



Subject card

Subject name and code	, PG_00048774						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	4	Language of instruction			English		
Semester of study	7	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Monika Pawłowska				
	Teachers		dr inż. Monika Pawłowska				
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		5.0		15.0	50
Subject objectives	Gaining basic knowledge about the functioning of organisms and the existing threats to them in the environment. Understanding the toxic factors that affect living organisms and have an impact on entire ecosystems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions.		Is able to evaluate the role of environment protection from chemical and biological factors. Can assess the role of environmental protection in the removal of basic chemical and biological hazards of toxic compounds. Appreciates the role of anthropogenic factors and takes into account national and European conditions aimed at reducing the presence of toxic substances in the environment.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes		Can use literature and IT data to assess the danger and toxicity of using a given substance. Can calculate basic toxicometric values.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		

Subject contents	<p>The lecture entitled Ecotoxicology aims to present the causes and biochemical mechanisms that influence the effects of the environmental pollutants on the living organisms. It will not provide the descriptive knowledge about the toxic effects induced by chemicals, but will make students understand the processes responsible for these effects. It is assumed in this program that students had already gained the fundamental knowledge in biochemistry.</p> <p>The course covers the following subjects:</p> <ol style="list-style-type: none"> 1. Introduction to ecotoxicology, definitions and history 2. Physicochemical properties responsible for toxic effects. 3. The penetration routes of chemicals inside the living organisms. 4. Metabolic transformations as the detoxication and activation pathways of the strange substances introduced into living organism.. 5. Bioconcentration and bioaccumulation processes in the living organism and in the environment as a whole. 6. Biochemical mechanisms of mutagenic and carcinogenic action of xenobiotics. 7. Selected physiological effects of toxicants: action towards nervous system, teratogenic, immunosuppressive and allergenic effects. 8. Biochemical mechanisms of the toxic action of selected groups of chemicals, for instance: heavy metals, asbestos, polycyclic aromatic hydrocarbons, polychlorinated biphenols, dioxins or xenoestrogens. 9. Methods for toxicity assessment of xenobiotics and employed for the prediction of this toxicity for new compounds introduced into the environment. 10. Sources of pollutants in the environment and their displacement. 								
Prerequisites and co-requisites									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>100% evaluation</td> <td>60.0%</td> <td>100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	100% evaluation	60.0%	100.0%
Subject passing criteria	Passing threshold	Percentage of the final grade							
100% evaluation	60.0%	100.0%							
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. S.F. Zakrzewski, Principles of environmental toxicology, Washington 1991 2. R.M. Sibly, Principles of Ecotoxicology, Taylor and Francis, 2012 3. J. Paasivirta, Chemical Ecotoxicology, Lewis Publ. 1991 							
	Supplementary literature	<ol style="list-style-type: none"> 1. Zarys ekotoksykologii, pod red. J.Namieśnika i J.Jaśkowskiego, EKO-Pharma, Gdańsk 1995 2. J.B. Harborne, Ekologia biochemiczna, PWN, Warszawa 1997 							
	eResources addresses	Adresy na platformie eNauczanie: Ecotoxicology - Moodle ID: 34047 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=34047							
Example issues/ example questions/ tasks being completed	<p>Whar are the characteristics of the substances that make them toxic?</p> <p>What is the pathway of metabolic transformations of xenobiotics, which penetrate our organism?</p> <p>Haw to determine the concentration of selected pesticide in soil?</p>								
Work placement	Not applicable								