Course Unit Descriptor

Study Programme: Physics

Course Unit Title: Nuclear Structure - Measuring Methods

Course Unit Code: FD18MSJ

Name of Lecturer(s): Associate Professor Jovana Nikolov

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: Nuclear Physics

Course Aims:

Applying the knowledge of nuclear physics to the study of the structure of atomic nuclei. Students should become familiar with the experimental techniques used to study the basic parameters of nuclear structure.

Learning Outcomes:

- General Skills:

General knowledge of experimental methods and techniques, analysis of experimental results.

- Specific Competencies:

Understanding of methods and techniques used in experimental nuclear physics. After completing this course, student should be able to decide which the most suitable technique for application is in the present study of the nuclear structure. To improve ability to analyze experimental results and obtain specific information about the structure of the nuclei.

Syllabus:

Theoretical instruction:

The interaction of radiation with matter, detectors, particle accelerators, nuclear reactions, gamma spectroscopy, particle and electron spectroscopy, signal processing, measuring techniques for coincident measurements, advanced methods of nuclear physics and instrumentation. Measurement of monopole, dipole and quadrupole nuclear moments. Testing of nuclei deformations.

Practical instruction:

Calculus, student term paper, analysis of experimental data from nuclear structure experiments.

Required Reading:

1. Krane, K.S. “Introductory Nuclear Physics”, John Wiley, 1987.

2. Tavernier, S. “Experimental techniques in nuclear and particle physics”, Springer-Verlag, 2010.

3. Knoll, G.F. “Radiation detection and measurement”, 4 ed., Wiley, 2010.

4. Low-temperature nuclear orientation, Editors N. J. Stone, H. Postma, NH (1986).

Weekly Contact Hours:	**Lectures:** 4	**Practical work:** 6

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	-
Practical work	15	oral exam	70
Preliminary exam(s)	-	…….	
Seminar(s)	10		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			