



Subject card

Subject name and code	Waste-water Technology, PG_00058815						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	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	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			5.0		
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	dr inż. Alina Wargin mgr inż. Emilia Bączkowska dr hab. inż. Krzysztof Czerwionka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		5.0		60.0	125
Subject objectives	Presentation of the basic scope of knowledge regarding the issues of quantity and quality of municipal wastewater and knowledge regarding the unit processes used for their treatment						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W03] has a structured and theoretically founded knowledge in the field of chemistry and biology, including knowledge necessary to understand the technological processes related to water treatment, wastewater treatment, waste management and sludge management	The student is able to use knowledge of chemistry and biology to assess the effectiveness of processes used for wastewater treatment.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions	The student understands the need to update knowledge in the field of wastewater characteristics and its impact on the selection of unit processes for pollutant removal	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject
	[K6_U10] can design basic equipment for water treatment, wastewater treatment and sludge and waste management	Student potrafi przedstawić ciąg technologii oczyszczania ścieków	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_U09] is able to use well-chosen methods and measuring devices that enable determination of basic parameters of the water treatment process and wastewater treatment; can perform simple laboratory tests leading to the assessment of water quality, pollutant load in sewage	The student is able to perform laboratory tests to determine the parameters of wastewater treatment processes	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
Subject contents	Lecture: Basic concepts and definitions. Indicators and criteria for assessing sewage quality. Pollutant loads. Discharge of sewage into the environment: sewage receivers, legal conditions. Technological processes of mechanical sewage treatment. Basics of biological sewage treatment: microbiological composition, development of bacterial culture. Biological unit processes: hydrolysis, oxidation, ammonification, nitrification, denitrification, biological dephosphatation. Technological parameters of the activated sludge method. Basic technological systems of biological sewage treatment. Natural methods of sewage treatment: biological ponds, soil-plant treatment plants, domestic treatment plants. Modern methods of nitrogen removal: partial nitrification/denitrification, anammox, deammonification. Laboratory exercises: Examination of COD fractions of sewage. Chemical removal of phosphorus from sewage. Treatment of sewage contaminated with oil emulsions. Studies of the speed of unit processes of nitrogen and phosphorus removal. Studies of the efficiency of nitrogen removal in the deammonification process.		
Prerequisites and co-requisites	Knowledge of the following subjects: environmental chemistry and basics of eco-engineering		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Passing the laboratory	60.0%	30.0%
	Final exam	60.0%	70.0%
Recommended reading	Basic literature	1. Łomotowski J., Szpindor A.: Nowoczesne systemy oczyszczania ścieków. Arkady, Warszawa, 1999.  2. Praca zbiorowa (red.: Oleszkiewicz J.): Poradnik eksploatatora oczyszczalni ścieków. Wyd. PZiTS, Poznań, 1997.  3. Henze M., Harremoës P., Jansen J., Arvin E.: Oczyszczanie ścieków procesy biologiczne i chemiczne. Wyd. Politechniki Świętokrzyskiej, Kielce, 2002.  4. Bever J., Stein A., Teichmann H.: Zaawansowane metody oczyszczania ścieków eliminacja azotu i fosforu, sedymentacja i filtracja. Wyd. Projprzem-Eko, Bydgoszcz, 1997.	
	Supplementary literature	1. Magrel L.: Uzdatnianie wody i oczyszczanie ścieków. Wyd. Ekonomia i Środowisko, Białystok, 1999.  2. Bernacka J., Kurbiel J., Pawłowska L.: Usuwanie związków biogenych ze ścieków miejskich. Wydawnictwo Instytutu Ochrony Środowiska, Warszawa, 1992.	
	eResources addresses	Adresy na platformie eNaukanie:	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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