



**DOCTORAL SCHOOL OF THE INSTITUTE
OF IMMUNOLOGY AND EXPERIMENTAL THERAPY
POLISH ACADEMY OF SCIENCES**

Rudolfa Weigla 12, 53-114 Wrocław, Poland szkoladoktorska.hirszfeld.pl

Doctoral School Syllabus

Course Title	Immunochemistry Techniques (Instrumental techniques in immunochemistry)
Form of classes	Lecture/Workshop
Main lecturer	Dr hab. Tomasz Niedziela (coordinator)
Lecturers	Dr hab. Wojciech Jachymek, prof. dr hab. Jolanta Łukasiewicz
Number of hours	10
Subject status	Mandatory
Languages of classes	English
Entry requirements	Knowledge of basic concepts and research methods in biochemistry/immunochemistry.
Course description	The course syllabus includes the introductory approach to “Instrumental Techniques in Immunochemistry.” 1. Techniques of NMR spectroscopy in immunochemistry [instructor: Tomasz Niedziela] – 5 hours •Basic principles of nuclear magnetic resonance •Basics of operating an NMR spectrometer •NMR analysis – from sample preparation to the spectrum •Modern methods of NMR analysis •Practical NMR spectroscopy in antigen analysis – structure and interactions – introduction 2. Mass spectrometry techniques in immunochemistry [instructor: Wojciech Jachymek] – 2.5 hours •Basics of operating MALDI-TOF and ESI mass spectrometers •Acquisition and analysis of MALDI-TOF MS spectra of biological molecules





**DOCTORAL SCHOOL OF THE INSTITUTE
OF IMMUNOLOGY AND EXPERIMENTAL THERAPY
POLISH ACADEMY OF SCIENCES**

Rudolfa Weigla 12, 53-114 Wrocław, Poland szkoladoktorska.hirszfeld.pl

	•Acquisition and analysis of ESI-MS spectra in biochemical analyses •Microorganism biotyping – MALDI BioTyper 3. SPR technique in immunochemistry [instructor: Jolanta Łukasiewicz] - 2.5 hours •SPR interaction analysis – requirements and methods •Basics on how to use the Biacore device •Sample preparation and selection of the detection system •SPR analysis – preparation and performance of basic experiments with data analysis using selected examples.
Learning outcomes	Understanding of the basic concepts and practical applications of instrumental techniques (NMR, mass spectrometry, and SPR) in the analysis of biological molecules. The ability to critically evaluate the selection of instrumental techniques in the context of the objectives of a planned experiment. The capability to independently assess the suitability of instrumental techniques and immunochemical methods, as well as how to apply them to the extent necessary to conduct experiments for their doctoral thesis. P8S_WG, P8S_WK, P8S_UW
Method of verification of learning outcomes	The student will be evaluated on the following: A short written essay (1 page) A short talk presentation (3-5 minutes) Class participation and discussion
Supplementary literature	Information regarding the main references and relevant supplementary materials will be provided by each lecturer.
Additional information	The course is designed as a lecture supplemented by demonstrations of the techniques and equipment in the IITD PAN laboratories.

