

SYLLABUS

SUBJECT: FUNDAMENTALS OF PHYSICS

TEACHER: Prof. Marek Matczak, PhD, DSc

COURSE DESCRIPTION :

The purpose of the course is to provide the fundamentals of physics useful in computer science applications.

Lecture: Elements of classical mechanics: kinematics of material point, Newton's laws of dynamics, conservation laws, work and energy, Galilean transformations, inertial forces. Gravitation. Elements of electricity: Coulomb's law, electric field, Gauss' flux theorem, polarization of dielectric materials, continuity equation, electromotive force, Ohm's law, magnetic field, Biot-Savart law, Lorentz force, Ampere's circuital law, magnetic properties of materials, Faraday's law of induction, Maxwell's equations, electromagnetic wave equation. Fundamentals of optics. Fundamentals of acoustics. Fundamentals of quantum mechanics.

Classes: Practical exercises concerning application of physical laws for building algorithmic models of real physical phenomena and processes.

LEARNING OUTCOMES:

A student receives a basic knowledge about fundamentals of physics.

GRADING POLICY:

Lecture: Exam in the form of written test.

Classes: Activity during classes.

TIMETABLE

Lecture: 2 hours/every week

Classes: 2 hours/every week

TEXTBOOK AND REQUIRED MATERIALS:

1. D. Halliday, R. Resnick and K.S. Krane, *Physics* (5th Edition), Vol. 1 and 2, John Wiley & Sons, New York 2002 (in English)
2. R. F. Kingsbury, *Elements of Physics; An Introduction for Students of Science and Engineering*, Van Nostrand Company, Princeton 1965 (in English)
3. R. P. Feynman, R. B. Leighton, M. L. Sands, *The Feynman lectures on physics*, Pearson/Addison-Wesley, San Francisco 2006 (in English)
4. J. Oread: *Fizyka*, t. 1,2, WNT, Warszawa (in Polish)

PREREQUISITES:

Mathematics and physics in comprehensive school