COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1Lot2>Fiz]

Course

Field of study
Aviation

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
30

Laboratory classes
15

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of physics and mathematics at the secondary school level 2. Ability to solve elementary problems in physics based on existing knowledge and to obtain information from indicated sources 3. Understanding the need to expand one's competences and willingness to cooperate within a team Familiarizing students with basic concepts and physical laws in the field of classical physics, taking into account their applications in technical sciences. 2. Developing students' skills in solving problems in the field of technical physics, noticing its potential applications in the field they are studying.

Course objective

Familiarizing students with basic concepts and physical laws in the field of classical physics, taking into account their applications in technical sciences. 2. Developing students' skills in solving problems in the field of technical physics, noticing its potential applications in the field they are studying.

Course-related learning outcomes

Knowledge:
1. has an extended and in-depth knowledge of mathematics and physics useful for formulating and solving complex

technical tasks related to aviation and modeling real problems
2. has knowledge of the method of presenting test results in the form of tables and graphs, performing the analysis of
measurement uncertainties

Skills:
1. can use the language of mathematics (differential and integral calculus) to describe simple engineering problems.
Social competence:
1. understands that in technology, knowledge and skills very quickly become obsolete

Social competences:
-

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written exam
Exercises: assessment of solutions to exercises, final colloquium

Programme content

Mechanics - kinematics and dynamics of a material point, conservation laws in mechanics, free, forced and damped
harmonic vibrations. Fundamentals of gravity

Course topics

- Kinematics of a material point (rectilinear and curvilinear motion),
- Dynamics of a material point (Newton's laws of motion, friction, momentum, work, power, and energy),
- Dynamics of a rigid body (torque, moment of inertia, Steiner's theorem, laws of rotational motion, angular momentum, kinetic energy of rotational motion),
- Conservation laws in mechanics (conservation of momentum, angular momentum, energy), collisions of bodies
(perfectly elastic and inelastic), statics of rigid bodies (simple machines),
- Free, damped, and forced harmonic oscillations (resonance phenomenon)
- Mechanical waves (interference, rumbling, acoustic waves)
- Fundamentals of fluid mechanics
- Fundamentals of thermodynamics
- Gravity (law of universal gravitation, field intensity and potential), Kepler's laws
- Electrostatics (Coulomb's law, electric field intensity and potential, work of electric field forces)
- Electricity (capacitors, resistors, Kirchhoff's laws)
- Magnetic field (Lorentz force, electrodynamic force, Hall effect)
- Electromagnetism (magnetic induction, Faraday's law of induction, Lenz's law) and magnetism of matter (diamagnetics, paramagnetics, and ferromagnetics)
- Electromagnetic waves (Maxwell's equations, electromagnetic wave spectrum)
- Geometric optics (speed of light, laws of reflection and refraction, flat and spherical mirrors, lenses, fiber optics)
- Wave optics (interference, diffraction, polarization of light)
- Physics of matter (states: solid, liquid, and gas; phase transitions.elements, atomic structure, molecules, chemical compounds)

PART - 66 (THEORY - 22.5 hours, PRACTICE - 11.25 hours)
PART - 66 (THEORY - 11.25 hours)
MODULE 2. PHYSICS
2.1 Matter 1 1 1 1
Physical properties of matter: elements, atomic structure, molecules;
Chemical compounds.
States: solid, liquid, and gaseous;
Changes between states. [1]

2.2 Mechanics
2.2.1 Statics
Forces, moments and pairs, vector representations;
Center of gravity; [2]
2.2.3 Dynamics
a) Mass
Force, inertia, work, power, energy (potential, kinetic and total), heat, efficiency;
b) Momentum, conservation of momentum;
Impulse;
Gyroscopic principles;
Friction: Physical properties and effects, coefficient of friction (rolling friction). [2]

Teaching methods

Lecture: multimedia presentation supplemented with examples on the board
Exercises: analysis of tasks and their solution on the board (teamwork possible) Laboratories: independent performance of experiments and development of results

Bibliography

Basic:
1. D. Halliday, R. Resnick, J. Walker, "Podstawy fizyki" t. I - IV, PWN, Warszawa 2005.
2. J. Massalski, M. Massalska, "Fizyka dla inżynierów" t. I, WNT, Warszawa 2006.
3. J. Orear, „Fizyka”, t. 1- 2, WNT, Warszawa 1990.

Additional:
1. K. Jezierski, B. Kołodka, K. Sierański, „Fizyka. Zadania z rozwiązaniami. Cz. 1 Mechanika”, Oficyna Wyd. Scripta, Wrocław 2000 K.
2. Cz. Bobrowski, "Fizyka - krótki kurs dla inżynierów", WNT, Warszawa 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,00