

Level: bachelor				
Course title: Experimental Biochemistry				
Status: obligatory				
ECTS: 7				
Requirements: none				
Learning objectives The goal of the course is to provide students with the fundamental knowledge of contemporary methods used in biochemical laboratories for isolation, purification and characterization of biomolecules from natural sources. Furthermore, the goal of the course is to develop students' ability to choose the appropriate experimental procedure by applying gained knowledge and understanding of the fundamental physicochemical properties of biomolecules, as well as to acquire a wide range of practical (experimental) skills related to biochemical techniques.				
Learning outcomes Students will be able to (1) understand the fundamental principles of isolation, purification and characterization of biomolecules from natural sources, (2) understand the dependence between the selection and sequence of biochemical techniques used for the isolation, purification and characterization of biomolecules and their physicochemical characteristics, (3) properly handle basic equipment in biochemistry laboratory, handle chemicals safely and recognize potential hazards and risk assessment during practical work, (4) apply appropriate experimental procedures for isolation, purification and characterization, (5) interpret experimental results and write reports.				
Syllabus <i>Theoretical instruction:</i> Homogenization. Extraction. Lyophilization. Precipitation: isoelectric, salting in/out, with organic solvents. Preparative centrifugation of biomolecules and cell organelles. Size-based separation of biomolecules: dialysis and electro dialysis, ultrafiltration and reverse osmosis. Chromatographic methods: size exclusion, adsorption, hydrophobic, ion-exchange, affinity and partition chromatography. High performance liquid chromatography. Gas chromatography. Chosen spectroscopic methods (UV-VIS spectrometry, spectrofluorimetry, circular dichroism) in experimental biochemistry. Immunochemical and radioisotope methods. Electrophoresis (SDS, PAGE, disc). Electrophoresis of proteins and nucleic acids (blotting). Polymerase chain reaction (PCR). Cell cultures in biochemistry. <i>Practical instruction:</i> Isolation and purification of amino acids, proteins, lipids, enzymes, vitamins, polysaccharides, cellular components, DNA, and RNA from natural sources. Western blott. PCR.				
Weekly teaching load				Other:
Lectures: 3	Exercises: 5	Other forms of teaching:	Student research:	