GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Physics I, PG_00039391 | | |
| Field of study | Medical and Mechanical Engineering, Mechanical and Medical Engineering | | |
| Date of commencement of studies | October 2020 | Academic year of realisation of subject | 2020/2021 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 1 | ECTS credits | 5.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Ireneusz Linert | |
| | Teachers | dr inż. Ireneusz Linert | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 15.0 | 0.0 | 0.0 | 0.0 | 45 |

E-learning hours included: 0.0

Adresy na platformie eNauczanie:
Fizyka 1 - kurs dla specjalności IMM oraz MiBM niestacjonarne - Moodle ID: 7126
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7126

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 45 | 10.0 | 70.0 | 125 |

**Subject objectives**

To know physical quantities and phenomena, to describe, analyse and understand more complex physical problems with the use of advanced mathematics

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K6_U01 | The student learns the methods of solving and analyzing physical problems. With this knowledge he can solve other engineering problems. | [SU4] Assessment of ability to use methods and tools |
| K6_W02 | the student knows the theoretical basis of classical physics | [SW1] Assessment of factual knowledge |
| K6_U05 | Student is able to solve analytically physical problems in the area of classical physics. With this knowledge he can solve other engineering problems in the field of mechanical and medical engineering | [SU1] Assessment of task fulfilment |

<table>
<tr><td>Subject contents</td><td>LECTURE: Introduction: International system of units. Standards of units. Description of motion. Newton’s law. Work, energy, power. Conservation of energy. Centre of mass, linear momentum of a system, conservation of linear momentum – examples. Angular motion of a rigid body, moment-of- the-force, angular momentum, conservation of angular momentum Simple harmonic motion, damped harmonic motion. Forced vibration. Resonance. Mechanical waves. Harmonic waves. Interference of waves. Standing wave. Doppler’s effect. Special theory of relativity. Galilean transformation, relativity effects. Lorentz transformation. Electric field. Electric field strength. Coulomb’s law. Electric dipole. Gauss’s law. Potential of electric field. Potential of a charge system. Potential of a conductor. Electrical capacitance. Electric current: current strength, Ohm’s law, Kirchhoff’s law, power of electric current Magnetic field: Lorentz’s force, charge and conductor with current into magnetic field. Ampere’s law. Two parallel conductors with currents. Biot-Savart’s law. Conductors and dielectrics, dia-, para- and ferromagnetic materials, phenomenon of electromagnetic induction Geometrical optics: reflection and refraction of light, mirrors, lens, optical fibers. EXERCISE: Solving problems illustrating Newton’s laws, translational and rotational motions of bodies. Solving problems applying conservation energy, momentum and angular momentum. Solving problems of simple harmonic motion and damped harmonic motion. Solving problems of propagation waves in elastic medium. Calculation of deflection and velocity of particle of medium during propagation waves. Calculation of dilatation of time and contraction of length using Lorentz’s transformation. Solving problems illustrating dependence of mass, momentum and energy of bodies on the velocity. Calculation of the forces, the electrostatic field strength and the electrostatic potential in point charges system, solution of problems using the Gauss" law, calculation of the capacitance of capacitors, calculation of trajectory motion of charged particles in electric and magnetic field, determination of magnetic induction using the Biot-Savart’s and Amper’s law, solving problems illustrating the phenomenon of electromagnetic induction</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>High school level physics knowledge</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Final test - solving problems</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>Final exam - theory and problems</td><td>50.0%</td><td>60.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Bobrowski Cz., Fizyka: krótki kurs, WNT, Warszawa 2005 2. Orear J., Fizyka t. 1,2, WNT, Warszawa 1993</td></tr>
<tr><td>Supplementary literature</td><td>1. Halliday D., Resnick R., Walker J., Podstawy fizyki t. 1,2,3,4 PWN, Warszawa 2003</td></tr>
<tr><td>eResources addresses</td><td>Fizyka 1 - kurs dla specjalności IMM oraz MiBM niestacjonarne - Moodle ID: 7126<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7126</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>A bullet was shot at the angle of alfa to the horizontal. Find its final velocity and range in its highest point of trajectiory is 5 m?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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