

Study program	Level of studies		Third cycle	
	Title of the study program		Doctoral studies in physics	
Course title	THEORY OF MULTIPHOTON PROCESSES			
Course ID	Semester	Course status	ECTS credits	Teaching hours
PTH7081	I /II	Elective	10	30
Course aims and expected learning outcomes	The goal of the course is to systematically master the theoretical methods used to analyze multiphoton processes in atomic physics.			
	Learning Outcomes: <ul style="list-style-type: none"> - student understands the basic terms used in the theory of multiphoton processes. - student will apply the formalism of quantum mechanics to the description of multiphoton processes. - student master the mathematical tools and methods used in the analysis of multiphoton processes. 			
COURSE CONTENT				
Electrons and atoms in the radiation field. Perturbation theory. Perturbation theory renormalization. Non-resonant multiphoton ionization. Theory of the effective Hamiltonian with stationary and time-dependent interactions. Density matrix method. Floquet's theory of multiphoton transitions. Theory of non-Hermitian Hamiltonians of multiphoton transitions. Theory of radiative electron-atom scattering.				
LITERATURE			ASSESSMENT OF LEARNING	
1. F. H. M. Faisal, <i>Theory of multiphoton processes</i> , Plenum Press, New York, 1987			Assessment Method	Points
			Homework	20
2. N. B. Delone, V. P. Krainov, <i>Multiphoton processes in atoms</i> , Springer-Verlag, Berlin, 2000.			Seminar paper	40
			Final exam	40
3. I. I. Sobelman, <i>Atomic Spectra and Radiative Transitions</i> , Springer-Verlag, Berlin, 1979.				
			Total	100
Remarks				