

Study program	Level of studies		First cycle	
	Study program name		Physics Education	
Course name	INTRODUCTION TO ATOMIC PHYSICS			
Course ID	Semester	Course status	ECTS credits	L+E
PHY4611	IV	MANDATORY	5	2+2
Lecturer				
Aims and intended learning outcomes	<p>Course objective is to familiarize students with phenomena and physical laws at the atomic level.</p> <p>Learning outcomes:</p> <ol style="list-style-type: none"> 1. Knows and understands phenomena and physical laws at microscopic level 2. Applies this knowledge to independently solve problems from this field 3. Can successfully attend and understand further courses throughout the study 			
Course content				
<p>Review of ideas that led to development of atomic physics. THERMAL RADIATION. Definition of black body. Black body emission and absorption. Laws of thermal radiation: Kirchhoff, Stefan-Boltzmann, Wien and Rayleigh-Jeans formula. UV catastrophe. Planck's law. Idea of photon. QUANTIZATION OF PHYSICAL WORLD-Quantization of electricity. Discovery of the electron. Thompson and Millikan experiments. Quantization of energy. Photons. Photoelectric effect. Einstein's formula for photoelectric effect. X-rays. Spectrum of X-rays. Atomic spectra. ELEMENTS OF THE SPECIAL THEORY OF RELATIVITY-Transformation of coordinates. Dilatation of time. Contraction of length. Mass and energy. Compton effect. MODELS OF ATOM- Thompson's static model. Rutherford's experiment with alpha particles. Rutherford's atomic model. BHOR'S THEORY OF HYDROGEN ATOM- Line spectra. Bhor's postulates. Energy levels. Application of Bhor's theory to atoms similar to hydrogen. Frank-Hertz experiment. Moseley's law. IMPROVEMENT OF BOHR'S MODEL. Wilson-Sommerfeld quantization rules. Elliptical model. Space quantization. QUANTUM MECHANICAL ATOMIC MODEL. Matter waves- de Broglie wavelength. Davisson-Germer experiment. Heisenberg uncertainty principle. WAVE FUNCTION AND PROBABILITY, QUANTIZATION OF ENERGY-Schrodinger equation. QUANTUM NUMBERS-Quantization of energy. Source and meaning of quantum numbers. Stern-Garlach experiment. PERIODIC TABLE OF ELEMENTS-Pauli's principle of exclusion. Dimensions of atoms.</p>				
Student workload (hours)		Grading		
Lectures and Exercises	60	Assessment method	Points	
Exam preparation	65	Test	50	
Assignments		Final exam	50	
Other				
Total	125			
		Total	100	
Literature				
1. N.Tanović i L.Tanović: OSNOVE ATOMSKE I NUKLEARNE FIZIKE, Uniprint Sarajevo, 1991.				
Remarks				