University of Gdańsk

Subject card

Subject name and code	Chemistry of pharmaceutical compounds, PG_00081941						
Field of study	Chemia leków (Ćw. laboratoryjne)						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
Education level	Bachelor's studies		Subject group	Obligatory subject group 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	4		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Medical Chemistry -> Department of Biomedical Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Marta Spodzieja				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		5.0	15.0	50	
Subject objectives	• Familiarization of students with the problems pointed out in the content of laboratory course, • Familiarization of students with laboratory technique used in analytical and organic chemistry, in micromolar scale work, • Acquiring the ability to unaided planning of experimental work, performance of chemical analysis and problem solving during their realization.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	student carries out a complex synthesis of an organic compound with properties medicinal products using the Polish-language literature procedure	[SW4] test/egzamin - ustny lub pisemny [SW1] wypowiedź ustna/rozmowa/ dyskusja
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	student is able to describe general methods of detecting and identifying individual pharmacological compounds from the groups specified in the program content	[SW2] prezentacja/projekt/referat/ raport [SW5] realizacja zadania problemowego
[CHEML3_U09] Is able to learn independently.	student uses the literature to prepare for written tests	[SU4] test/egzamin - ustny lub pisemny
[CHEML3_W05] Has basic knowledge of the chemical specialisation studied.	Have knowledge about obstacles to the site of action and how the compound may be metabolized and eliminated from organism.	[SW4] test/egzamin - ustny lub pisemny
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	student retains care during work with substances with putative biological/phamacological activity	[SK8] obserwacja samodzielnej lub zespołowej pracy studenta
[CHEML3_U01] Identifies, analyses and solves problems in the field of broadly understood chemistry on the basis of the acquired knowledge.	student designs paths for distinguishing individual medicinal substances in a series of several compounds belonging to different structural groups	[SU4] test/egzamin - ustny lub pisemny [SU8] obserwacja samodzielnej lub zespołowej pracy studenta
[CHEML3_W03] Explains the relationship between the structure of matter and its observed properties.	Outlines the key sources of lead compounds and the methods used for their quest. Describes fundamental modifications of lead structure performed in the initial stage of search for drugs.	[SW4] test/egzamin - ustny lub pisemny
[CHEML3_K06] Raises her/his professional and personal competences by using information provided in various sources.	Appreciate of the social and economical importance of research aimed at finding and elaboration of new drugs;	[SK4] test/egzamin - ustny lub pisemny
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	student carries out a complex synthesis of an organic compound with properties medicinal products using the Polish-language literature procedure	[SU8] obserwacja samodzielnej lub zespołowej pracy studenta
[CHEML3_K08] Formulates opinions in the field of science with caution and criticism in their expression.	student argues judgments based on the collected experimental results and draws conclusions through logical reasoning	[SK2] prezentacja/projekt/referat/ raport [SK4] test/egzamin - ustny lub pisemny
[CHEML3_U08] Presents in an understandable way the basic facts about chemistry using a scientific language typical of chemical sciences.	Defines fundamental (can define) fundamental terms from medicinal chemistry area, contained in the course content.	[SU4] test/egzamin - ustny lub pisemny
[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development.	On the examples of selected groups of drugs, proposes modifications of their chemical structure leading to desired changes of their biological activity profile (e.g. selectivity), ability to penetration of biological barriers, chemical stability and metabolic susceptibility.	[SK4] test/egzamin - ustny lub pisemny
[CHEML3_U04] Plans and performs simple chemical experiments and analyses the results obtained.	student carries out a complex synthesis of an organic compound with properties medicinal products using the Polish-language literature procedure student argues judgments based on the collected experimental results and draws conclusions through logical reasoning	[SU2] prezentacja/projekt/referat/ raport [SU5] realizacja zadania problemowego [SU6] demonstracja umiejętności praktycznych

Course outcome	Subject outcome	Method of verification
[CHEML3_K03] Establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others.	student designs paths for distinguishing individual medicinal substances in a series of several compounds belonging to different structural groups	[SK5] realizacja zadania problemowego [SK8] obserwacja samodzielnej lub zespołowej pracy studenta
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	student develops and analyzes the results of tasks specified in the program content	[SU2] prezentacja/projekt/referat/ raport
[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	student determines the content of the active substance in a commercial simple drug, using pharmacopoeial procedures for quantitative analysis and basic chemical calculations	[SU2] prezentacja/projekt/referat/ raport [SU8] obserwacja samodzielnej lub zespołowej pracy studenta

Subject contents

- Preparation of straight therapeutic compounds. Identity analysis of synthesis products. Assessment of purity of obtained compounds.
- Identification of active substances in unknown commercially available straight drugs, by qualitative chemical analysis. General methods of identification of therapeutic compounds of selected groups (alkaloids and their derivatives, steroids, tetracyclines, sulfonamides -lactam compounds, aniline and salicylic acid derivatives, barbiturates).
- Quantitative analysis of active substance in known straight drug. Detrmination of amount of the active substance in the single dose of commercially available single-component drug.

Prerequisites and co-requisites

Finished Organic Chemistry, General Chemistry and Analytical Chemistry courses.

- knowledge of a fundamental calculations applied in analytical chemistry,
- knowledge of the basic health and safety rules in chemical laboratory,
- ability to work with laboratory glass and principal laboratory apparatus applied in chemical synthesis and analysis

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
passing of three tests ((on the synthesis of a medicinal product, on the qualitative analysis of organic ingredients and on the qualitative analysis of selected retail groups)	51.0%	95.0%
preparation and analysis of the results of each exercise (obtaining a positive grade in the reports is a necessary condition for passing)	51.0%	5.0%

Recommended reading

Basic literature

Literature required to pass the course

- R. Kasprzykowska, A.S. Kołodziejczyk, Chemiczna analiza środków leczniczych. Leki proste, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2009.
- R. Kasprzykowska, Preparatyka prostych środków leczniczych, materiały niepublikowane, udostępniane przez prowadzą-cych ćwiczenia.
- R. Walczyna, J. Sokołowski, G. Kupryszewski, Analiza związków organicznych, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 1996.

Extracurricular readings

- Graham L. Patrick. Chemia medyczna. Podstawowe zagadnienia, wyd. WNT, Warszawa, 2003
- Graham L. Patrick Krótkie wykłady. Chemia leków, wyd. PWN, Warszawa 2004.
- R.B. Silverman, Chemia organiczna w projektowaniu leków, wyd. WNT, Warszawa, 2004
- Praca zbiorowa pod red. K. Kieć-Kononowicz, Wybrane zagadnienia z metod poszukiwania i otrzymywania ś

	Supplementary literature	• Zdzisław Markiewicz, Zbigniew A. Kwiatkowski Bakterie antybiotyki lekooporność, wyd. PWN, Warszawa 2001. \ • Alojzy Zgirski, Roman Gondko Obliczenia biochemiczne, wyd. PWN, Warszawa 1998. • Marianna Zając, Ewaryst Pawełczyk Chemia leków, Wydawnictwo Akademii Medycznej im. Karola Marcinkowskiego, Poznań 2000. • Alfred Zejca, Maria Gorczyca Chemia leków, wyd. PZWL, Warszawa 2004
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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