



## Subject card

Subject name and code	, PG_00059983						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Environmental Engineering Technology -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Krzysztof Czerwionka				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
	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	45		5.0		52.0	102
Subject objectives	The aim of the course is to provide detailed and advanced knowledge in the field of wastewater characteristics, legal regulations and standards, design methods and tools supporting design, methods and technologies for the implementation of the treatment systems in question, as well as the non-technical conditions related to them. The classes will lead to the acquisition of skills in obtaining and integrating information from various sources and databases, applying calculation methodologies and design principles, and using software.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U10	The student is able to design a municipal wastewater treatment plant in the field of wastewater treatment technologies for various outputs			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	K7_W06	The student has extended and deepened hydraulic knowledge necessary in designing wastewater treatment plants.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_W07	The student has extended and in-depth knowledge of unit processes and their application in the technological system of sewage treatment plants.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_U12	The student has extended and in-depth knowledge in the field of designing wastewater treatment systems from the technological, economic and legal perspective			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	Lectures: Wastewater treatment plant as a source of raw materials. Balance of organic matter, nitrogen and phosphorus compounds. The influence of sludge management on the pollution load in activated sludge chambers. Optimizing the demand for organic compounds. Phosphorus removal and recovery. Nitrogen removal and recovery. Use of treated wastewater as a water source. Rules for dimensioning sewage treatment plants based on the modified ATV A131 guidelines. Control systems for nitrogen and phosphorus transformation processes. Flow measurements in sewage treatment plants. Sewage treatment plants of the future.		
Prerequisites and co-requisites	Water and wastewater technology II.  Water and wastewater treatment equipment.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	60.0%
	Completion of the project	60.0%	40.0%
Recommended reading	Basic literature	1. Bever J., Stein A., Teichmann H.: Zaawansowane metody oczyszczania ścieków. Bydgoszcz: Wydawnictwo Projprzem-Eko 1997.  2. Heidrich Z. Witkowski A.: Urządzenia do oczyszczania ścieków. Warszawa: Wyd. Seidel-Przywecki 2005.  3. Henze M., Harremoës P., Jes la Cour J., Arvin E.: Oczyszczanie ścieków, procesy biologiczne i chemiczne. Kielce: Wyd. Pol. Świętokrzyskiej 2002	
	Supplementary literature	1. Anielak A.: Chemiczne i fizykochemiczne oczyszczanie ścieków. Warszawa: PWN 2000.  2. Kayser R.: Komentarz ATV-DVWK do A131P i do A210P. Warszawa: Wydawnictwo Seidel-Przywecki, 2002.  3. Kowal A.: Odnowa wody. Podstawy teoretyczne procesów. Wrocław: Politechnika Wroclawska 1996.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		