



Subject card

Subject name and code	SMART BIOPHARMACEUTICALS, PG_00063490						
Field of study	Biotechnology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
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		prof. dr hab. inż. Sławomir Milewski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	30
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=6859						
	Moodle ID: 6859 INTELIGENTNE BIOFARMACEUTYKI https://enauczanie.pg.edu.pl/2025/course/view.php?id=6859						
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	30		2.0		18.0	50
Subject objectives	This course is a source of knowledge on modern second generation biopharmaceuticals exhibiting high selectivity due to the presence of fragments responsible for the targeted action of an active component.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W06] recognizes the technological and scientific, as well as organizational and economic opportunities and limitations in biotechnology and related fields		has the knowledge at an advanced level regarding the possibilities of designing structures of second generation biopharmaceutics and their production using biotechnological methods.		[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K7_U04] predicts the interaction of biomolecules and biologically active compounds on living organisms and the course of processes involving them based on knowledge in biology, biotechnology and related fields and computer methods of data analysis, modeling and simulation		1. is able to identify structural features of a given biopharmaceutic conditioning its biological properties. 2. is able to indicate alternative possibilities of modification of structure of a given biopharmaceutic towards changing a particular biological property.		[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K7_K01] understands the need to constantly update knowledge based on the state of the art in accordance with the latest scientific literature, improve professional skills and the importance of teamwork		is ready to collaborate as part of a group, share knowledge, and work together to prepare and present information on selected biopharmaceuticals.		[SK2] Assessment of progress of work [SK1] Assessment of group work skills		

Subject contents	Course content – lecture		
	1. Strategies for searching for novel molecular targets 2. Novel molecular targets for antibacterial, antifungal and antiprotozoal chemotherapy 3. Mechanisms of microbial drug resistance and strategies of its overcoming 4. Strategies to improve the properties of antimicrobial chemotherapeutics 5. Drug molecular carriers and nanocarriers 6. Prodrugs 7. Conjugates of biopharmaceuticals 8. Molecular targets in anticancer chemotherapy 9. Targeted anticancer therapies. Design and preparation of drugs based on antibodies and antibody fragments 10. Drug repurposing 11. Molecular targets in antiviral chemotherapy. 12. Prevention and therapy of viral infections		
	Course content – seminar		
	Correlated with lecture topics		
Prerequisites and co-requisites	Basic knowledge on low molecular weight, proteinous and nucleic acids-based biopharmaceuticals gained during first-cycle studies.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar: assessment of own presentation and activity during seminars	50.0%	40.0%
	Lecture: written tests on lecture materials	50.0%	60.0%
Recommended reading	Basic literature	D.J.A. Crommelin, R.D. Sindelar, B. Meibohm (eds). Pharmaceutical Biotechnology. Fundamentals and Applications. Fifth edition, Springer, New York, 2019	
	Supplementary literature	R.J.Y Ho and M. Gibaldi (eds.) Biotechnology and Biopharmaceuticals, John Wiley & Sons Inc., Hoboken, 2003	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Drug targeting - examples 2. Structural modifications of antimicrobial drugs - goals and ways to achieve them 3. Classes of drug carriers 4. Linkers used in construction of drug conjugates 5. Techniques of preparation drug:antibody conjugates 6. Modifications of oligonucleotides aimed at their protection against nucleases		

Practical activities within the subject	Not applicable
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