



Subject card

Subject name and code	, PG_00048768						
Field of study	Green Technologies						
Date of commencement of studies	October 2021	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	3	Language of instruction			English		
Semester of study	5	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Colloid and Lipid Science -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Christian Jungnickel				
	Teachers		dr hab. Christian Jungnickel				
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						
	Additional information: Material will be shared on the e-learning Platform https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32884						
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		2.0		18.0	50
Subject objectives	Understanding the importance of sustainable development on the basis of current problems that pose a potential threat to our civilization						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K06] has awareness of the importance of non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for decisions.	Understanding the importance of sustainable development on the basis of current problems that pose a potential threat to our civilization	[SK2] Assessment of progress of work
	[K6_K05] is ready to initiate actions for public interest, preparation of social projects (economic, civil, political).	By recognizing the threats facing our civilization, the student will learn to look for alternative technologies for various chemical processes	[SK4] Assessment of communication skills, including language correctness
	[K6_W05] has an elementary knowledge of the fundamental concepts and problems of quality management, the general principles of creation and development of forms of individual entrepreneurship, application of the principles of work organization and integrated management, basic principles of quality control and analysis results; knowledge of basic legal aspects relating to the management of chemicals with particular emphasis on compounds polluting the environment and business, knows and understands the basic concepts and principles of the protection of industrial property and copyright and the need for management of intellectual property.	Various civilization threats can have an impact at the enterprise level. The student will learn how quality control and effective company decisions can reduce environmental risks	[SW3] Assessment of knowledge contained in written work and projects
	[K6_K03] turns the attention to the prestige associated with the profession and professional solidarity properly understood, shows respect for others and concern for their welfare	The student learns that individuals have a significant impact on society as a whole and that we should proactively support society for the next generation	[SK2] Assessment of progress of work
Subject contents	Lecture: The series of lectures will include and cover topics such as: Biosphere 2 experiment (and thus - homeostasis); circulation of matter in the biosphere; carbon cycle, global warming and the role of methane; pesticides; force fields in the biosphere (gravitational, electric, magnetic); nitrogen cycle; genetically modified organisms: transgenic food and cloning and the associated risks and environmental impacts; increasing ionization of the atmosphere; environmental causes of cancer, communication and media - electromagnetic radiation; disease control, parasites; non-degradable and non-biodegradable materials (pesticides, plastics, detergents, drugs); heavy metals (sources, storage, environmental hazards), including: lead, cadmium, mercury; the concept of eco-development; green chemistry principles; pro-ecological engineering opportunities; REACH; BAT and NDN (MAK) values.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture test	50.0%	30.0%
	Final test	50.0%	70.0%
Recommended reading	Basic literature	1. G. Simmons, Changing the Face of the Earth - Culture, Environment, History, University Press, Cambridge 1991. 2. David A. Dunnette and Robert J. O'Brien, The Science of Global Change - The Impact of Human Activities on the Environment, American Chemical Society, Washington, DC 1992. 3. The Worldwatch Institute, State of the World 2003, WW Norton & Company New York London 2003. 4. KB Misra, Clean Production - Environmental and Economic Perspectives, Springer 1996. 5. Jerry D. Allison, Davis S. Brown, Mintage2 / Prodefa2: A Geochemical Assessment Model for Environmental Systems, Environmental Research Laboratory, Athens, Georgia, 1991. 6. Robert L. Doneker, Gerhard H. Jirka, Expert System for Hydrodynamic Mixing Zone Analysis of Conventional and Toxic Submerged Single Port Discharges, Environmental Research Laboratory, Athens, Georgia, 1990.	
	Supplementary literature	Not required	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/example questions/tasks being completed	<ol style="list-style-type: none"> Name the principles of Green Chemistry. Under what conditions does environmental degradation occur. Name some physical properties of a new chemical and describe how these factors affect the environmental / human risk 		
Work placement	Not applicable		