<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">General Physics III</td></tr>
<tr><td>Code</td><td>PMP006</td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Prof. Mile Dželalija, PhD</td><td>Credits (ECTS)</td><td colspan="3">8,0</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ass. Prof. Damir Kovačič, PhD</td><td rowspan="2">Type of instruction (number of hours)</td><td>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>60</td><td>15</td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of application of e-learning</td><td colspan="3">20 %</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Understanding and application of physical concepts and laws on oscillations, waves and optics to solve the problem, explain the natural phenomena and principles of the work of selected devices and instruments.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Learning Outcomes from Mechanics and Electromagnetism.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">- Apply and critically discuss the terms and laws on oscillations, mechanical and electromagnetic waves and optics
- Solve complex in oscillations, waves and optics
- Explain the principles of operation of basic measuring instruments and apply them to selected measurements of oscillations, waves and optics
- Explore and present selected topics of oscillations, waves and optics
- Critically discuss the application of the principles and laws of oscillations, waves and optics interdisciplinary</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Introduction; The mass and size of the nuclei; properties of nuclei in the ground state. 2. Mean potential model. 3. Fermi gas model. 4. Liquid-drop model. 5. Shell model. 6. Quantum-mechanical model of alpha-decay. 7. Alpha-decay and spontaneous fission. 8. Unstable states and resonances; Excited states of nuclei. 9. Beta i gamma decay. 10. Cross-section; Transport of particles through matter. 11. Nuclear reactions. 12. Nuclear fusion. 13. Energy from nuclear fusion and fission. 14. Radiation and the life. 15.Nuclear processes in stars.

1. Oscillations. Simple harmonic motion. Damped oscillations. Forced oscllations.
2. Bound oscillations. Adding harmonic oscillations.
3. Transverse and longitudinal waves in elastic media. Wave equation.
4. Speed of transverse wave on string. Energy and power of a wave. Wave packet.
5. Waves interference. Standing waves. Reflection. Standing waves and resonance.
6. Fourier analysis.
7. Sound waves. Intensity and sound level. Standing sound waves. Doppler effect
8. Waves in solids
9. Electromagnetic oscillations. Echectromagnetic waves. Poyintingov vector.
10. Polarization. Refraction and reflection. Dispersion of light.
11. Geometric optics. Fermat's principle. Mirrors. Spherical diopters. Lenses.
12. Wave optics. Light interference. Light diffraction.
13. Optical instruments. Colors. Photometry.
14. Linear spectra. Physical basis of laser.
15. Matter waves.</td></tr>
<tr><td>Format of instruction</td><td colspan="5">Lectures using presentations, interactive simulations, performing demonstration experiments, solving selected task examples, both individually and in the group, discussing and solving the problem. Solving tasks at</td></tr>
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	auditory exercises, independently and with the guidance of the assistant, and student presentations and discussion of individual topics at the seminar.
Student responsibilities	Passed exams: Numerical problems and theories. Success in each of at least 50%. - actively participate in the classes with their comments, questions and answers to the questions - prepare and present the seminar work on the selected topic - solving numerical tasks by applying the concepts and laws in the content - critically discuss selected concepts and laws and their applicability
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)*	2 ECTS: preparation and presentation of the seminar 3 ECTS: active participation in the lectures and independent learning of the theoretical concepts and laws of the mentioned contents 3 ECTS: active participation in exercises and self-exercising solving complex numerical problems
Grading and evaluating student work in class and at the final exam	- preparation and presentation of the seminar (15%) - Critical Discussion of Terms and Laws (45%) - Solving Numerical Complex Problems (40%)
Required literature (available in the library and via other media)	M- D.Halliday, R.Resnick, J.Walker, Fundamentals of Physics, JW and Sons, 6th edition, extended, 2003; or later - M.Dželalija, General Physics III, presentations, 2018.
Optional literature (at the time of submission of study programme proposal)	- V. Henč-Bartolić i Petar Kulišić. Valovi i optika. Školska knjiga, Zagreb 1989. - F.S. Crawford. Waves. Berkeley Physics Course III, McGraww-Hill, New York - Babić, R. Krsnik i M. Očko, Zbirka riješenih zadataka iz fizike. Školska knjiga, Zagreb 1982. - F.W. Sears, M.W. Zemansky, H. D.Young, R. A. Freedman. University Physics. Addison Wesley London, 2000. - R.P. Feynman, R.B. Leighton, M. Sands. The Feynman lectures on physics I, Addison-Wesley, London 1975. - M. Paić, Osnove fizike I,IV, Liber, Zagreb, 1978-1983.
Quality assurance methods that ensure the acquisition of exit competences	- Analysis of learning outcomes at the end of class versus initial screening. - monitoring student development on the following subjects and links to the success of this subject - other student surveys
Other (as the proposer wishes to add)	