



## **RADIOACTIVE ELEMENTS IN POWER INDUSTRY AND SOIL POLLUTION CONTROL**

**3 ECTS (ELECTIVE)**

**AGH University of Science and Technology**

**Course responsible: dr. habil. Barbara Kubica**

### **Course overview**

The main objective of the course is to bring to the students knowledge of analytical and radiochemical methods as applied to nuclear energy and the environmental protection.

The course is built of three parts: lectures, laboratory and seminar.

Lectures: During lectures students will be acquainted with the most important issues and methods of radiochemistry and their application to environmental problems. The following subjects will be discussed: the basic concepts of analytical chemistry with elements of radiochemistry and environmental chemistry in the radiochemistry field, especially :1) the structure of an atomic nucleus, 2) nuclear transformations of alpha, beta and gamma, 3) the presence of radioactive elements, both natural and artificial in natural environment, 4) environmental monitoring of artificial radionuclides in terms of nuclear energy etc.

Laboratory:

- Characteristics of radiation counters
- Interaction of radiation with matter
- Determination of  $^{137}\text{Cs}$  activity in samples of soil and sediment
- Gamma spectrometry
- Determination of distribution coefficient  $^{137}\text{Cs}$  for the selected sorbents

Seminars are connected with the topics presented during the lectures and related to the proposal, preparation and methods of decontamination of cesium  $^{137}$  from environmental samples. The student has to prepare a presentation illustrating the problems identified by the teacher, based on literature data and discuss it.

### **Outcome of the course**

After this course students should be able to:

- Assess the level of activity of selected radionuclides and concentrations of certain heavy metals at the possible contamination of the environment

- Discuss and present to the public the current problems of environment contamination
- Propose a process for decontamination of a contaminated area
- Choose and propose an appropriate selective and low-cost sorbent for removal of the effects of contamination

**Course coordinator & teachers**

Dr. habil. Barbara Kubica, Faculty of Energy and Fuels, AGH, E-MAIL: [bkubica@agh.edu.pl](mailto:bkubica@agh.edu.pl)