Program	Level of studies		First cycle	
	Program name		Educational Physics	
Course name	QUANTUM MECHANICS II			
Course ID	Semester	Course status	ECTS credits	L+E
PTH6711	**VI**	**MANDATORY**	**6**	**3+2**
Lecturer	**Prof. dr. Dejan Milošević**			
Aims and intended learning outcomes	The objective of the course is to introduce students to the applications of quantum mechanics, as well as to enable them to independently solve the tasks from this fundamental field of theoretical physics. Formalism developed within the scope of the course Quantum Mechanics I will be applied to various problems of atomic and molecular physics, scattering theory, etc. The learning outcome is mastering theoretical knowledge from the application of quantum mechanics and the ability to independently solve different problems from the application of quantum mechanics.			

Course content

Approximative methods in quantum mechanics: stationary perturbation theory, variational method, quasiclassical (WKB) approximation, time-dependent perturbation theory. Semiclassical theory of radiation. **Spin**: Key experiments. Mathematical description of the spin. Pauli's equation. **Quantum mechanics of many particle systems**: Identical particles. Pauli's principle. Slater's determinant. **Theory of atoms and molecules**: Methods of calculation of atomic systems. Self-consistent field method (Hartree-Fock method). Thomas-Fermi method. The theory of molecules in adiabatic approximation. **Scattering theory**: Scattering cross section. Transition amplitude. Born approximation. Method of partial waves. Inelastic scattering.

Student workload (hours)		Grading	
Lectures and Exercises	75	Assessment method	Points
Exam preparation	75	Partial exam	50
Assignments		Final exam	50
Other			
Total	150		
		Total	100

Literature

Mandatory:

1. D. Milošević, Kvantna mehanika II, 2015 (available at e-learning)

Recommended:

1. L. I. Šif, Kvantna mehanika, Vuk Karadžić, Beograd, 1968.
2. Supek, Teorijska fizika i struktura materije, II dio, Školska knjiga, Zagreb, 1977.
3. W. Greiner, Quantum mechanics. An introduction, Springer, Berlin, 1989.

Remarks