radiological; knows how to properly define the requirements for this infrastructure in technical language and in accordance with the requirements of occupational health and safety; can configure basic measuring systems
student is able to plan, carry out standard measurements, analyze and document the results of research on classical and quantum physical phenomena on a macro, micro and nano scale; is able to identify and evaluate the importance of the fundamental factors disturbing the measurement.(k_u01, k_u02)

Social competences:
sudent is able to work on the assigned task independently and cooperate in a team, assuming various roles in it; he demonstrates responsibility in this work. the student acts in accordance with the principles of professional ethics; is responsible for the reliability of the results obtained and their interpretation.(k_k01,k_k02)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Exam of knowledge necessary to carry out the problems posed in a given area of laboratory tasks,
Exam on the technique and correctness of measurements appropriate for a given exercise,
Exam continuous assessment, during each class - assessment of knowledge and skills related to the implementation of the exercise task,
Written reports: elaboration of obtained results and their measurement uncertainty, accuracy of conclusions, transparency and aesthetics of the report,
Assessment of group cooperation skills.

Programme content

1.MECHANICS
1) Determination of the speed of sound in air by the phase shift method. 2) Determination of gravitational acceleration using a reversible and mathematical pendulum. 3) Determination of the linear expansion coefficient of solids. 4) Inertia moment test. 5) Determination of Young"s modulus by deflection. 6) Testing uniformly accelerated motion using a computer measuring set. 8) Determining the dependence of the viscosity coefficient on temperature. 9) Determination of the stiffness modulus using the dynamic method.
2. ELECTROMAGNETISM
1) Determining the capacitance of a capacitor using relaxation vibrations. 2). Transformer testing. 3) Determining the dependence of conductivity on temperature for semiconductors and conductors. 4) Investigating the impact of a magnetic field on a conductor with current. 5) Determination of Planck constant and output work based on photoelectric effect. 6) Determination of ferromagnetic hysteresis loop by means of a hallotron. 7) Marking of a thermocouple. 8) Measurement of the e / m ratio by means of deviations in the magnetic field.
III.OPTICS
1) Determination of the refractive index based on the apparent and actual thickness of the plates. 2) Determination of focal length lenses from the lens pattern and the Bessel method. 3) Determination of the constant diffraction grating. 4) Examination of optical emission spectra. 5) Determination of the refractive index of a liquid using an Abbe refractometer. 6) Investigation of the plane polarization by solutions using a polarimeter. 7) Determination of the luminous efficiency of selected light sources. 8) Determining the radius of curvature of the lens using Newton rings.

Teaching methods

Multimedia presentation, exercise animations. graphic illustration, practical exercises.

Bibliography

Basic
1)R. Resnick, D. Halliday, Fizyka , t. 1- 5, PWN, Warszawa 2005
2)J. Orear, Fizyka, t. 1- 2, WNT, W-wa 1990
3) S. Szuba, Ćwiczenia laboratoryjne z fizyki , Wyd. Politechniki Poznańskiej, 20041) R. Resnick, D. Halliday, Fizyka , t. 1- 5, PWN, Warszawa 2005
Additional
1) H. Szydłowski, Pracownia fizyczna, PWN, Warszawa 2003
2) Z. Kąkol, e-fizyka http://www.ftj.agh.edu.pl/~kakol/efizyka/

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,40
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,60