**Nazwa przedmiotu:**

Physics 2

**Koordynator przedmiotu:**

dr Jan Leszek Nowiński

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia I stopnia

**Program:**

Informatyka

**Grupa przedmiotów:**

Wspólne

**Kod przedmiotu:**

brak

**Semestr nominalny:**

2 / rok ak. 2009/2010

**Liczba punktów ECTS:**

4

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

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

**Język prowadzenia zajęć:**

polski

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

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

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

**Wymagania wstępne:**

A student should attend Physics I course.

**Limit liczby studentów:**

**Cel przedmiotu:**

After the course a student gains the knowledge related to electromagnetism, elasticy, peridic motion, waves, foundation of quantum mechanics. Physics II course combined with Physics I delivers a standard, knowledge in physics, necessary for the fundamental education of an engineer.

**Treści kształcenia:**

The lecture content: 1. Maxwell?s equations. 2. Electromagnetic waves. 3. Elastic, shear and volume deformations (units). 4. Concepts of stress and strain. 5. Hooke?s law. 6. Ideal spring. 7. Simple harmonic motion, damped and driven harmonic motions. 8. Resonance. 9. Waves: definition, types of waves. 10. Phase angle. 11. Phase and group speeds. 12. Energy in wave motion. 13. Interference: constructive and distractive. 14. Coherent waves. 15. How does a compact disk work ? 16. Huygens?- Fresnel?s principle. 17. Fermat?s principle. 18. Refraction and reflection. 19. The diffraction grating. 20. Resolving power of a diffraction grating. 21.The photoelectric effect. 22. The Compton effect. 23. The Davisson and Germer experiment. 24. The waves of matter. 25. The Heisenberg uncertainty principle. 26. Schr?dinger equation (with and without time). 27. Wave and specific functions ?? physical interpretation. 28. Examples of the Schr?dinger equation solution: a/ a free particle, b/ a particle in the step potential, c/ a particle in the infinite potential well. 29. The tunnel effect. 30. Why do nanoscale objects show quantum effects? 31. The quantum simple harmonic oscillator. 32. The Schr?dinger model of a hydrogen atom. 33. The quantum numbers: n, l, m and ms. 34. Periodic table of elements. 35. The quantum dipole. 36. Ruby and He-Ne lasers. The execise content: 1/ Electric circuits, currents - problems 2/ Currents - class test, 3/ Maxwells equations - selected problems, 4/ Maxwells equations - class test, 3/ Wave motion - problems, 4/ Interference and diffraction phenomena - selected problems, 5/ Waves - class test

**Metody oceny:**

The results of the final lecture test and the exercises comprise the final mark. 1/ Lecture Final test - 60 pts (max) The list of all exam questions is announced in advance by the lecturer. The final test proceeds during exam session, and usualy it lasts no longer than two hours. During the test the studends answer the questions and solve simple problems, all related to the lectured material. To pass the panel (lecture) is required to get more than 30 pts 2/ Exercises - 40 pts (max) During exercises are three tests related to the problems previously discussed and solved. To pass the panel (exercise) is required to get more than 20 pts. The final mark (lecture + exercises). Mark A - (91-100) pts, Mark B+ -(81-90) pts, Mark B - (71-80) pts, Mark C+ - (61-70) pts, Mark C - (51- 60) pts, Fail, if less than 51 pts.

**Egzamin:**

**Literatura:**

1/ Hugh D. Young and Roger A. Freedman, University Physics, San Francisco 2008, Addison-Wesley, 2/ J.L. Nowi?ski and J.E. Garbarczyk, Physics Lectures. Auxilary materials, part II, CEmS, Politechnika Warszawska, 1998, Warszawa

**Witryna www przedmiotu:**

**Uwagi:**

## Efekty przedmiotowe