COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [N1MiBP1>FIZ]

Course

Field of study
Mechanical and Automotive 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
part-time

Requirements
compulsory

Number of hours

Lecture
18

Laboratory classes
0

Other (e.g. online)
0

Tutorials
9

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Ewelina Nowak

Lecturers

dr inż. Michał Kotkowiak
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Prerequisites

1. Student: has a basic knowledge of physics and mathematics (program basis for high schools, basic level) – PRK4 2. Student can obtain information from literature, databases and other sources, is able to solve problems (simple) in physics. - PRK4 3. Understanding of the need to expand their competence, their willingness to cooperate within theteam. - PRK4

Course objective

1 Provide students with a basic knowledge of physics, to the extent specified by the curriculum relevant to the field of study. 2. Acquisition of the ability to solve problems in physics

Course-related learning outcomes

Knowledge:
Has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probability, analytical geometry necessary to: describe the operation of discrete mechanical systems, understand computer graphics methods, describe the operation of electrical and mechatronic systems.
Has knowledge in the field 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 field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.
Has a basic knowledge of the methods of linear measurements, measurements of stresses, strains, velocities, temperatures and fluid streams, including measurements of these quantities by electrical means.

Skills:
Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.
Can use learned mathematical theories to create and analyze simple mathematical models of machines and their elements, and simple technical systems.
Can prepare and present a short verbal and multimedia presentation devoted to the results of an engineering task.

Social competences:
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.
Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.
Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: written and oral
Auditory classes: solving problems in physics, final colloquium
3,0 (50,01 - 60,0 %)
3,5 (60,01 - 70,0 %)
4,0 (70,01 - 80,0 %)
4,5 (80,01 – 90,0 %)
5,0 (from 90,01%)

Programme content

kinematics of a material point (linear motion and curvilinear)
dynamics of material point (Newton"s principles, friction, momentum, work, power and energy)
rigid body dynamics (force momentum and moment of inertia, Steiner’s Theorem, principles of dynamic rotational motion, angular momentum, kinetic energy of rotation)
conservation laws in mechanics (the law of conservation: momentum, angular momentum, energy),
the collision of bodies (perfectly elastic and inelastic) statics of rigid bodies (simple machines)
harmonical vibration (free and forced – phenomenon of resonance
mechanical waves (reflection and refraction, phenomena of diffraction and interference, Doppler effect, the bascis of acoustics)
gravitational interactions, relativistic mechanics
electric field (Coulomb"s law, the intensity and the potential of the electric field, the work force of the electric field)
magnetic field (Lorentz force, electrodynamic force)
electromagnetic induction (fluxinduction Faraday"s law of induction, Lenz"s law),
electromagnetic waves (Maxwell equations)

Course topics

none

Teaching methods

Lecture: the prezentation, demonstrations
Auditory classes solving problems in physics

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
2. S.J.Ling, J.S. Loyola „Fizyka dla szkół wyższych” , https://openstax.pl/pl/

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	27	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	73	2,00