



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

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Materials Engineering and Technical
Physics

ul. Piotrowo 3

Responsible for the course/lecturer:

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Faculty of Materials Engineering and Technical
Physics

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Prerequisites

1. Basic knowledge of secondary school physics and mathematics
2. Ability to solve elementary problems in physics based on own knowledge and obtaining information from specified sources
3. Understanding the need to broaden own competences and willingness to cooperate within a group

Course objective

1. Familiarizing students with the basic concepts and physical laws in classical physics, including their applications in technical sciences



2. Developing students skills in solving problems in technical physics, noticing its potential applications in the studied field

Course-related learning outcomes

Knowledge

1. Has knowledge in mathematics including algebra, analysis, theory of differential equations, analytical geometry and being the basis for understanding issues in the field of physics
2. Has knowledge of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, thermodynamics, necessary to understand theoretical issues and constructions used in aircraft

Skills

1. Is able to use with understanding various sources of knowledge as well as analyze obtained information and draw conclusions from them

Social competences

1. Understands the need of critical evaluation of knowledge and is able to independently develop and expand own competences

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written and/or oral exam

Exercises: evaluation of exercises' solutions, final test.

Programme content

- Material point kinematics (rectilinear and curvilinear motion),
- Material point dynamics (Newton's dynamics principles, friction, momentum, work, power and energy),
- Dynamics of a rigid body (moment of force, moment of inertia, Steiner's theorem, principles of dynamics of rotational motion, angular momentum, kinetic energy of rotation),
- Principles of behavior in mechanics (principle of conservation: angular momentum, angular momentum, energy), collisions of bodies (perfectly elastic and inelastic), rigid body statics,
- Free, forced harmonic vibrations (resonance phenomenon) and suppressed harmonic vibrations,
- Basics of thermodynamics

PART-66

MODULE 2. PHYSICS

2.1 Physical properties of matter: elements, atomic structure, molecules;



Chemical compounds. States: solid, liquid and gas; Changes between states. [1]

2.2 Mechanics

2.2.1 Statics

Forces, moments and pairs, vector performances; Center of gravity; Elements of the theory of stress, deformation and elasticity: stretching, compression, shear and turning; Physical properties of solid, liquid and gas bodies; Pressure and buoyancy in liquids (barometers). [2]

2.2.2 Kinetics

Linear motion: uniform motion in a straight line, motion with constant acceleration (motion under force gravity); Rotational motion: uniform rotational motion (centrifugal / centripetal force); Periodic movement: swinging; Simple theory of vibration, harmony and resonance; Speed factor, power ratio and mechanical efficiency. [2]

2.2.3 Dynamics

a) Mass Strength, inertia, work, power, energy (potential, kinetic and total), heat, efficiency; [2]

b) Momentum, momentum conservation; Impulse; Gyroscopic rules; Friction: Physical properties and effects, coefficient of friction (rolling friction). [2]

2.2.4 Fluid dynamics

a) Specific weight and density; [2]

b) Viscosity, fluid resistance, effects of streamlining; Effects of fluid squeezing; Static, dynamic and total pressure: Bernoulli's law, Venturi. [2]

Teaching methods

Lecture: multimedia presentation supplemented with examples on the board

Exercises: task analysis and solving on the board (teamwork possible)

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	64	3,0
Classes requiring direct contact with the teacher	34	1,5
Student's own work (literature studies, preparation for tutorials, preparation for tests) ¹	34	1,5

¹ delete or add other activities as appropriate