GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biotechnology Derived Drugs, PG_00054751		
Field of study	Biotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2025/2026
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		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Sławomir Milewski	
	Teachers		

Lesson types and methods of instruction

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_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	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
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	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the basic aspects of general and industrial microbiology, organic chemistry, biochemistry, molecular biology and genetic engineering.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>written exam</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>Biotechnologia farmaceutyczna, pod red. O. Kaysera i R. H. Müllera, PZWL, Warszawa 2004
O. Kayser, Podstawy Biotechnologii Farmaceutycznej, Wydawnictwo UJ, Kraków 2006</td></tr><tr><td>Supplementary literature</td><td>Podstawy Biotechnologii, C. Ratledge i B. Kristiansena (ed.), PWN, Wwa 2011</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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