

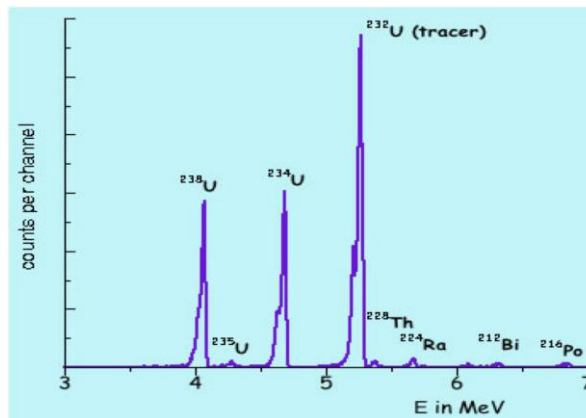
## Target group

This training course aims at delivering the basics of alpha, beta and gamma spectroscopy techniques for the determination of radionuclides in environmental samples.

Participants should have interests in analytical radiochemistry, basic knowledge on radioactive decay, analytical chemistry and detection of radionuclides.

## Objectives

- to get familiar with the radiochemical analysis of alpha, beta and gamma emitters by radiometric techniques
- to gain understanding of basic principles of radiochemical analysis
- to get familiar with alpha, beta and gamma spectrometry
- to be able to understand radiochemical analytical procedures and apply them on practical problems
- to gain practical skills of working in radiochemistry laboratory
- to gain practical skills of handling radioactive materials



<http://www.cinch-project.eu>

A-CINCH is a HORIZON 2020 EU Framework Program project aiming to improve and evolve nuclear chemistry education and training in Europe.

The project closely collaborates with the European Network on Nuclear Chemistry Education and Training aiming to shift the education and training in nuclear chemistry to a new level.

Institut  
"Jožef Stefan"  
Ljubljana, Slovenija

University  
of Cyprus



HANDS-ON TRAINING ON  
ANALYSIS OF ALPHA, BETA AND  
GAMMA EMITTERS BY  
RADIOCHEMICAL  
SPECTROSCOPIC TECHNIQUES

Ljubljana

13-17 June 2022



This project receives funding from the EURATOM Research and Training programme under grant agreement No 945301 and from the Norwegian Research Council under grant agreement No 313053.

## ORGANIZATION

The course is organized by the A-CINCH Consortium and it consists of a distance learning via CINCH Moodle (see and sign up at [moodle.cinch-project.eu](https://moodle.cinch-project.eu)).

The following practical Hands-on training will take place at the Jožef Stefan Institute, Department of Environmental Sciences.

All teaching will be in English.

## LOCATION

Jožef Stefan Institute  
Reactor Centre  
Department of Environmental Sciences  
Brinje 40  
SI-1000 Ljubljana  
Slovenia

## REGISTRATION

For detailed information, please visit the A-CINCH web page to download the application form (<https://www.cinch-project.eu/>). Send the filled-in form to Marko Štok ([marko.strok@ijs.si](mailto:marko.strok@ijs.si)).

No course fee will be charged to the participants and a budget exists to support travel and accommodation expenditures of the participants.

Application deadline is 30 April, 2022.

## TRAVEL INFORMATION

<https://www.lju-airport.si/en/>

<https://www.openstreetmap.org/way/533841>



## E-LEARNING

The e-learning part will take place at [moodle.cinch-project.eu](https://moodle.cinch-project.eu).

Introduction to radiochemical spectroscopic analysis of alpha, beta and gamma emitters with theoretical considerations.

Gamma spectroscopy of environmental samples.

Determination of uranium by alpha-particle spectrometry.

Determination of Po-210 by alpha-particle spectrometry and Pb-210 by beta counting.

## Self Assessment/Assessment

Participants have to successfully finish this course before entering the on-site course.



## PRACTICAL SESSION 13-17.6.2022

Hands-on experience on determining uranium, Po-210, Pb-210 and Cs-137 in water

Laboratory work and exercises (introduced by theoretical lectures and discussion sessions):

- Preparation and pre-treatment of fish and calcite samples
- Digestion of samples for radionuclides determination
- Cation-exchange separation of uranium from calcite sample
- Preparation of Cs-137 on AMP counting source for gamma spectrometry
- Separation of Po-210 and Pb-210 using Sr resin
- Preparation of counting sources for alpha, beta and gamma spectrometry
- Measurement of alpha, beta and gamma emitters
- Calculation of results for Cs-137, uranium, Po-210 and Pb-210 with measurement uncertainties
- QA/QC in radionuclide determination
- RoboLab gamma spectroscopy of environmental samples

