



Subject card

Subject name and code	New Generation Vaccines, PG_00058255						
Field of study	Biotechnology						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marta Wanarska					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	The goal of the course is to provide students with knowledge in the field of vaccinology, and in particular on the development of new vaccines.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W08] has a profound knowledge of methods of obtaining biotechnological products, possibilities and limitations related to the design of biotechnological processes, understands the specificity of the biotechnological industry, both in terms of organization, management and economic analysis	Student has knowledge of methods for obtaining biotechnological products such as bacterial cells, viruses, proteins and plasmid DNA used as vaccine antigens. Student understands the specificity of the biotechnological industry and knows the possibilities and limitations related to the cultivation of pathogens for vaccine purposes, both in terms of organization and economic analysis.	[SW1] Assessment of factual knowledge
	[K7_U10] is able to use knowledge about possibilities, aims and limitations of biotechnology to develop, design and obtain products and biotechnological processes in the area of his/her specialization	Student defines the properties of an ideal vaccine. Student presents the biotechnological methods of vaccines production. Student develops a new vaccine.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K7_K03] is conscious and able to explain the importance of the development of science and technology for the economy	The student is aware of the dangers posed by epidemics of infectious diseases. The student can justify the importance of mass vaccination for public health. The student can justify the importance of the development of vaccinology for society and the economy.	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice
	[K7_W10] has knowledge in the field of bioprocess technology and engineering and knowledge in the field of engineering design of technical objects and processes including engineering graphics with the use of computer-aided design and databases	Student knows the principles of designing vaccine antigen production processes.	[SW1] Assessment of factual knowledge
	[K7_W06] has knowledge about modern forms of drugs, including drugs of plant origin, new generation vaccines, alternative forms of therapy based on phages, knows issues related to biological activity of plant chemicals, knows how to test new drugs and how to introduce them to the market	Student defines the terms in the field of vaccinology. Student distinguishes between classical and modern vaccines. Student knows the essential ingredients of vaccines and their functions. Student lists the types of immune response induced by vaccination. Student knows how to test the effectiveness and safety of new vaccines before introducing them to the market.	[SW1] Assessment of factual knowledge
Subject contents	Immune response induced by vaccination (primary and secondary immune response, innate and adaptive immunity, humoral and cell-mediated immune response, immunological memory, herd immunity). Ingredients of vaccines except antigen (adjuvants, preservatives and stabilizers). Characteristics of vaccines due to the form of antigen (live attenuated vaccines; inactivated vaccines; acellular vaccines: toxoid vaccines, polysaccharide vaccines, vaccines comprising recombinant proteins as antigens, peptide vaccines; DNA vaccines, mRNA vaccines and live recombinant vaccines. These vaccines will be characterized in terms of immunogenicity, stability, safety, efficacy and administration routes. Preventive and therapeutic cancer vaccines. Vaccines against parasitic diseases. Allergen immunotherapy.		
Prerequisites and co-requisites	Completion of: General microbiology, Basic genetic engineering, Immunology, Virology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60.0%	100.0%
Recommended reading	Basic literature	1. Magdzik W., Naruszewicz-Lesiuk D., Zieliński A. (Red.): Wакcynologia, -medica press, Bielsko-Biała, 2005 (2007). 2. Gołab J., Jakóbiak M., Lasek W. (Red.): Immunologia, Wydawnictwo Naukowe PWN, Warszawa, 2002. 3. Oxford J., Kellam P., Collier L.: Human Virology, Oxford University Press, 2006 (2016). 4. Deryło A. (Red.): Parazytologia i akarozjologia medyczna, Wydawnictwo Naukowe PWN, Warszawa, 2011.	

	Supplementary literature	1. Oshinsky D.M.: Polio: an American story, Oxford University Press, 2005. 2. Articles in scientific journals, e.g. Vaccine (Elsevier Science Direct).
	eResources addresses	Uzupełniające Adresy na platformie eNauczenie: Szczepionki nowej generacji_Nowy_2024/2025 - Moodle ID: 37487 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=37487
Example issues/ example questions/ tasks being completed	Basic concepts in the field of vaccinology. The types of immune response induced by vaccination. The essential ingredients of vaccines. Classical and modern vaccines. Properties of an ideal vaccine. The biotechnological methods of vaccines production.	
Work placement	Not applicable	