



## Subject card

Subject name and code	Waste and sewage sludge management, PG_00042714						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject			2024/2025	
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	Part-time studies		Mode of delivery			at the university	
Year of study	4		Language of instruction			Polish	
Semester of study	8		ECTS credits			2.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Environmental Engineering Technology -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Eliza Kulbat				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	0.0	0.0	25
	E-learning hours included: 0.0						
	Address on the e-learning platform: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23164">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23164</a>						
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	25		2.0		33.0	60
Subject objectives	Acquiring skills assessment technology related to solid waste and sewage sludge.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U10] can design basic equipment for water treatment, wastewater treatment and sludge and waste management	The student is able to design the basic devices used in sludge and waste management.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K6_U16] can, when formulating and solving engineering tasks in environmental engineering, evaluate, select and apply appropriate methods and tools, recognize their non-technical aspects, including environmental, economic and legal aspects	The student is able to choose the appropriate methods and tools for solving issues in waste and sludge management.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of the sanitary industry engineer's activity; is aware of the importance and understands the non-technical aspects and effects of engineering activities; makes efforts to provide such information and opinions in a widely understandable way, presenting different points of view	The student understands the need to provide the society with reliable knowledge about the functioning of waste and sludge management facilities.	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness
	[K6_W10] has elementary knowledge in the field of running a business in the sanitary industry; knows the general principles of creating and developing forms of individual entrepreneurship; knows the basic principles of health and safety at work in the laboratory and at the construction site	The student has basic knowledge about running a business in the sanitary industry, knows the basic principles of occupational health and safety in municipal management facilities.	[SW1] Assessment of factual knowledge
Subject contents	<p>Organisation and legal bases of municipal solid waste management, waste hierarchy. Physical, chemical and biological properties of waste, waste collection systems. Waste management and disposal methods: reuse, recycling, thermal methods, composting, anaerobic digestion, landfill. Organization and operation of municipal waste landfills.</p> <p>Legal bases for sewage sludge. Types, properties and amounts of municipal sewage sludge. Thickening and conditioning of sewage sludge. Stabilization of sewage sludge - methane fermentation, biological oxygen methods and chemical methods. Dewatering and drying of sewage sludge. Thermal methods of sewage sludge neutralization.</p>		
Prerequisites and co-requisites	Knowledge of chemistry, microbiology and wastewater technology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	60.0%	60.0%
	design tasks	60.0%	40.0%

Recommended reading	Basic literature	<p>1. Rosik-Dulewska C. Basics of waste management, PWN 2015</p> <p>2. Bernd Bilitewski, Georg Hardtle, Klaus Marek, Waste management manual- II wydanie Wydawnictwo:Seidel-Przywecki, ISBN: 83-919449-8-0, Wydanie:2006</p> <p>3. Grygorczuk-Petersons E.H., Tałała J.A. Shaping waste management in a commune, Podlaska Agencja Zarządzania Energią, Białystok 2007</p> <p>4. J. B. Bień, K. Wystalska, Sewage sludge. Theory and practice, Wyd. Politechniki Częstochowskiej 2011</p> <p>5. A sewage treatment plant operator's guide : praca zbiorowa / pod red. Zbysława Dymaczewskiego</p> <p>6. M. Jakubus, Municipal sewage sludge. Genesis - economy, Wyd. Uniwersytetu Przyrodniczego w Poznaniu,</p>
	Supplementary literature	EU directives on waste management, legal acts regarding waste management in force in Poland.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Discuss the factors influencing the efficiency of the sewage sludge thickening process.</p> <p>Discuss the methods of municipal waste management in Poland.</p>	
Work placement	Not applicable	

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