Study program	Level of studies		**Third cycle**	
	Title of the study program		**Doctoral studies in physics**	
Course title	**ELECTROCHEMISTRY FOR MATERIALS SCIENCE**			
Course ID	Semester	Course status	ECTS credits	Teaching hours
POT7061	**I /II**	**Elective**	**10**	**30**
Course aims and expected learning outcomes	**In the frame of the course student acquire basic knowledge in electrochemistry necessary for understanding of energy conversion and storage, corrosion and protection of materials and research and development of smart materials. After succesful completion of the course student is familiar with electrochemical fundamentals and methods necessary for research, development and production of photovoltaics, lithium ion and other battery materials, active materials for electrocehmical supercapacitors and catalytic and memvrane materials for fuel cells and water electrolysers. Furthermore, students will be familiar with electrochemical aspects of hydrogen technologies, electrochemical sensors and development of smart materials, and will gain fundamental competence in corrosion research and engineering.**			

COURSE CONTENT

Thermodynamics of electrode processes; Kinetics of electrochemical cell processes; Mass transport, diffusion and migration; Buttler-Volmer equation; Electrocatalysis – role of the material and crystalographic orientation; Electrochemical aspect of corrosion; Kinetics of new phase formation; Models of electrical double layer; Supercapacitor, capacitance and pseudocapacitance; Materials for supercapacitors; Electrochemical systems for energy storage; Materials for electrochemical systems for energy storage; Electrochemical systems for energy conversion; Materials for electrochemical systems for energy conversion; Electrochemical sensors and smart materials; Voltametric techniques; Electrochemical impedance spectroscopy; Electrochemical quartz microbalance; Scanning electrochemical microscopy; Electrochemical instruments, potenciostats/galvanostats, amplifiers.

LITERATURE	ASSESSMENT OF LEARNING	
	Assessment Method	Points
	Seminar paper	60
1. S. Mentus, Elektrohemija, Univerzitet u Beogradu – Fakultet za fizičku hemiju, Beograd	Final exam	40
2. A.J. Bard, L.R. Faulkner, Electrochemical methods. Fundamentals and Applications, 2nd ed. Wiley, 2001.	Final exam	
	Total	100

Remarks