<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Fundamental concepts in physics</td></tr>
<tr><td>Code</td><td>PMP106</td><td>Year of study</td><td colspan="4">1st year of undergraduate study</td></tr>
<tr><td>Course teacher</td><td>doc. dr. sc. Bernarda Lovrinčević</td><td>Credits (ECTS)</td><td colspan="4">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>15</td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="4">50%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Acquire conceptual knowledge and understanding of mechanics, fluid mechanics, waves and thermodynamics. Acquire computational knowledge in solving physical problems and develop competence in construction of mathematical models for real mechanical problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Enrollment in the 1st year of undergraduate study</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Upon passing the course of Fundamental Concepts of Physics, the student will be able to:<br>1. demonstrate knowledge of kinematics of motion in one, two and three dimensions;<br>2. identify and explain Newton's laws of motion and apply them in numerical problems;<br>3. explain the concepts of work , kinetic and potential energy, momentum and impulse and apply the laws of conservation of energy and momentum in realistic examples;<br>4. demonstrate knowledge of kinematics and dynamics of rigid bodies rotations and solve simple problems involving the rotation of a rigid body;<br>5. explain the concept of hydrostatic pressure and buoyancy, apply the Continuity equation and Bernoulli equation in numerical examples in hydromechanics;<br>6. explain the motion of a simple harmonic oscillator and describe the propagation of waves, the interference of waves, the resonance and the Doppler effect;<br>7. identify and explain the laws of Thermodynamics and explain the concept of heat and heat transfer.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures per weeks (15 weeks in total):<br>1. Motion in one dimension (2L+1S)<br>2. Motion in two and three dimensions (2L+1S)<br>3. Force and Newton's laws of motion (2L+1S)<br>4. Applying Newton's laws (2L+1S)<br>5. Work and kinetic energy (2L+1S)<br>6. Potential energy and energy conservation (2L+1S)<br>7. Momentum, impulse, and collisions (2L+1S)<br>8. Kinematics and dynamics of rotation of rigid bodies (2L+1S)<br>9. Conditions for equilibrium (2L+1S)<br>10. Fluid mechanics (2L+1S)<br>11. Oscillations (2L+1S)<br>12. Waves (2L+1S)<br>13. Solids, liquids and gases (2L+1S)<br>14. Heat and heat transfer (2L+1S)<br>15. Laws of thermodynamics (2L+1S)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">x lectures<br>x seminars and workshops<br>☐ exercises<br>☐ on line in entirety<br>☐ partial e-learning<br>☐ field work</td><td colspan="3">x independent assignments<br>☐ multimedia<br>☐ laboratory<br>☐ work with mentor<br>☐ (other)</td></tr>
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| Student responsibilities | Students have to attend at least 70% of the lectures and 80% of the seminars. Students have to write an essay on a chosen scientific topic and present it in front of the colleagues and the teacher. Students also have to solve 50% of the written exam. | | | | | |
| Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)* | Class attendance | 1 | Research | | Practical training | |
| | Experimental work | | Report | | (Other) | |
| | Essay | | Seminar essay | 1 | (Other) | |
| | Tests | | Oral exam | | (Other) | |
| | Written exam | 1 | Project | | (Other) | |
| Grading and evaluating student work in class and at the final exam | Contributions to the final grade:<br>1. written part of the essay – 25%<br>2. presentation of the essay – 25%<br>3. written exam – 50% | | | | | |

| Required literature (available in the library and via other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
|---|---|---|---|
| | 1. D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics. 9th Edition, John Wiley, New York 2011. | 21 | internet |
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| Optional literature (at the time of submission of study programme proposal) | • P. G. Hewitt, Conceptual Physics, 12th Edition, Pearson 2010.<br>• H. D. Young, R. A. Freedman, Sears and Zemansky's University Physics, 12th Edition, Pearson, 2008. |
| Quality assurance methods that ensure the acquisition of exit competences | Statistics of the exam results and student evaluation via an anonymous survey conducted by the University of Split. |
| Other (as the proposer wishes to add) | |