Level : Bachelor

Course title: Nuclear Physics

Status: compulsory

ECTS: 7

Requirements: Fundamentals of Nuclear Physics

Learning objectives

To introduce students with the basic characteristics of the atomic nucleus, the interactions between nucleons, some of nuclear models, types of radioactive decay, and nuclear reactions.

Learning outcomes

- General Skills:

Knowledge of the properties of the atomic nucleus, nuclear interactions, nuclear models, types of radioactive decay and nuclear reactions.

- Specific Competencies:

Adopting practical knowledge in the field of nuclear physics, which will qualify student to continue education in the field of high energy physics and elementary particles, as well as gain possibility to introduce students to some practical disciplines based on the application of nuclear physics in medicine, energy, industry, etc.

Syllabus

Theoretical instruction:

Basic nuclear properties, mass, binding energy, electromagnetic moments of the nucleus (magnetic dipole moment, electrical quadrupole moment, multipolar moments of higher order, measurements of multipole moments.) Nature of nuclear forces, nucleon - nucleon interaction, meson theory of nuclear power. Nuclear models (Fermi gas model, shell model, collective models, radioactive decay probability (alpha decay - tunnel effect, beta decay – week interaction, electromagnetic transitions. Alpha, beta, and gamma spectroscopy).
Nuclear reactions.

Practical instruction:

Experimental and computational exercises.

Literature

1. W.E.Burcham, Nuclear Physics An Introduction, Longmans Green and Co Ltd, London 1967
2. K.S.Krane, Introductory Nuclear Physics, John Willey and Sons, 1987
3. K.N. Mukhin, Physics of Atomic Nucleus, Mir Publishers, Moscow, 1987

Weekly teaching load	**Lectures:** 3	**Exercises:** 3