COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics

Course

Field of study
Aerospace Engineering
Area of study (specialization)
–
Level of study
First-cycle studies
Form of study
full-time

Year/Semester
1/1
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
15
Other (e.g. online)
0
Tutorials
15
Projects/seminars
0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
dr inż. Ewa Chrzumnicka
email: ewa.chrzumnicka@put.poznan.pl
tel. +4861 665 3173
Wydział Inżynierii Materiałowej i Fizyki Technicznej
ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:
dr inż. Ryszard Skwarek
email: ryszard.skwarek@put.poznan.pl
tel. +4861 665 3187
Wydział Inżynierii Materiałowej i Fizyki Technicznej
ul. Piotrowo 3, 60-965 Poznań

Prerequisites

Knowledge: The student has basic knowledge of physics and mathematics (core curriculum for secondary schools, basic level)

Skills: The student is able to obtain information from literature, databases and other sources and to solve simple problems (tasks) in physics

Social competences: The student understands the need and knows the possibilities of continuous training and is ready to submit to work in a team

Course objective

1. Provide students with basic knowledge of physics, within the scope defined by the curriculum content appropriate for the field of study.

2. Acquiring the ability to solve problems (tasks) in physics

Course-related learning outcomes

Knowledge

1.has knowledge 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 theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems

Skills

1. is able to 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

Social competences

1. understands the need for lifelong learning; can inspire and organize the learning process of other people

2. Is ready to critically evaluate his knowledge and received content, recognize the importance of knowledge in solving cognitive and practical problems and consult experts in the event of difficulties with solving the problem on his own

3. is aware of the social role of a technical university graduate, and especially understands the need to formulate and convey to the society, in particular through the mass media, information and opinions on the achievements of technology and other aspects of engineering activities; makes efforts to provide such information and opinions in a commonly understandable manner

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture: Assessment of knowledge and skills on a written or oral exam based on the explanation of selected issues
Tutorials: assessing the solutions of the tasks in the exercises, final test.
Labolatory: Preparation of reports on the implementation of individual laboratory exercises. Optional assessment of students' knowledge before starting the classes.

Programme content

1.material point kinematics (rectilinear and curvilinear motion),

2.material point dynamics (Newton's laws of motion, friction, momentum, work, power and energy)
3. dynamics of a rigid body (moment of force, moment of inertia, Steiner theorem, principles of dynamics of rotational motion, angular momentum, kinetic energy of rotational motion),
4. conservation principles in mechanics (conservation principle: momentum, angular momentum, energy),
5. body collisions (perfectly elastic and inelastic), statics of a rigid body (simple machines),
6.simple harmonic motion: (free, forced? Resonance)
7.mechanical waves (wave refraction and reflection, the phenomenon of diffraction and interference, Doppler effect, basics of acoustics),
8. gravitational interactions
9. basics of special relativity
10.electric field (Coulomb's law, electric field strength and potential, work of electric field forces)
11.magnetic field (Lorentz force, electrodynamic force),
12.Electromagnetic induction (induction flux, Faraday's law of induction, Lenz's law), electromagnetic waves (Maxwell's equation)

Teaching methods

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

Exercises, problem solving and interpretation of calculation results

Laboratory (experiment) method (students independently conduct experiments)

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. K. Jezierski, A. Kołodka, K. Sierański, "Fizyka-zadania z rozwiązaniami", t. 1-2, Wydawnictwo Scripta, Wrocław 2009,
4. J.Kalisz, M. Massalska, J. Massalski. "Zbiór zadań z fizyki z rozwiązaniami", PWN, Warszawa 1971.

Additional

1. . Cz. Bobrowski, "Fizyka - krótki kurs dla inżynierów", WNT, Warszawa 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) [1]	65	3,0

1 delete or add other activities as appropriate