



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

### Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Year/Semester

1/1

Profile of study

Level of study

First-cycle studies

Form of study

part-time

Course offered in

polish

Requirements

Year/Semester

1/1

Profile of study

Course offered in

polish

Requirements

### Number of hours

Lecture

18

Laboratory classes

Other (e.g. online)

Tutorials

9

Projects/seminars

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Dr Ryszard Skwarek

Responsible for the course/lecturer:

Responsible for the course/lecturer:

### 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 the team. - 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 a basic knowledge of physics, (including mechanics, optics, electricity, magnetism) including the knowledge necessary to understand the physical phenomena

#### Skills

1. - can obtain the information from literature, databases and other sources, is able to integrate the information, make the interpretation of them, as well as draw conclusions and formulate and justify opinions - [K1\_U01(P6S-UW)]

2. - is able to work independently and in a team, is able to estimate the time needed for the commissioned tasks, is able to develop and implement a schedule of work to ensure deadlines - [K1U\_02 (P6S\_UO)]

#### Social competences

1. - is ready to critically assess his knowledge, recognize the importance of knowledge in solving problems

[K1\_K01 (P6S\_KK)]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written and oral

Auditory classes: solving problems in physics, final colloquium

3,0 ( 50,1 - 60,0 %)

3,5 (60,1 - 70,0 %)

4,0 (70,1 - 80,0 %)

4,5 (80,1 – 90,0 %)

5,0 ( from 90,1%)

### 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 basics 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)

### Teaching methods

Lecture: the presentation, 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  | 95    | 4    |
| Classes requiring direct contact with the teacher   | 45    | 2    |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup> | 50    | 2    |

<sup>1</sup> delete or add other activities as appropriate