Level: Specialist studies	
Course title: Application of AAS and ICP-MS in Environmental Analysis (advanced course)	
Status: elective	
ECTS: 5	
Requirements: none	

Learning objectives

Training students to apply techniques of AAS and ICP-MS for the analysis of metals in samples of air, water, soil and sediment.

Learning outcomes

Students will acquire highly specialized knowledge on the selection of appropriate analytical techniques and methods of analysis of metals in environmental samples.

Syllabus

Theoretical instruction

Studying the principles of atomic absorption spectroscopy, instrumentation (equipment needed for the analysis of liquid, gaseous and solid samples), an overview of techniques for the determination of trace metals (flame, hydride and graphite). Principles of ICP-MS, types of analysis (semi-quantitative scans, quantitative, isotope ratio); analytes that can be analyzed with satisfactory control of interferences. Advantages and disadvantages of ICP-MS and AAS.

Practical instruction

Techniques for preparation of standards for solid, liquid and gaseous samples. AAS instrumentation, application software WinLab32, data processing. AAS application for quality control of the environment in terms of metal content - Analysis of Al, Cd, Cr, Cu, Pb, Zn, Ni, Mn, Fe, Ca, Mg by flame absorption spectroscopy, determination of arsenic and mercury by cold vapor mercury (FIAS flow injection system), analysis of K and Na in environmental samples by atomic emission spectroscopy. Determination of trace metals (Al, As, Cd, Cr, Cu, Pb, Zn, Ni, Mn, Fe) in environmental samples by atomic absorption spectrometry in a graphite furnace. ICP-MS instrumentation, optimization of ELAN 5000, Semi-quantitative scan analysis of samples from the environment. Quantitative determination of boron, manganese, iron and arsenic in trace amounts. Data processing and reporting the results of the analysis.

Weekly teaching load				Other:
Lectures: 30	Exercises: 30	Other forms of teaching:	Student research:	