

Subject card

Subject name and code	Pharmaceuticals in the water environment - origin, transformation, threats, PG_00154780						
Field of study	Farmaceutyki w środowisku wodnym - pochodzenie, przemiany, zagrożenia (Ćw. audytoryjne)						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group				
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Experimental Biology and Plant Biotechnology -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Anna Aksmann				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	15.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	Additional information:						
	- Analiza tekstów z dyskusją - Wykład z prezentacją multimedialną - Prezentacje multimedialne przygotowywane przez studentów - Część zajęć w formie e-learningu						
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	15		2.0		8.0	25
Subject objectives	Presenting to the student selected aspects of environmental pollution with pharmaceuticals. Indication of the sources of these pollutants and discussion of possible transformations that pharmaceuticals may undergo in the cells of living organisms and in the environment. Drawing attention to the threats associated with the presence of pharmaceuticals in the environment and the possibilities of preventing their effects.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OZPL3_U11] The graduate is able to present in Polish and in a foreign language on specific issues in the field of biology during oral presentations	The graduate presents and describes contemporary problems in the field of environmental protection and related disciplines.	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport
	[OZPL3_U03] The graduate is able to search for and use available sources of biological information, including electronic sources, and critically analyse them	The graduate searches for and uses available sources of biological information, including electronic sources, and critically analyzes them.	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport
	[OZPL3_U02] The graduate can read with comprehension scientific texts in the field of natural sciences in Polish and simple texts in English	The graduate reads and understands scientific texts in the field of natural sciences in Polish and simple texts in English.	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport
	[OZPL3_K01] The graduate is ready to recognise the limitations in his/her own knowledge and understands the need for continuous learning and development	The graduate is ready to recognize the limitations of his or her own knowledge and understands the need for constant learning and development.	[SK1] wypowiedź ustna/rozmowa/ dyskusja [SK8] obserwacja samodzielnej lub zespołowej pracy studenta
	[OZPL3_W10] The graduate possesses a comprehensive understanding of current issues in biology and related fields	The graduate knows and understands at an advanced level contemporary problems related to environmental pollution with pharmaceuticals and issues related to its protection.	[SW1] wypowiedź ustna/rozmowa/ dyskusja [SW2] prezentacja/projekt/referat/ raport
Subject contents			
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	multimedia presentation	51.0%	50.0%
	essay	51.0%	50.0%
Recommended reading	Basic literature	Kümmerer, K. (Ed.). (2008). Pharmaceuticals in the environment: sources, fate, effects and risks. Springer Science & Business Media. Aga, D. S. (Ed.). (2007). Fate of pharmaceuticals in the environment and in water treatment systems. CRC Press. Brooks, B. W., & Huggett, D. B. (Eds.). (2012). Human pharmaceuticals in the environment: current and future perspectives (Vol. 4). Springer Science & Business Media. Harshkova D., Aksmann A. Zanieczyszczenie środowiska niesteroidowymi lekami przeciwzapalnym na przykładzie diklofenaku przyczyny, skutki, bioidnykacja. Kosmos (2019) 322, 185÷194 Hejna, M., Kapuścińska, D., & Aksmann, A. (2022). Pharmaceuticals in the aquatic environment: A review on eco-toxicology and the remediation potential of algae. International Journal of Environmental Research and Public Health, 19(13), 7717. Selected articles from scientific journals.	
	Supplementary literature	Karthikeyan, O. P., Mehariya, S., & Bhatia, S. K. (Eds.). (2022). Algal Biorefineries and the Circular Bioeconomy: Industrial Applications and Future Prospects. CRC Press. Selected articles from scientific journals.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		

Work placement	Not applicable
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