Course code	**IRL103**		
Course title	**METHODS IN PROTEIN ANALYSIS**		
General information			
Study programme	Graduate study „Drug research and development“, Graduate study „ Biotechnology in medicine“	Academic year	
Lecturer	Doc. Dr. Sc. Mirela Sedić	Lecturer	
Status			Required
ECTS system			

Course objectives

- to describe modern methods used in the protein analysis field with the accent on these routinely used in experimental medicine, biotechnology and pharmaceutical industry
- to train the student for the autonomous performance of some of the methods used in the protein analysis
- to instruct the student for the scientific mode of the problem resolving
- to offer the student the clear picture of the future support she/he can expect in her/his work

Course description

The link between the protein analysis and the medicine/technology – the importance, aim and the purpose of the protein/protein based investigation, the implementation of the methods in the biotechnology and medicine, the examples (drug production, insulin, vaccine design etc.)
The production and purification of proteins, protein engineering – recombinant proteins, different expression systems (prokaryotic, eukaryotic expression), preliminary protein separation (centrifugation, precipitation), gradient centrifugation, chromatographic methods (FPLC- Fast Protein Liquid Chromatography, affinity chromatography, gel chromatography)
The protein analysis – protein labeling techniques, electrophoresis techniques (Isoelectric focusing, native, SDS- and two-dimensional electrophoresis), the basis of the spectroscopic methods (mass spectrometry, nuclear magnetic resonance, Infrared spectroscopy), the basis of the protein crystallography, the basis of bioinformatics, immunochemical/ immunohistochemical methods (western blot, immunoprecipitation, ELISA - Enzyme-Linked ImmunoSorbent Assay, flow cytometry, immunohistochemical analysis of the frozen and paraffin sections, immunofluorescence with the analysis by the confocal microscope)
The production and importance of the monoclonal antibodies
Proteomics: principles and methods

Learning outcomes