GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	CHEMISTRY OF ANTIBIOTICS , PG_00066141		
Field of study	Chemistry		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
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 None
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	dr hab. inż. Piotr Szweda dr inż. Andrzej Skwarecki dr inż. Karolina Matejczuk	

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 Moodle ID: 1731 Chemia antybiotyków 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_W05] defines the principles of sustainable development, national and European conditions for environmental management, in the field of intellectual property protection and patent law	The student 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_K01] is aware of the problems related to the profession of a chemist, is able to assess the effects of the activity performed	The student understands the clinical and social problems posed by pathogenic microorganisms and the challenges associated with the treatment of infectious diseases.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U03] plans and performs the synthesis of chemical compounds with the required properties	The student knows the basic groups of antimicrobial chemotherapeutics, their chemical structures, and methods of preparation. The student understands the molecular mechanisms of action of the most important antimicrobial chemotherapeutics.	[SU3] Assessment of ability to use knowledge gained from the subject
[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	The student understands the mechanisms of drug resistance developed by microorganisms. The student understands the procedures involved in the search for new antimicrobial drugs and their introduction into clinical practice.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

1. Historical Overview, Development of Antibiotic Resistance, Current Situation 1 hour
2. Testing Antimicrobial Activity of Antibiotics 1 hour
3. Antibacterial Antibiotics
3.1. β-Lactam Antibiotics: Penicillins, Cephalosporins, Other 4 hours
3.2. Tetracyclines and Aminoglycosides 2 hours
3.3. Polypeptide Antibiotics 2 hours
3.4. Non-Polyene Macrolides, Rifamycins 2 hours (1+1)
4. Anticancer Antibiotics 1 hour
5. Antifungal Antibiotics 2 hours

Course content – laboratory

1. Biotechnological Production of Polyene Antibiotics
2. Synthesis of Sulfonamides
3. Study of the Antimicrobial Activity of the Obtained Polyenes and Sulfonamides

Course content – seminar

1. Total Synthesis of Sancycline
2. Total Synthesis of Erythromycin
3. Semi-Synthetic Method for Obtaining Artemisinin
4. Industrial Production of Azole Lanosterol Demethylase Inhibitors
5. Zanamivir, Laninamivir, and Oseltamivir - From an Idea to an Anti-Influenza Drug
6. Azole Fungicides Used in Agriculture - Impact on Candida Spp. Resistance
7. Bacteriocins

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
Exam	60.0%	80.0%
Oral presentation	60.0%	20.0%

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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