

Course code																																	
Type and description	Elective Course																																
ECTS credit	1																																
Course name	Engineered Immunoglobulins as Biotechnological Tools																																
Course name in Polish	Inżynieria białkowych narzędzi biotechnologicznych																																
Language of instruction	English																																
Course level	8 PRK																																
Course coordinator	Dr hab. inż. Małgorzata Zakł ^o s-Szyda (0000-0001-8341-1654)																																
Course instructors	Dr hab. inż. Małgorzata Zakł ^o s-Szyda (0000-0001-8341-1654)																																
Delivery methods and course duration	<table border="1"> <thead> <tr> <th></th> <th>Lecture</th> <th>Tutorials</th> <th>Laboratory</th> <th>Project</th> <th>Seminar</th> <th>Other</th> <th>Total of teaching hours during semester</th> </tr> </thead> <tbody> <tr> <td>Contact hours</td> <td>0</td> <td>0</td> <td>0</td> <td>15</td> <td>0</td> <td>0</td> <td>15</td> </tr> <tr> <td>E-learning</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td></td> </tr> <tr> <td>Assessment criteria (weightage)</td> <td></td> <td></td> <td></td> <td>1,00</td> <td></td> <td>0,00</td> <td></td> </tr> </tbody> </table>		Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester	Contact hours	0	0	0	15	0	0	15	E-learning	No	No	No	No	No	No		Assessment criteria (weightage)				1,00		0,00	
	Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester																										
Contact hours	0	0	0	15	0	0	15																										
E-learning	No	No	No	No	No	No																											
Assessment criteria (weightage)				1,00		0,00																											
Course objective	The aim of the course is an explanation of the immune mechanisms that allow the production of antibodies and get acquainted students with modern, highly specific immunochemical techniques and their applicability of immunochemical methods.																																
Learning outcomes	After completing the subject a student is able to: <ol style="list-style-type: none"> 1. Characterise antibodies structure – outcomes W4 2. Explain function of immunological system leading to the production of antibodies – outcomes W4, U4 3. Propose the method for production of immunoglobulins used in detection systems or as therapeutics via hybridoma technology and CHO-based systems – U4, K1 4. Make out a case for application of a particular analytical method or therapy and suitable preparation of antibodies – outcomes W4, U4 5. Characterize immunochemical methods and assess their analytical potential and limitations – outcomes W4, U4 																																
Assessment methods	Effects 1-3. Written assessment Effects 4-5. Project presentation Average mark of the final written exam (40%) and the grade being work during the project (60%).																																
Prerequisites	Basic knowledge in biochemistry																																
Course content with delivery methods	The lecture involves the following topics: <ol style="list-style-type: none"> 1. Molecular basis of antibody production: clonal selection theory, diversity of antibodies (recombinase machinery, somatic hypermutation, gene conversion, class switch recombination), secondary immune responses, autotolerance, immunopathology; 2. Antigen (Ag) and antibodies (Ab) structures and their interactions: classes of immunoglobulins, the antibody combining site, affinity, avidity and valence, immune complexes formation and dissociation, specificity and cross-reactivity of antibodies; 3. Production of poly- and monoclonal antibodies: antigenicity and immunogenicity, haptens, factors that influence immunogenicity, carrier proteins, adjuvants, animals immunization, hybridoma technology, antiglobulins, purification of antibodies, vaccines, abzymes, chimeric and grafted antibodies, bispecific antibodies, phages display and engineering antibodies: miniantibodies, immunotoxins; 4. Analytical methods based on the primary interaction between Ag-Ab: affinity purification, nephelometry, immunohistochemistry, immunofluorescence (confocal microscopy) immunoblotting, detection and quantitation of antigen by antibody (ELISA and RIA assays); secondary interaction techniques using Ag-Ab: chromatine immunoprecipitation (ChIP assays), agglutination, epitope mapping; molecular sonds; 5. Immunoglobulins as therapeutics. 																																
Basic reference materials	Male D., Brostoff J., Roth D., Roitt I. Immunology 2012, Saunders																																
Other reference materials	-																																
Average student workload outside classroom	12h																																
Comments	-																																
Last update	25.01.2022																																