Level : PhD

Course title: Fundamental and applied neutron research

Status: elective

ECTS: 15

Requirements: Nuclear Physics

Learning objectives

Introducing students with the most up-to-date fundamental and applied research that requires the use of experimental techniques with neutrons.

Learning outcomes

Understanding the principles of research with neutrons. Ability to follow the latest results in this research

Syllabus

Theory teaching

Neutron properties. Neutron interactions with matter. Neutron transport through matter. Neutron nuclear reactions. Sources of neutron. Detection and spectroscopy of neutrons. Neutron activation analysis. Prompt neutron activation analysis. Neutron scattering measurement techniques. Methods of neutron shield . Determination of the parameters of the nuclear structures with neutron activation techniques. Techniques for measuring effective cross sections for neutron nuclear reactions. Determination of neutron flux by methods of deconvolution. Nuclear fission and neutrons. International database. Neutron application in medicine. Neutron application in environmental studies. Detection of neutrons in low-background gamma spectroscopy measurements.

Practical teaching

Monte Carlo simulations of neutron detector systems. Working with neutron detectors. Working with computer programs for deconvolution of spectra. Processing of experimental data obtained by activation measurements.

Weekly teaching load				Other:
Lectures : 6	Exercises: 4	Other forms of teaching:	Student research:	