Study program	Level of studies		**Third cycle**	
	Title of the study program		**Doctoral studies in physics**	
Course title	**SUPERFLUIDITY AND SUPERCONDUCTIVITY**			
Course ID	Semester	Course status	ECTS credits	Teaching hours
ŠIFRA	**I /II**	**Elective**	**10**	**30**
Course aims and expected learning outcomes	**The aim of the course is to get acquainted with the phenomena of superfluidity and superconductivity.** **Learning outcomes:** **- understands the theoretical basics of superfluidity,** **- understands the theoretical basics of superconductivity,** **-applies theoretical knowledge in the experimental work.**			

COURSE CONTENT

Superfluidity: historical and physical introduction to superfluidity; Helium; Superfluids and Condensates.

Superconductivity: Historical and physical introduction to superconductivity; Supercondacting materials, Model of two fluids; Thermodynamics of superconducting state; London equations; Pippards theory/equation; Ginzburg – Landau theory; Bardeen – Cooper – Schrieffer theory; Josephson effect; Applications of superconductivity.

LITERATURE

[1]Prof. dr. sc. Amir Hamzić, Suprafluidnost i supravodljivost, PMF Zagreb (2010);

[2] James F. Annett, Superconductivity, Superfluids and Condensates, Oxford University press (2005);

[3] P. Kapitza, Nature 141, 74, (1938);

[4] J. F. Allen, A. D. Misener, Nature 141, 75, (1938);

[5] C. Pethcik, H. Smith, Bose-Einstein Condensation in Dilute Gases, New York: Cambridge University Press (2008);

[6] C. Kittel, Quantum Theory of Solids, John Wiley&sons, (2005);

[7] J. Solyom, Fundamentals of the Physics of Solids, I, II, III, Springer (2007 – 2010);

ASSESSMENT OF LEARNING

Assessment Method	Points
Seminar paper	30
Final (oral)exam	70
Total	100
Total	100

Remarks