<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Classical Mechanics I</td></tr>
<tr><td>Code</td><td>PMP110</td><td>Year of study</td><td colspan="4">2nd year of undergraduate study</td></tr>
<tr><td>Course teacher</td><td>doc. dr. sc. Marko Kovač</td><td>Credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Tomislav Primorac, mag. phys.</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>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="4">25%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">The knowledge and understanding of Newtonian mechanics.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">General Physics I</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Students who have completed this course should:

1. Be able to apply vector calculus to solve basic problems in Classical Mechanics;
2. Have a deep understanding of Newton’s laws;
3. Understand the central forces with accent on gravity;
4. Understand the connection between the inertial and non-inertial frames of reference.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Vector calculus: definition and basic properties of vectors; addition of vectors; vector multiplication; parity operator; derivative and integral of a vector field; gradient; divergence and Gauss’s theorem; rotation and Stokes’ theorem; Laplace operator.

Kinematics: cylindrical coordinate system; spherical coordinate system; velocity and acceleration in rectangular, cylindrical and spherical coordinate systems; Frenet - Serret formulas; circular motion.

Newtonian mechanics: Newton’s axioms; inert and heavy mass; work, power, and kinetic energy; conservative forces and potential energy; conservation of mechanical energy; impulse, torque, and angular momentum; equilibrium of a particle; systems of particles and center of mass.

Projectiles and charged particles: motion in a uniform force field; falling bodies and projectiles; linear and quadratic air resistance; motion of charged particles in the Lorentz force field.

Oscillations: free, damped and driven damped harmonic oscillations; resonance; two-dimensional harmonic oscillator; mathematical pendulum.

Not-inertial systems: time derivative of vectors in inertial and non-inertial systems, speed and acceleration in non-inertial systems; the equation of motion in non-inertial systems connected to the surface of the Earth.

Central force problem: general properties of central forces; gravitational force as an example of central force; multipole expansion of the gravitational field; equations of motion for a particle in the central foce field, effective potential and energy graph; equivalence of Kepler’s laws and the laws of gravity; virial theorem; scattering in the central force field.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning</td><td colspan="3">☒ independent assignments
☒ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
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	☐ field work					
Student responsibilities	Attendance: lectures ≥ 70% and auditory exercises ≥ 70%.					
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		(Other)	
	Tests	1	Oral exam	2	(Other)	
	Written exam	1	Project		(Other)	
Grading and evaluating student work in class and at the final exam	Two pre-exams during the semester (50% weighting) each followed by the oral exam (50% weighting), or one written exam (50% weighting) and the oral exam (50% weighting).					

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Goldstein H, Poole CP, Safko JL. Classical Mechanics. Addison-Wesley Longman; 2002.		No
	Taylor JR. Classical Mechanics. University Science Books; 2005.		No

Optional literature (at the time of submission of study programme proposal)	Notes and slides available on Moodle.
Quality assurance methods that ensure the acquisition of exit competences	Evaluation via anonymous questionnaires at the end of the course. The survey is conducted according to the rules of the University of Split.
Other (as the proposer wishes to add)	