**Nazwa przedmiotu:**

Physics I

**Koordynator przedmiotu:**

Wojciech Wróbel, PhD

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia I stopnia

**Program:**

Electric and Hybrid Vehicles Engineering

**Grupa przedmiotów:**

Fizyka i Mechanika

**Kod przedmiotu:**

1150-00000-ISA-0110

**Semestr nominalny:**

1 / rok ak. 2022/2023

**Liczba punktów ECTS:**

2

**Liczba godzin pracy studenta związanych z osiągnięciem efektów uczenia się:**

1) Number of contact hours- 30, including:
a) lecture – 30 h;

2) Student’s individual work 20 hours, including:
a)20 h – student’s current preparation for lectures, literature study,
b) 10 h – student’s current preparation for test.

3) TOTAL – sum of individual work and contact hours- 60.

**Liczba punktów ECTS na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich:**

1.2 ECTS points – number of contact hours - 30, including:
a) lecture – 30 h;

**Język prowadzenia zajęć:**

angielski

**Liczba punktów ECTS, którą student uzyskuje w ramach zajęć o charakterze praktycznym:**

0

**Formy zajęć i ich wymiar w semestrze:**

|  |  |
| --- | --- |
| Wykład:  | 30h |
| Ćwiczenia:  | 0h |
| Laboratorium:  | 0h |
| Projekt:  | 0h |
| Lekcje komputerowe:  | 0h |

**Wymagania wstępne:**

brak

**Limit liczby studentów:**

brak

**Cel przedmiotu:**

The aim of the lecture is to provide students with basic knowledge about the general principles of physics, physical quantities, fundamental interactions and their physical and mathematical description. After completing the course the student should have ordered knowledge in the field of non-relativistic mechanics, hydrostatics, hydrodynamics of phenomenological thermodynamics.

**Treści kształcenia:**

(1) Introduction; physical quantities, SI units, coordinate system, calculations with vectors and units, estimates and oders of magnitude
(2) Motion along a straight line and in two or three dimentions. Displacement, distance, velocity, acceleration.
(3) Newton's laws of motion. Momentum and impulse. Work and energy. Definition and calculation of work.
(4) Gravitational and elastic potential energy. Kinetic energy. Conservation of energy and momentum in mechanics.
(5) Rotation of rigid bodies. Relating linear and angular kinematics. Energy in rotational motion. Dynamics of rotational motion, conservation of angular momentum. Kepler's laws of planetary motion.
(6) Hydrostatics; density and pressure. Pascal's law, hydraulic systems. Buoyancy.
(7) Hydrodynamics; fluid flow, continuity equation and Bernoulli's equation. The properties of real fluids - viscosity and turbulence, dynamic resistance and coefficient of resistance, the Magnus effect.
(8 ) Thermodynamics; Kinetic theory of gases. Temperature, heat, laws of thermodynamics. Basic thermodynamic processes. Equations of state. Heat engines. Entropy .
(9) Heat transfer, thermal resistance. Thermal expansion of solids and liquids.

**Metody oceny:**

Exam

**Egzamin:**

tak

**Literatura:**

1. D. Halliday, R. Resnick, J. Walker, „Fundamentals of Physics"
2. H. Young, R. Freedman "University Physics"

**Witryna www przedmiotu:**

**Uwagi:**

## Efekty przedmiotowe

### Profil ogólnoakademicki - wiedza

**Efekt :**

Student has basic knowledge on physical quantities, SI units, coordinate system, calculations with vectors and units, estimates and oders of magnitude; motion along a straight line and in two or three dimentions; Newton's laws of motion. Momentum and impulse. Work and energy. Definition and calculation of work.; Gravitational and elastic potential energy. Kinetic energy. Conservation of energy and momentum in mechanics.; Rotation of rigid bodies. Relating linear and angular kinematics. Energy in rotational motion. Dynamics of rotational motion, conservation of angular momentum. Kepler's laws of planetary motion.; Hydrostatics; density and pressure. Pascal's law, hydraulic systems. Buoyancy.; Hydrodynamics; fluid flow, continuity equation and Bernoulli's equation. The properties of real fluids - viscosity and turbulence, dynamic resistance and coefficient of resistance, the Magnus effect.; Thermodynamics; Kinetic theory of gases. Temperature, heat, laws of thermodynamics. Basic thermodynamic processes. Equations of state. Heat engines. Entropy .; Heat transfer, thermal resistance. Thermal expansion of solids and liquids.

Weryfikacja:

written exam

**Powiązane efekty kierunkowe:** K\_W02, K\_W03

**Powiązane efekty obszarowe:** T1A\_W03, T1A\_W04, T1A\_W01, T1A\_W02

### Profil ogólnoakademicki - umiejętności

**Efekt :**

Student can solve basic problems in the field of mechanics, hydrostatics and thermodynamics

Weryfikacja:

written exam

**Powiązane efekty kierunkowe:** K\_U01

**Powiązane efekty obszarowe:** T1A\_U01