NAME OF THE COURSE	Nuclear Physics					
Code	PMP203	Year of study	1			
Course teacher	Ivana Weber, PhD, assistant professor	Credits (ECTS)	5,0			
Associate teachers	Ivana Weber, PhD, assistant professor	Type of instruction (number of hours)	P	S	V	T
			30		30	
Status of the course	compulsory and elective	Percentage of application of e-learning	20 %			
COURSE DESCRIPTION						
Course objectives	Understanding the basic properties of atomic nuclei, basic models, including laws, that describe states and processes in atomic nuclei.					
Course enrolment requirements and entry competences required for the course	Learning outcomes foreseen in subjects: General Physics; Quantum physics.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Explain the basic properties of atomic nuclei. 2. Critically discuss and apply basic models that describe atomic nucleus. 3. Explain spontaneous radioactive decay of atomic nuclei and apply appropriate laws. 4. Explain of nuclear reactions and use them in given examples. 5. Critically discuss the application of nuclear processes and their impact on life.					
Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction. The structure of the nuclei, basic nuclear properties. 2. The mass and size of the nuclei. Nuclear properties in the ground state. 3. Nuclear forces. Total angular momentum, spin and magnetic momentum. 4. Nuclear models: Mean potential model. 5. Nuclear models: Fermi gas model. 6. Nuclear models: Liquid-drop model. 7. Nuclear models: Shell model. 8. Nuclear models: Collective model. 9. Radioactivity. 10. Nuclear decays: Alpha decay. 11. Nuclear decays: Quantum-mechanical model of alpha-decay. 12. Nuclear decays: Beta and gamma decay. 13. Nuclear reactions. Cross-section; Transport of particles through matter. 14. Nuclear fission. Nuclear fusion. 15. Nuclear processes in stars. Radiation and life.					
Format of instruction	Frontal teaching; Demonstration experiments; Group work; Numerical exercises.					
Student responsibilities	Passed exams: Numerical problems and theories. Success in each of at least 50%.					

<table>
<tr><td>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)</td><td>
<table>
<tr><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th></tr>
<tr><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Experimental work</td><td></td></tr>
<tr><td>Oral exam</td><td>2</td><td>Report</td><td></td><td>Homework assignments</td><td></td></tr>
<tr><td>Seminar essay</td><td></td><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td></td><td>Practical training</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>2</td><td>Project</td><td></td><td></td><td></td></tr>
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<tr><td>Grading and evaluating student work in class and at the final exam</td><td>Students will be evaluated during the semester and the final exam. Successful final exam can replace all obligations.</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>Ivana Weber, Osnove nuklearne fizike, lectures, University of Split, 2020</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>A. Beiser, Concepts of Modern Physics, Mc Graw-Hill, 2003
J.-L. Basdevant, J. Rich, M. Spiro, Fundamentals in Nuclar Physics, Springer, 2005
W.N. Cottingham, D.A. Greenwood, An Introduction to Nuclear Physics, Second Edition, Cambridge University Press, 2001
S.S.M. Wong, Introductory Nuclear Physics, Second Edition, Wiley & Sons, New York, 1998</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>Regular validation of learning outcome during class.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td></td></tr>
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