

NAZIV PREDMETA		Modern Physics				
Code	PMP008	Year of study	II.			
Course teacher	Associate professor Željana Bonačić Lošić	Credits (ECTS)	5,0			
Associate teachers		Type of instruction (number of hours)	P	S	V	T
			45	5	30	0
Status of the course	obligatory	Percentage of application of e-learning				
OPIS PREDMETA						
Course objectives	Understanding of the basic concepts of modern physics and ability to explain them to others.					
Course enrolment requirements and entry competences required for the course						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Outline of historical evolution of the atomic structure. Explanation of the necessity of the replacement of the deterministic description of the nature with probabilistic one. Description and application of basic concepts and principles of quantum mechanics on simple problems: Schrödinger's equation, wave function and its physical interpretation, spin and Pauli's principle. Solving Schrödinger's equation in the simple cases (free particle, particle in a square well in different dimensions, ...). Description of the structure of the atomic nucleus. Description of the principle of the work of the nuclear reactors. Description of basic concepts of particle physics and cosmology.					
Course content broken down in detail by weekly class schedule (syllabus)	Rutherford scattering and Rutherford model of atom. Planck law of black body radiation. Bohr's model of hydrogen atom. Franck-Hertz experiment. Photoelectric effect. Compton scattering. De Broglie hypothesis. Davisson-Germerov experiment. Bohr's principle of complementarity and Heisenberg principle of uncertainty. Schrödinger wave equation. Tunnel effect. Harmonic oscillator. Hydrogen atom. Stern Gerlach experiment. Spin. Spectrum of X rays. Atomic nucleus. Radioactivity. Elementary particles. Big bang.					
Format of instruction	Lectures accompanied with experiments. Home experiments. Solving problems instructed by assistant. Uninfluenced solving of problems. Check of the solved problems and discussion on tutorials. Home experiments.					
Student responsibilities	Active lectures and exercises attendance.					
Screening student work (<i>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</i>)	Written exam 2 ECTS. Oral exam 2 ECTS. Seminar 1 ECTS.					

Grading and evaluating student work in class and at the final exam	Preliminary exams. Written exam. Seminar. Oral exams which include all or partially teaching material.
Required literature (available in the library and via other media)	<p>1. R. A. Serway, C.J. Moses and C. A. Moyer, Modern Physics, Thomson, Brook/Cole, 2005.</p> <p>2. P. Županović and Ž. Bonačić Lošić: Predavanja iz Moderne fizike, skripta za internu uporabu</p>
Optional literature (at the time of submission of study programme proposal)	D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics. John Wiley, New York 2001
Quality assurance methods that ensure the acquisition of exit competences	Student's opinion poll.
Other (as the proposer wishes to add)	