



Subject card

Subject name and code	CHEMISTRY OF ANTIBIOTICS , PG_00066141						
Field of study	Chemistry						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Specialty subject group		
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		3.0		
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		dr hab. inż. Piotr Szweda				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	15.0	45
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=1731						
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	45		5.0		25.0	75
Subject objectives	The aim of the subject is to familiarize the student with the basic issues of antimicrobial drugs chemistry						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U03] plans and performs the synthesis of chemical compounds with the required properties		is able to describe the basic classes of antimicrobial chemotherapeutic agents, taking into account their chemical structures and methods of synthesis; is able to explain the molecular mechanisms of action of the most important antimicrobial chemotherapeutic agents.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W05] defines the principles of sustainable development, national and European conditions for environmental management, in the field of intellectual property protection and patent law		knows the procedures and legal framework related to the search for new antimicrobial drugs and their introduction into clinical practice.		[SW1] Assessment of factual knowledge		
	[K7_W01] recognizes problems of modern chemistry, including properties and obtaining chemical compounds, necessary for making calculations, including the dependence of the compound's structure and its reactivity		understands the mechanisms of drug resistance developed by microorganisms.		[SW1] Assessment of factual knowledge		
	[K7_K01] is aware of the problems related to the profession of a chemist, is able to assess the effects of the activity performed		is aware of the clinical and social problems caused by pathogenic microorganisms, as well as the challenges associated with the treatment of infectious diseases.		[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Course content – lecture		
	1. Historical overview, the development of antibiotic resistance, and a discussion of the current situation.		
	2. Testing the antimicrobial activity of antibiotics.		
	3. Antibacterial antibiotics		
	3.1. β -lactam antibiotics: penicillins, cephalosporins.		
	3.2. Tetracyclines and aminoglycosides.		
	3.3. Polypeptide antibiotics.		
	3.4. Non-polyene macrolides, rifamycins.		
	4. Anticancer antibiotics.		
	5. Antifungal antibiotics.		
	Course content – laboratory		
	Assesment of antimicrobial activity selected chemical substances.using microdilution and diffusion assays		
	Production of polyene antibiotics.		
	Synthesis of derivatives of selected antibacterial or antifungal antibiotics.		
	Assessment of the molecular mechanisms of action of selected antimicrobial chemotherapeutics – fluorescence microscopy and flow cytometry.		
	Course content – seminar		
	During the seminars, each student prepares a presentation on the current state of knowledge in the following areas:		
	• the synthesis and evaluation of antimicrobial potential of new antibiotics,		
	• modifications to the structure of known antibiotics,		
	• molecular mechanisms of antibiotic action,		
	• the production of antibiotics on an industrial scale,		
	• environmental problems posed by the presence of antibiotic residues in agricultural products and wastewater.		
	The presentation is based on publications from renowned scientific journals.		
Prerequisites and co-requisites	General knowledge of organic chemistry, biochemistry and microbiology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar - oral presentation	60.0%	15.0%
	Laboratory - short tests	60.0%	15.0%
	Lecture - exam (oral)	60.0%	70.0%
Recommended reading	Basic literature	"Chemia Medyczna. Podstawowe zagadnienia" G.L. Patrick. Wydawnictwa Naukowo-Techniczne. Warszawa 2005	
		"An itroduction to medicinal chemistry" G.L. Patrick. Oxford University Press. Nowy Jork 2017	
	Supplementary literature	Recent scientific papers of antibiotics chemistry	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Explain the meaning of the terms MIC and MBC and explain how to determine the values of these parameters. What are the molecular targets of beta-lactam antibiotics? Characteristics of the two most important polyene macrolide antibiotics with antifungal activity.		
Practical activites within the subject	Not applicable		

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