



Subject card

Subject name and code	Civilization Threats and Sustainable Development, PG_00048788						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
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			Polish		
Semester of study	5	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Iwona Cichowska-Kopczyńska					
	Teachers	dr inż. Iwona Cichowska-Kopczyńska dr hab. inż. Anna Zielińska-Jurek					
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		2.0		18.0	50
Subject objectives	The aim of the course is to familiarize students with the types of threats and civilization disasters both antropogenic and natural. The threats to the environment resulting from human activity and life models as well as their effects will be presented, along with a discussion of the possibilities of prevention on a local, regional and global scale. The assumptions of the sustainable development concept and the methods of their implementation in terms of circular economy, resource management, intensification and optimization of processes, advanced technologies and modern solutions.						

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.	Student is able to identify factors, their strength and range, as well as their longterm impact.	[SK5] Assessment of ability to solve problems that arise in practice
	[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 understands the role and importance of knowledge, skills, experience in general activity, understands the value of teamwork and knowledge transfer.	[SK1] Assessment of group work skills
	[K6_K05] is ready to initiate actions for public interest, preparation of social projects (economic, civil, political).	The student is able to correctly identify current problems of public interest, prioritize actions and propose actions and solutions along with the justification of their legitimacy.	[SK5] Assessment of ability to solve problems that arise in practice
	[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.	The student knows the relations in the economy and its impact on the environment, can interpret the complexity of processes and phenomena in an interdisciplinary approach. The student defines and characterizes the mutual relations between the influencing factor and the effect it causes in the environment.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
Subject contents	Basic environmental concepts, the concept of civilization threats, types of threats, the concept of sustainable development, environmental aspects of the use of natural resources, modern energy systems, cleaner technologies, optimization and intensification of processes, the role of simulation in sustainable design, analysis and minimization of process risk, the impact of industrial processes on environment, product life cycle, environmental impact assessment, poorly biodegradable substances, REACH, BAT, nanotechnology, advanced techniques to minimize emissions.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Additional tasks	60.0%	34.0%
	Test 1	60.0%	33.0%
	Test 2	60.0%	33.0%

Recommended reading	Basic literature	<p>Por. S. Kozłowski, <i>Ekorozwój. Wyzwanie XXI wieku</i>, Warszawa 2000; J. Bohdanowicz, <i>Ku cywilizacji</i></p> <p><i>ekorozwoju</i>, Gdańsk 2001;</p> <p>J. Krystek, <i>Ocena oddziaływania na środowisko</i>, PWN 2021</p> <p>M. Hauschild, <i>Life cycle assessment: Theory and Practice</i>, Springer</p> <p>1.R. Salomone, <i>Industrial Symbiosis for the Circular Economy</i>, Springer</p> <p>M. Kanazawa, <i>Natural resources and the environment</i>, Routledge</p> <p>M. De Lara, <i>Sustainable Management of Natural Resources</i>, Springer</p> <p>A. Azad, <i>Advances in clean Energy technologies</i>, Elsevier</p> <p>A. Sinharoy, <i>Renewable Energy Technologies for Energy Efficient Sustainable Development</i>, Springer</p> <p>L. Torres, <i>Energy and Environment nowadays</i>, Nova</p> <p>D. Foo, et al. <i>Recent Advances in Sustainable Process Design and Optimization</i>, WS, 2021</p> <p>A. Ramiro <i>Risk Analysis and Reduction in the Chemical Process Industry</i>, Springer, 1998</p> <p>T. Chmielniak, <i>Technologie Energetyczne</i>, PWN</p> <p>J. Armstrong <i>The Future of Energy: The 2021 guide to the energy transition - renewable energy, energy technology, sustainability, hydrogen and more</i>, ETP, 2021</p> <p>D. JC MacKay, <i>Sustainable Energy</i>, Cambridge, 2009</p> <p>Por. A. Toffler, <i>Trzecia fala</i>, Warszawa 1977; Cz. Mojsiewicz, <i>Globalne problemy ludzkości</i>, Poznań</p> <p>1998; Z. Bauman, <i>Globalizacja</i>, Warszawa 2000, roz. I.</p> <p>E. Polak, <i>Przemiany cywilizacji współczesnej w sferze kultury materialnej</i>, Gdańsk 1996, roz. II.</p> <p>Robert A. Ristinen, Jack J. Kraushaar, <i>Energy and the Environment</i>, John Wiley & Sons, Inc. USA 1998.</p> <p>K. B. Misra, <i>Clean Production - Environmental and Economic Perspectives</i>, Springer 1996</p>
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	Supplementary literature	<p>James T. Winpenny, 7. Environmental Evaluation - Economic methods assessment, PWE Warszawa, 1995.</p> <p>G. Simmons, Changing the Face of the Earth - Culture, Environment, History, University Press, Cambridge 1991.</p> <p>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.</p> <p>The Worldwatch Institute, State of the World 2003, W W Norton & Company New York London 2003.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	global civilization threats, spread of pollution in the environment, poorly biodegradable substances, food safety, consumerism, natural, chemical and energy resources, raw material extraction, biodiversity, product life cycle, BAT, green chemistry, cleaner technologies, industrial symbiosis	
Work placement	Not applicable	