**Nazwa przedmiotu:**

Physics 1

**Koordynator przedmiotu:**

Jan L. Nowiński

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia I stopnia

**Program:**

Computer Science

**Grupa przedmiotów:**

Technical Courses

**Kod przedmiotu:**

EPHY1

**Semestr nominalny:**

1 / rok ak. 2015/2016

**Liczba punktów ECTS:**

6

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

45 - lectures and exercises
60 - self study
15 - lab sessions
30 - preparation for lab projects and continuation of complex projects at home
10 - preparation for exam

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

4

**Język prowadzenia zajęć:**

angielski

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

3

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

|  |  |
| --- | --- |
| Wykład:  | 30h |
| Ćwiczenia:  | 15h |
| Laboratorium:  | 15h |
| Projekt:  | 0h |
| Lekcje komputerowe:  | 0h |

**Wymagania wstępne:**

**Limit liczby studentów:**

60

**Cel przedmiotu:**

The Physics 1 course aims, in general, for teaching the students in understanding the world around and learning them in application of the physical approach for solving technical or technological problems. The goals are achieved by the lectures, which provide with the theoretical background, the tutorials during which the gained theory is used for solving problems and the physics laboratory, where the students learn the art of experimental measurements and train the estimation of the experimental uncertainties.
The physics knowledge gained should help and facilitate the other engineering courses.

**Treści kształcenia:**

Lectures:
1. Language and methodology of physics (2h).
2. Classical mechanics (4h): basic concepts in mechanics, mass and moment of inertia, force and torque, momentum and angular momentum, Newton's law of motion, conservation laws, symmetries and conservation laws, field of forces and potentials.
3. Theory of relativity (6h): the Michelson-Morley experiment, Einstein's postulates, Lorentz transformation, the law of relativistic addition of velocities, the relativistic effects: a length contraction and a time dilation, mass and energy in relativity, the timespace.
4. Thermodynamics (6h): basic notions of thermodynamics, work and heat, the laws of thermodynamics, the state and the process functions, thermodynamics potentials, politropic process, ideal and real gases, entropy.
5. Statistical physics (10h): basic concepts in statistical physics, pressure, temperature and entropy in statistical physics, the Boltzmann's and the Maxwell Boltzmann's distributions, the equipartition of energy, electricity, electric field in vacuum, metals and dielectrics, the electric capacity, piezoelectricity, currents, a classical model of current, current rules, magnetism, a physical concept of magnetic field, the Biot-Savart-Laplace's law, the Ampere's law, magnetic materials, electromagnetic induction.
6. The Maxwell's equations (2h).
Tutorials:
During exercises students are taught and trained to solve problems prepared by the tutor and related to:
a) Classical Mechanics (the Newton's lows of motion, the Conservation laws, momentum and angular momentum),
b) Theory of Relativity (the Lorentz transformation, the law of relativistic addition of velocities, the relativistic effects: a length contraction and a time dilation, mass and energy in relativity).
Laboratory:
An educational goal of the physics laboratory focuses on teaching the students to perform a physical experiments in a correct manner. It includes: planning the experiment, measurements execution, analysis of the obtained results, error analysis of the results and the final report. A student has to perform satisfactorily all scheduled experiments (three experiments).
Some of the experiments are related to the nuclear physics.

**Metody oceny:**

Assessment scheme of the modules
Lecture 0-60pts Pass>30pkt Written & oral test
Tutorials 0-20pts Pass>10pkt Written tests
Laboratory 0-20pts Pass> to perform satisfactorily all scheduled experiments
The final result is based on the following pattern:
• 5.0: 91-100 points
• 4.5: 81-90 points
• 4.0: 71-80 points
• 3.5: 61-70 points
• 3.0: 51-60 points
• 2.0: 0-50 points

**Egzamin:**

tak

**Literatura:**

1. J.L. Nowiński, J.E. Garbarczyk, Physics Lectures, part I, CEmS, Politechnika Warszawska, 1998 Warszawa.
2. J.L. Nowiński, J.E. Garbarczyk, Physics Lectures. Auxiliary materials, part II, CEmS, Politechnika Warszawska, 1998 Warszawa.
3. H.D. Young, R.A. Freedman, University Physics, San Francisco 2000, Addison Wesley,
4. J.D. Cutnell, College Physics, New York 1995, John Wiley & Sons,
5. D.C. Giancoli, Physics, Upper Saddle River 1980, Prentice Hall,
6. G.L. Buckwalter, D.M. Riban, College Physics, New York 1987, McGraw Hill.

**Witryna www przedmiotu:**

http://studia.elka.pw.edu.pl/

**Uwagi:**

## Efekty przedmiotowe

### Profil ogólnoakademicki - wiedza

**Efekt EPHY1\_W01:**

Understands the basic phenomena and interactions in physics, knows mathematical methods of description of physical systems, knows the basic rules of behavior.

Weryfikacja:

Exam

**Powiązane efekty kierunkowe:** K\_W02

**Powiązane efekty obszarowe:** T1A\_W01, T1A\_W02, T1A\_W03, T1A\_W07

**Efekt EPHY1\_W02:**

Has a basic knowledge of principles of mechanics

Weryfikacja:

Exam

**Powiązane efekty kierunkowe:** K\_W02

**Powiązane efekty obszarowe:** T1A\_W01, T1A\_W02, T1A\_W03, T1A\_W07

**Efekt EPHY1\_W03:**

Has a basic knowledge of electrodynamics, including electrostatics, magnetostatics, electromagnetic induction and electromagnetic field theory.

Weryfikacja:

Exam

**Powiązane efekty kierunkowe:** K\_W02

**Powiązane efekty obszarowe:** T1A\_W01, T1A\_W02, T1A\_W03, T1A\_W07

### Profil ogólnoakademicki - umiejętności

**Efekt EPHY1\_U01:**

Is able to formulate and solve simple equations of motion of mechanical systems,

Weryfikacja:

Test, exam

**Powiązane efekty kierunkowe:** K\_U01, K\_U02

**Powiązane efekty obszarowe:** T1A\_U01, T1A\_U02

**Efekt EPHY1\_U02:**

He can apply Coulomb's law, Gauss' law, Biot-Savart's law, Ampere's law, and Faraday's law, as well as solve elementary problems of electrodynamics.

Weryfikacja:

Test, exam

**Powiązane efekty kierunkowe:** K\_U01, K\_U02

**Powiązane efekty obszarowe:** T1A\_U01, T1A\_U02

**Efekt EPHY1\_U03:**

Can use appropriate mathematics and mathematical tools to solve problems in physics

Weryfikacja:

Test, exam

**Powiązane efekty kierunkowe:**

**Powiązane efekty obszarowe:**