

Course Unit Descriptor

Study Programme: Physics			
Course Unit Title: Alpha and beta spectroscopy			
Course Unit Code: FD18STS			
Name of Lecturer(s): Full Professor Nataša Todorović			
Type and Level of Studies: PhD Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Summer			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 15			
Prerequisites: -			
Course Aims: To introduce students with physical methods and application of alpha and beta spectroscopy.			
Learning Outcomes: General Skills: Gaining knowledge of the alpha and beta spectroscopy. Specific Competencies: Gaining knowledge about qualitative and quantitative analysis of specific types of nuclear radiation and the application.			
Syllabus: The interaction of alpha and beta radiation with matter. Alpha and beta decay. Alpha and beta emitters. Detection. Spectroscopy of alpha-radiation (characteristics of detector, the sample preparation). Beta spectroscopy (characteristics of detector, sample preparation). Detection of electrical signals and spectra processing. Qualitative and quantitative analysis of the spectra. Scintillation processes. The characteristics of the scintillator. Components of LSC cocktails. Interaction of alpha, beta and gamma radiation. Cherenkov radiation. Photomultipliers. Background radiation. Quench effects in a liquid scintillation spectrometry. Quench corrections. Counting statistics. Optimization of LSC measurements. Liquid scintillation detector. Energy calibration. Efficacy of alpha / beta detection. Methods for different radioisotope determination.			
Required Reading: 1. Michael F. L Annunziata, Handbook of Radioactivity Analysis, Academic Press, ISBN 0-12-436603-1. 2. K. Siegbahn, Alpha-, Beta- and Gamma Spectroscopy, North Holland, 1979, ISBN 9780720400830. 3. Charles J. Passo, Gordon T. Cook, Handbook of Environmental Liquid Scintillation Spectrometry, Pacard Instrument Company, 1994.			
Weekly Contact Hours:	Lectures: 6	Practical work: 4	
Teaching Methods: Lectures, seminars and practical work.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	points
Active class participation	5	written exam	20

Practical work	10	oral exam	50
Preliminary exam(s)	-	
Seminar(s)	15		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			