

Level: PhD				
Course title: Radioactivity in the Environment				
Status: elective				
ECTS: 15				
Requirements: Modern experimental physics III, Nuclear Physics				
Learning objectives: Training students for research in the field of radioecology, to inform them with the latest achievements in the field of radiation protection and learn about modern methods for experimental investigations of radioactivity in the environment				
Learning outcomes:				
General skills: Application of nuclear physics knowledge in the field of radioecology, application of legal regulations in the field of radiation protection, the use of scientific literature for research				
Subject-specific skills: Knowledge of modern methods of testing the low activity from natural sources of ionizing radiation, the ability of conducting the radioactivity monitoring of the environment and analyzing the obtained results, the use of software packages ERICA and CROM6 for dose modeling of the environment				
Syllabus				
<p>The origin of the elements. The origin of radioactive nuclei. Transformations in the radioactive decay chains. Radioactive equilibrium. The natural radioactive elements. Cosmogenic radioisotopes. Anthropogenic radioisotopes. Radioactive dating. Radioisotopes in the living environment. Regional and local variations. Migration of radionuclides in nature. Radioisotopes in the lithosphere, hydrosphere, atmosphere. Chemical and biological effects of radiation. Radioisotopes in ecosystems. Contamination. Spatial and temporal development. Transmission of radioisotopes through the food chains. NORM and TENORM problems. Radon and radiation risk from radon and radon short-lived daughters inhalation. Radon equilibrium. Radon potential.</p> <p>Measurement of radioactivity in the samples from the environment. Low-level counting and spectrometric techniques. The origin and reduction of background. Nuclear detectors for measurement of radioactivity in the environment. In-situ measurements. Radioactivity monitoring of the environment. Sampling and preparation of environmental samples. Acquisition, analysis and presentation of results. Practical exercises of dose estimation in software packages ERICA and CROM6</p>				
Weekly teaching load				Other
Lectures: 4	Exercises	Other forms of teaching:	Student research: 6	