



Subject card

Subject name and code	Waste and sewage sludge management, PG_00043506						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Optional subject group 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			Polish		
Semester of study	7	ECTS credits			4.0		
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	dr inż. Karolina Fitobór dr hab. inż. Eliza Kulbat					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=14347							
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	45		5.0		50.0	100
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 basic devices for sludge and waste management	[SU4] Assessment of ability to use methods and tools [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, when formulating and solving engineering tasks in environmental engineering, to evaluate, select and apply appropriate methods and tools, to see their non-technical aspects, including environmental, economic and legal	[SU3] Assessment of ability to use knowledge gained from the subject [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 formulate and transmit to the public information and opinions on the achievements of environmental engineering; understands the non-technical aspects and effects of engineering activities	[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 elementary knowledge 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 occupational health and safety in the laboratory and on the construction site	[SW3] Assessment of knowledge contained in written work and projects	
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 the basics and credit items in the range: water and wastewater technologies, hydraulics, geotechnics, sanitary biology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tasks and test	60.0%	100.0%

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-PetersonsE.H., Talałaj I.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>
	Supplementary literature	<p>M. Jakubus, Municipal sewage sludge. Genesis - economy, Wyd. Uniwersytetu Przyrodniczego w Poznaniu,</p> <p>EU directives on waste management</p>
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Gospodarka odpadami i osadami ściekowymi - wykład 2023/2024 - Moodle ID: 34640 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34640</p> <p>Gospodarka odpadami i osadami ściekowymi - wykład 2023/2024 - Moodle ID: 34640 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34640</p>
Example issues/ example questions/ tasks being completed	<p>Calculation of the degree of dewatering of sewage sludge. Agricultural management of sewage sludge. Analysis of changes in the ways of handling municipal waste</p>	
Work placement	Not applicable	