GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Waste managment and waste disposal, PG_00048792		
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	6	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Colloid and Lipid Science -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aneta Pacyna-Kuchta	
	Teachers	dr inż. Aneta Pacyna-Kuchta dr inż. Ilona Kłosowska-Chomiczewska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	15.0	60
	E-learning hours included: 0.0						
	2023 Gospodarka odpadami i utylizacja odpadów komunalnych - Nowy - Moodle ID: 27931 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27931						

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	60	15.0	50.0	125

Subject objectives	The aim of the course is to familiarize the student with the history, legal, technical and technological aspects related to the waste management and waste disposal

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K02] is aware of the social role of a technical college graduate, take the reflections on the ethical, scientific and social aspects of the work performed, understands the need to promote, formulating and providing the public with information and opinions concerning the activities of the profession of engineer.	The student is aware of the importance of the issue of waste management, understands the need to spread social awareness in this area	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice
[K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions	The student is able to recognize problems and potential threats environmental issues related to waste management, can propose appropriate solutions and estimate their costs	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	The student has a basic knowledge of of waste management and technologies of waste management waste	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents

Legal aspects of municipal solid waste management. Legal regulations of waste management in Poland and the EU. Waste classification, definitions. Municipal waste: characteristics, quantity and quality. Municipal waste collection system. Segregation. Recycling. Storage of waste in municipal landfills. Main design and operational requirements for municipal waste landfills. Physical, chemical and biological processes during waste storage. Biogas recovery. Leachate from landfills, characteristics, methods of treatment. Composting of organic waste. Process conditions, compost classification. Composting methods. Thermal methods of waste disposal. Pyrolysis and incineration. Co-combustion with addition of solid fuels. Methane fermentation of organic waste. Process conditions, methods of fermentation. Critical Raw Materials, E-waste.

Prerequisites and co-requisites

Knowledge of terms and definitions in the field of general chemistry and environmental chemistry. Knowledge of chemical technology. Knowledge of health and safety regulations and rules of work in the laboratory.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
seminar	60.0%	20.0%
laboratory	60.0%	20.0%
exam	60.0%	60.0%

Recommended reading	Basic literature	1. Bilitewski B., Härdtle G., Marek K.: Podręcznik gospodarki odpadami. Teoria i praktyka. Wydawnictwo "Seidel-Przywecki" Sp. z o.o., Warszawa, 2006. 2. Żygadło M. (red): Strategia gospodarki odpadami komunalnymi. Polskie Zrzeszenie Inżynierów i Techników Sanitarnych, Poznań, 2001. 3. Rosik-Dulewska C.: Podstawy gospodarki odpadami. PWN, Warszawa, 2007. 4. Jędrczak A.: Biologiczne przetwarzanie odpadów. PWN, Warszawa, 2007. 5. Maciak F.: Ochrona i rekultywacja środowiska. Wydawnictwo SGGW, Warszawa, 2003. 6. Błędzki A. K. (red): Recykling materiałów polimerowych. WNT, Warszawa, 1997. 7. Ambrożewicz P., Zwarty system zagospodarowania odpadów, Wydawnictwo Ekonomia i Środowisko, 1999
	Supplementary literature	1.Masters G.M. Introduction to Environmental Engineering and Science, Prentice-Hall inc. London, 1991. 2.Librizzi W.J., Lowery C.N., Hazardous Waste Treatment, Wat. Poll. Contr. Fed., Virginia 1990. 3.Janson M. Hazardous waste management engineering, VRN, New York, 1987. 4.Maughan J., Ecological assessment of hazardous waste sites, VRN, New York, 1993. 5.Cheremisinoff N.P., Biotechnology for waste and wastewater treatment, Noyes Publikations, 1996. 6.Martin W.F., Lippitt J.M., Webb P.J. Hazardous Waste Handbook for Health and Safety, Butterworth, Heinemann, 2000.
	eResources addresses	
Example issues/ example questions/ tasks being completed	List the parameters influencing the efficiency of the composting process. Give the optimal values and describe the importance of these parameters for the process. List the ways of controlling emissions from waste incineration. Describe the impact of each of them.	
Work placement	Not applicable	