

Course title: Radioactivity in nature			
Lecturer: Dušan Mrda			
Required Course: elective			
Number of ECTS: 15			
Prerequisites: Modern experimental physics III, Nuclear Physics			
Course Objective: Teaching students about the applied nuclear physics and radioactivity in nature			
Course Outcome: Upon completion of the course, students should possess: <ul style="list-style-type: none"> - General abilities: Students will become familiar with the application of nuclear physics. - Subject specific abilities: Certain technologies will be covered in detail so that this knowledge can later be applied in practice 			
Course Content: The origin of the elements. The origin of radioactive nuclei. Transformations in the radioactive series. Balance. 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 chain. Measurement of radioactivity in the samples from the environment. Counting and spectrometric techniques. Measurement of low activity. The origin and reduction of background. Nuclear detectors for measurement of radioactivity in the environment. The measurements in situ. Sampling and preparation of samples from the environment. Processing, analysis and presentation of results.			
Reading List: <ol style="list-style-type: none"> 1. R. L. Kathren: Radioactivity in the Environment, Gordon & Breach Publishing Group, 1984. 2. P. Theodorson: Measurement of low radioactivity, 3. V. Valkovic: Radioactivity in the Environment, Elsevier, Amsterdam, 2000. 			
Total hours:			10
Lectures: 5	Practicals:	Other:	Student research work: 5
Methods of instruction: Lectures, exercises and preparation and presentation of seminar work			
Assessment (maximum number of points 100)			
Requirements Active participation in lectures 5 pts, Active participation in practicals 20 pts, Seminar work 25 pts Oral exam 50pts			