

Level: bachelor			
Course title: Instrumental analysis			
Status: elective			
ECTS: 8			
Requirements: Principles of Instrumental Analysis			
Learning objectives Expanding the knowledge base of the physical and physico-chemical principles necessary for understanding the principles of analytical instruments. Expanding the understanding of the role, importance and application areas of instrumental analysis. Enabling deeper understanding of the specialized branches of instrumental chemical analysis. Training in practical skills that enable professional handling of the devices during instrumental analysis. Advanced training of students in solving problems and tasks using instrumental analysis.			
Learning outcomes Application of knowledge of instrumental analysis techniques to understand the methodology for the selection of suitable measurement techniques and methods to solve complex analytical tasks / problems. Independently and critically apply knowledge and understanding of facts, concepts, principles and theories in solving analytical problems unknown. Independently operated instruments for physico-chemical analysis of various samples. Choose, and if necessary, optimize / modify / adapt and implement appropriate laboratory procedures/methods (optical, electroanalytical, thermoanalytical and other methods) when solving practical problems by applying instrumental chemical analysis. Evaluate and present research results.			
Syllabus <i>Theoretical instruction</i> Trends in the Instrumental analysis, Chemical analytical systems, Processing of the Analytical Signals, Enhancement of the signal-to-noise ratio. Calibration of instruments, Errors of measurements, Quality of measurements and validation of analytical methods, Röntgen spectrometry, Microscopy and microanalysis, Reflection spectrometry, Rahman spectrometry, Electron spin resonance spectrometry, Newer spectroscopic methods. Photoacoustic spectrometry, Thermal lens spectrometry, Dielectrometry, Chemical Sensors, Analytical application of magnetic susceptibility, Selection of the optimal method of analysis. <i>Practical instruction</i> Auditory exercise: Processing of the analytical signals. Enhancement of the signal-to-noise ratio. Errors of measurements. Quality of measurements and validation of analytical methods, Selection of the optimal method of analysis. Experimental exercise: Calibration of instruments. Röntgen spectrometry. Microscopy and microanalysis. Dielectrometry. Electron spin resonance spectrometry. Chemical sensors. Analytical application of magnetic susceptibility.			
Weekly teaching load			Other:
Lectures: 3	Exercises: 1	Other forms of teaching: 3	