



## Subject card

|   |   |  |   |            |         |         |     |
|---|---|--|---|------------|---------|---------|-----|
| Subject name and code                       | Physics I, PG_00055087  |  |   |            |         |         |     |
| Field of study                              | Mechanical Engineering  |  |   |            |         |         |     |
| Date of commencement of studies             | October 2022  | 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                               | 1   | Language of instruction                                    | Polish  |            |         |         |     |
| Semester of study                           | 1   | ECTS credits   | 5.0   |            |         |         |     |
| Learning profile                            | general academic profile  | Assessment form  | exam  |            |         |         |     |
| Conducting unit                             | Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology |  |   |            |         |         |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr hab. inż. Małgorzata Śmiątek-Telega                     |   |            |         |         |     |
|   | Teachers  | dr hab. inż. Małgorzata Śmiątek-Telega                     |   |            |         |         |     |
| 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  |  |   |            |         |         |     |
| 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   | 9.0   | 71.0       | 125     |         |     |
| Subject objectives                          | Student knows fundamentals of Classical Mechanics, Electricity and Magnetism as well as thermodynamics      |  |   |            |         |         |     |
| Learning outcomes                           | Course outcome  | Subject outcome  | Method of verification  |            |         |         |     |
|   | K6_W02  | The student knows the foundations of classical physics     | [SW1] Assessment of factual knowledge   |            |         |         |     |
|   | K6_U01  | The student can predict the effects of the laws of physics | [SU2] Assessment of ability to analyse information<br>[SU1] Assessment of task fulfilment |            |         |         |     |

## Subject contents

1. Units
2. Introduction to Kinematics, Vectors
3. Projectile Motion
4. Uniform Circular Motion
5. Newton's Laws of Motion
6. Frictional Force
7. Work and Energy
8. Simple Harmonic Motion
9. Damped Simple Harmonic Motion, Forced Oscillations and Resonance,
10. Momentum, Conservation of Linear of Momentum
11. Inelastic and Elastic Collisions
12. Rotation of Rigid Body, Angular Momentum, Conservation of Angular Momentum
13. Equilibrium
14. Sound Waves
15. Electric Field and Dipoles
16. Electric Flux and Gauss' Law
17. Electric Potential and Electric Potential Energy
18. Electrostatic Shielding, High-Voltage Breakdown, Capacitors
19. Polarization and Dielectrics
20. Electric Current, Resistance, Ohm's Law
21. Batteries and EMF
22. Magnetic Field and Lorentz Force
23. Moving Charge in B-field
24. Biot-Savart Law and Ampere's Law
25. Electromagnetic Induction

|  | <p>26. Magnetic Materials</p> <p>27. Physical properties of fluids</p> <p>28 Thermodynamics</p> <p>28. Geometric Optics</p>   |                          |   |                               |  |                      |       |           |       |       |
|--|---|--------------------------|---|-------------------------------|--|----------------------|-------|-----------|-------|-------|
| Prerequisites and co-requisites                                | High school level physics knowledge   |                          |   |                               |  |                      |       |           |       |       |
| Assessment methods and criteria                                | <table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Lecture</td> <td>50.0%</td> <td>50.0%</td> </tr> <tr> <td>Exerciscs</td> <td>50.0%</td> <td>50.0%</td> </tr> </tbody> </table>  | Subject passing criteria | Passing threshold   | Percentage of the final grade | Lecture  | 50.0%                | 50.0% | Exerciscs | 50.0% | 50.0% |
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|  | Lecture   | 50.0%                    | 50.0%   |                               |  |                      |       |           |       |       |
| Exerciscs  | 50.0%   | 50.0%                    |   |                               |  |                      |       |           |       |       |
| Recommended reading  | <table border="1"> <tbody> <tr> <td>Basic literature</td> <td> <p><a href="https://openstax.org/details/books/university-physics-volume-1">https://openstax.org/details/books/university-physics-volume-1</a></p> <p><a href="https://openstax.org/details/books/university-physics-volume-2">https://openstax.org/details/books/university-physics-volume-2</a></p> </td> </tr> <tr> <td>Supplementary literature</td> <td>Halliday, David, Robert Resnick, and Jearl Walker. <i>Fundamentals of physics</i>. John Wiley &amp; Sons, 2013.</td> </tr> <tr> <td>eResources addresses</td> <td></td> </tr> </tbody> </table> | Basic literature         | <p><a href="https://openstax.org/details/books/university-physics-volume-1">https://openstax.org/details/books/university-physics-volume-1</a></p> <p><a href="https://openstax.org/details/books/university-physics-volume-2">https://openstax.org/details/books/university-physics-volume-2</a></p> | Supplementary literature      | Halliday, David, Robert Resnick, and Jearl Walker. <i>Fundamentals of physics</i> . John Wiley & Sons, 2013. | eResources addresses |       |           |       |       |
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| Supplementary literature                                       | Halliday, David, Robert Resnick, and Jearl Walker. <i>Fundamentals of physics</i> . John Wiley & Sons, 2013.  |                          |   |                               |  |                      |       |           |       |       |
| eResources addresses   |   |                          |   |                               |  |                      |       |           |       |       |
| Example issues/<br>example questions/<br>tasks being completed | A body of mass 2.0 kg makes an elastic collision with another body at rest and continues to move in the original direction but with one-fourth of its original speed. (a) What is the mass of the other body? (b) What is the speed of the two-body center of mass if the initial speed of the 2.0 kg body was 4.0 m/s?   |                          |   |                               |  |                      |       |           |       |       |
| Work placement   | Not applicable  |                          |   |                               |  |                      |       |           |       |       |