COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1IChiP1>FIZ1]

Course

Field of study
Chemical and Process Engineering

Year/Semester
1/1

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
45

Laboratory classes
0

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

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Prerequisites

Basic knowledge concerning physics and mathematics. Solving elementary physical problems based on acquired knowledge, ability to acquire information from given sources. Understanding of necessity of own competence broadening, readiness to cooperate within group

Course objective

Educate students in the basic concepts and physical laws in the field of classical physics, including their applications in technical sciences, develop students "skills to solve problems in the field of technical physics, recognize its potential applications in the studied field, develop students" teamwork skills.

Course-related learning outcomes

Knowledge:
advanced knowledge within classical mechanics, thermodynamics, gravity and electrical interactions with special emphasis on their applications in studied subject. basic knowledge about constructing,

principles of working and lifetime of modern engineering systems. (k_w02)

Skills:
using (with understanding) recommended knowledge sources (catalog data, applications notes) and derive knowledge from other sources for self-education purpose. carry out and analyze basic physical experiments and measurements on electrical systems with results interpretation and presentation in numerical and graphical forms.(k_u01, k_u02)

Social competences:
understanding of role of knowledge in problems solutions and in increasing level of professional, personal and social skills. ability of logical and enterprising thinking in electrical engineering field. (k_k01,k_k02)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:
Oral or written exam that is aimed at students knowledge evaluation based on their explanations of choosen physics problems, current evaluation of students activity
Math exercises:
Substantial evaluation of methods of problem solving: proper physical formula application, logical line of thinking, mathematical efficiency in formula calculations also with numerical data and units, capabilities to solve problems using different methods, clarity and aesthetics of task solutions, current evaluation of students activity

Programme content

1.Classical mechanics.
2. Kinematics Dynamics of forward motion.
3. Kinematics and dynamics of rotary motion
4. Vibrations and waves.
5.Thermodynamic
6. Gravitational interactions:law of universal gravitation,scalar and vector description of gravitational field.
7.Electric field.
8.Magnetic field.
9. Maxwell"s equations.
10. Electromagnetic waves.
11Geometrical optics and wave optics. Wave-corpuscular dualism.

Course topics

1.Classification of motions,vector description of motions, reference systems,work,
power, kinetic energy, potential energy, conservative and non-conservative forces.
2.Principles of dynamics, principles of conservation
3.Momentum of force, momentum, principles of dynamics, principles of conservation.
4.Harmonic motion simple, damped and resonance, wave equation.
5.Temperature, , pressure, 0 principle of thermodynamics, heat, thermal conductivity
heat, 1st principle of thermodynamics, elements of kinetic theory of gases, gas transformations, heat machines, 2nd principle of thermodynamics.
6.Law of universal gravitation, scalar and vector description of gravitational field.
7.Electric charge, Coulomb's Law ,Gauss's Law, conductors, motion of charge in an electric field, electric current (Ohm's Law, Kirchhoff's Laws), electrical properties of matter.
8.Magnetostatics (Gauss's law, Ampere's law, Biot-Savart's law), magnetic properties of matter, motion of charge in a magnetic field (Lorentz force, electrodynamic force), electromagnetic induction (Faraday's law).
9.Gauss's law for electric and magnetic fields, Ampere's law and Faraday's law.
10.Source and range of electromagnetic waves and application.
11.Laws of reflection and refraction, interference and diffraction.Photoelectric effect and Compton phenomenon.

Teaching methods

Lecture: multimedial presentation, animations, movies.
Math exercises: practical exercises.

Bibliography

Basic
1. J. Orear, Fizyka, t. 1- 2, WNT, W-wa 1990
2. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN, Warszawa 2005.
3. K.Jezierski, B.Kołodka, K.Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta, Wrocław 2007
Additional
1.J.Massalski, M.Massalska, Fizyka dla inżynierów t.1-2, WNT, Warszawa 2006
2. e-Fizyka" to internet course z Fizyki AGH : Autors: Zbigniew Kąkol i Jan Żukrowski.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	65	2,60
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,40