GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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| Subject name and code | Physics I, PG_00049254 | | | | | | |
| Field of study | Spatial Development | | | | | | |
| Date of commencement of studies | October 2020 | | Academic year of realisation of subject | 2022/2023 | | | |
| 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 | 3 | | Language of instruction | Polish | | | |
| Semester of study | 6 | | ECTS credits | 3.0 | | | |
| Learning profile | general academic profile | | Assessment form | assessment | | | |
| Conducting unit | Zakład Fotofizyki Molekularnej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Piotr Grygiel | | | | | |
| | Teachers | dr inż. Piotr Grygiel | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 15.0 | 0.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| 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 | 30 | | 5.0 | 40.0 | 75 | |
| Subject objectives | Mastering a specific body of knowledge in the field of general physics and developing the ability to reason in cause-effect categories based on the known laws of physics, in the context of engineering problems related to spatial management. | | | | | | |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
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| | [K6_K02] comprehending technical and non-technical aspects and effects of its activity, initiates various activities for the public interest, including co-organizing social projects, workshops and public debates on issues related to spatial management, within which it can reliably present a problem on a non-professional forum and explain the methods and solutions used | Understanding the technical and non-technical aspects and effects of his activities, she/he initiates various activities for the public interest, including co-organizing social projects, workshops and public debates on issues related to spatial management, within which she/he is able to reliably present the problem on a non-professional forum and explain the methods and solutions used, using arguments based on the knowledge of the basics of physics. | [SK4] Assessment of communication skills, including language correctness |
| | K6_U04 | demonstrates the ability to correctly interpret and assess the current state on the basis of data from various sources; formulates guidelines for urban design | [SU2] Assessment of ability to analyse information |
| | [K6_W03] has elementary knowledge in the field of mathematics and physics relating to issues related to space management, including the basic mathematical methods used in urban design, as well as analytical and design methods using information technology used in planning processes of settlement structures | Has elementary knowledge of the basics of physics relating to issues related to spatial management, including basic mathematical methods used in urban design, as well as analytical and design methods using IT techniques used in the processes of planning settlement structures. | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects |
| | [K6_U01] has the ability to abstractly understand technical problems; applies basic mathematical and simulation methods in urban planning and spatial planning | Has the ability to understand technical problems in an abstract way; applies basic mathematical and simulation methods in urban design and spatial planning, using the knowledge of the basics of physics. | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU5] Assessment of ability to present the results of task |

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| Subject contents | 1. The scope and scale of physics: units and standards, unit conversion, dimensional analysis.<br><br>2. Vectors: scalars and vectors, coordinate systems and components of a vector, algebra of vectors, products of vectors.<br><br>3. Motion along a straight line: position, displacement and average velocity, instantaneous velocity and speed, average and instantaneous acceleration, motion with constant acceleration, free fall.<br><br>4. Motion in two and three dimensions: displacement and velocity vectors, acceleration vector, projectile motion, uniform circular motion.<br><br>5. Newton's laws of motion: forces, first, second and third laws of motion, mass and weight, common forces, drawing free-body diagrams.<br><br>6. Applications of Newton's laws: friction, centripetal force, drag force.<br><br>7. Work and kinetic energy, work-energy theorem, power.<br><br>8. Potential energy and conservation of energy, sources of energy.<br><br>9. Linear momentum, impulse and collisions.<br><br>10. Fixed-axis rotation: rotational variables, rotation with constant angular acceleration, moment of inertia and rotational kinetic energy, Newton's second law of rotation, work and power for rotational motion.<br><br>11. Static equilibrium and elasticity: conditions for static equilibrium, stress, strain and elastic modulus.<br><br>12. Fluid mechanics: fluids, density, and pressure, measuring pressure, Pascal's principle and hydraulics, Archimedes' principle and buoyancy, fluid dynamics, Bernoulli's equation, viscosity and turbulence.<br><br>13. Oscillations: simple harmonic motion, energy in simple harmonic motion, pendulums, damped oscillations, forced oscillations, resonance.<br><br>14. Waves: traveling waves, mathematics of waves, energy and power of a wave, interference of waves, standing waves and resonance, sound waves, speed of sound, normal modes of a sound standing wave. |
| Prerequisites and co-requisites | Basic knowledge of high school physics. Knowledge of the mathematical apparatus at the level of engineering studies. |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
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| Active participation in classes | 0.0% | 25.0% |
| Assessment of a written work on a given topic | 0.0% | 75.0% |

Recommended reading

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| Basic literature | 1. University Physics by Open Stax |
| Supplementary literature | 1. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, John Villey & Sons, 2001 |
| eResources addresses | Adresy na platformie eNauczanie: |

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| Example issues/ example questions/ tasks being completed | 1. Determine the parameters for the movement of the passenger elevator as desired for a four-story and forty-story building.<br><br>2. Determine whether the slope of the roofs of the designed buildings is significant in areas with particularly heavy rainfall.<br><br>3. Determine whether the slope of the roofs of the designed buildings is significant in high winds.<br><br>4. Determine whether the distance between frontages on opposite sides of the street in the place of strong winds affects the comfort of building use. If so, when is the problem most significant? |
| Work placement | Not applicable |