



Subject card

Subject name and code	Biotechnology Derived Drugs, PG_00054751						
Field of study	Biotechnology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2028/2029		
Education level	first-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Sławomir Milewski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	15.0	75
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	75		10.0		65.0	150
Subject objectives	To make student acquainted with kinds of biopharmaceuticals, methods of their preparation, isolation and assessment of chemical and biological properties.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U02		1. Student understands the concept of biopharmaceutic, is able to determine classes and kinds of biopharmaceutics. 2. Student knows the stages of drug development		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	K6_W05		1. Student is able to design stages of the industrial manufacturing of proteinous biopharmaceutics 2. Student proposes methods of production and isolation of a low molecular weight biopharmaceutics		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		

Subject contents	Course content – lecture 1. Pharmaceutical biotechnology - historical survey, scope, legal aspects, public perception. 2. Microorganisms as a source of novel biologically active substances and high throughput screening methods of their discovery 3. Preclinical and clinical studies of novel potential drugs. 4. Knowledge of the microbial metabolism as a basis for the design of biotechnological processes. 5. Secondary metabolic pathways and their products. 6. Metabolic engineering; strain improvement 7. Overproduction of primary metabolites as a basic goal of biotechnological processes. 8. Design of biotechnological processes. Isolation and purification of products. 9. Control and quality assurance of biotechnological processes. 10. Production and isolation of low molecular weight secondary metabolites - antibiotics and statins 11. Proteins as drugs - manufacturing of therapeutic proteins - control and monitoring of protein production - formulation of protein drugs - strategies of immunogenicity reduction - examples of protein drugs - hybrid proteins - immunoglobulins in therapy 12. Nucleic acids as drugs - antisense strategy; use of ribozymes and siRNA technology - technologies of oligodeoxynucleotides (ODN) production - gene therapy - formulation of DNA and RNA drugs 13. Cell and tissue cultures in pharmaceutical biotechnology 14. Vaccine production 15. Construction of artificial tissues with the use of biopolymers and controlled drug release systems.		
Prerequisites and co-requisites	Knowledge of the basic aspects of general and industrial microbiology, organic chemistry, biochemistry, molecular biology and genetic engineering.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	50.0%	100.0%
Recommended reading	Basic literature	Biotechnologia farmaceutyczna, pod red. O. Kaysera i R. H. Müllera, PZWL, Warszawa 2004 O. Kayser, Podstawy Biotechnologii Farmaceutycznej, Wydawnictwo UJ, Kraków 2006	
	Supplementary literature	Podstawy Biotechnologii, C. Ratledge i B. Kristiansena (ed.), PWN, Wwa 2011	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Biosimilars and biobetters 2. The major pathways of secondary metabolism 3. Streptomyces as a source of low molecular weight biopharmaceutics 4. The stages of natibiotic production and isolation 5. Basic strategies of metabolic engineering 6. Classes of proteinous biopharmaceutics 7. Techniques of obtainin monoclonal antibodies 8. Construction of therapeutic protein:antibody conjugates 9. Antisense strategies 10. Preparation of oligonucleotides		
Practical activites within the subject	Not applicable		

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