

Study program	Level of studies		Third cycle	
	Title of the study program		Doctoral studies in physics	
Course title	ADVANCED STATISTICAL PHYSICS			
Course ID	Semester	Course status	ECTS credits	Teaching hours
PTH7051	I/II	Elective	10	30
Course aims and expected learning outcomes	The aim of the course is to expand the knowledge that students acquired during the statistical physics course.			
	Expected learning outcomes: Mastering the knowledge, methods and mathematical apparatus of quantum statistics. Getting acquainted with various applications of quantum statistics.			
COURSE CONTENT				
Equilibrium quantum statistics. Formalism of quantum mechanics in Dirac notation. Basic concepts of quantum statistics. Basic results of equilibrium quantum statistics. The ideal gas of quantum particles. Non-equilibrium statistical operator. Linear response of the system and Green's function. The energy and entropy of a non-equilibrium ensemble. The second quantization and Wick's theorem. Phonons and the Debye theory of specific heat. Ferromagnetics at low and high temperatures. Kinematic levels in an optical excitation system. Microtheory of the dielectric constant. Superfluidity. Superconductivity.				
LITERATURE			ASSESSMENT OF LEARNING	
1. B. S. Tošić, <i>Statistička fizika</i> , Institut za fiziku Prirodno-matematičkog fakulteta, Novi Sad, 1978. 2. Đ. Mušicki: <i>Uvod u teorijsku fiziku II - Statistička fizika</i> , Izdavačko informativni centar studenata (ICS), ŠIP Srbija, Beograd, 1975. 3. I. Supek, <i>Teorijska fizika i struktura materije</i> , II dio, Školska knjiga, Zagreb, 1977. 4. L. D. Landau, E. M. Lifšic, <i>Teorijska fizika. Tom V (1): Statistička fizika</i> , Nauka, Moskva, 1976. 5. B. S. Milić, S. M. Milošević, Lj. S. Dobrosavljević, <i>Zbirka zadataka iz teorijske fizike: Statistička fizika</i> , Naučna knjiga, Beograd, 1979.			Assessment Method	Points
			Homeworks	20
			Seminar paper	40
			Final exam	40
			Total	100
Remarks				