

Field: IT
Module title: Physics (B.1)
Preliminary conditions: none
Education aims: Discussion about laws and methods of general physics in order to explain physical phenomena and fundamentals of modern technology. To teach of using the units of measurements from the International System and how to present numerical results of measurements in the correct form.
Education outcomes: Student is able to make use of laws and methods of general physics in order to explain physical phenomena and fundamentals of modern technology. He knows and is capable of using the units of measurements from the International System and is able to present numerical results of measurements in the correct form. He can also estimate the measurement uncertainty.
Module type and contents: INTRODUCTION: Physics as a natural science. SI – International System of Units. Rudiments of vector calculus. Foundations of analysis of experimental results: measurement and uncertainty, types of error, error analysis. MECHANICS: Material point kinematics. Dynamics of the material point. Newton's Laws of Dynamics, Rigid body dynamics (rotary motion): torque, moment of inertia, law of parallel axis, angular momentum. Work, power and energy. Laws of conservation of momentum, angular momentum and energy. Statics. Gravitation: lines of forces, potential of gravitational field. FLUID MECHANICS: Hydrostatics: Hydrodynamics of the ideal fluid: equation of continuity of flow, Bernoulli's theorem, Magnus effect. Real fluids: viscosity, Stokes formula, Hagen-Poiseuille formula, Reynolds number. THERMAL PHYSICS: Kinetic theory of heat: temperature, zero law of thermodynamics, heat, specific heat. Thermostatistics: heat balance. First law of thermodynamics. Equation of state of ideal gas, ideal gas laws. Second law of thermodynamics: reversible and irreversible processes, entropy, heat engines, Carnot cycle. ELECTRICITY AND MAGNETISM: Electrostatics: electric charge, law of conservation of electric charge, Coulomb's law, electric field, potential and electric tension, dielectric properties of matter. Electric current: charge carriers, current strength, electric resistance, Ohm's laws, electromotive force, Kirchhoff's laws, Joule effect. Magnetic field: Lorentz force, induction and magnetic field strength, magnetic properties of matter. Electromagnetic induction: Faraday law, Lenz law, self-inductance. INTRODUCTION TO THE MODERN PHYSICS AND TECHNOLOGY: Quantum physics, special and general theory of relativity, cosmology..
Educational methods: Multimedia presentations, lessons.
Assessment methods: Examination
ECTS credits: 6
Students workload (hs.): 150
Form Number of hours: 30
Author of a module: Urbanik Witold, PhD
Module language: english