



Subject card

Subject name and code	WATER TREATMENT, PG_00060003						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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			English		
Semester of study	2	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. Katarzyna Jankowska					
	Teachers	mgr inż. Emilia Bączkowska dr hab. Katarzyna Jankowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	15.0	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		38.0	103
Subject objectives	Understanding the basics and unit processes of water treatment and the principles of designing technological lines for various types of water.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_W07	They understand the problems of municipal management. Have knowledge of water treatment and recovery technologies, treatment of various types of wastewater, sludge treatment.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K7_U06	They work independently and in a team using the knowledge gained in class. They are able to apply it to solve problems in the field of environmental engineering.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	K7_U07	They are prepared to conduct field and laboratory tests necessary to properly evaluate the parameters required for the design of facilities such as water treatment and wastewater treatment plants.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	K7_U10	Can design water and sewage systems, a complex heat source or energy storage or ventilation and air conditioning system or hydrotechnical system or technology of water treatment and sewage treatment plant.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	K7_U12	On the basis of their knowledge they can analyze and evaluate solutions and functioning of objects and systems of environmental engineering.	[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
Subject contents	Quality of natural waters (including surface waters, ground water, infiltration waters and rainwater). Pollution classification - physical, chemical and biological criteria. Requirements for water intended for human consumption (WHO recommendations, national standards, EU standards). Health aspects. Basic principles and processes in water purification technology. General principles of designing a water treatment plant. Types of devices, principles of operation, design guidelines. Disinfection - process mechanism and application. Calculations: reagent warehouse, hydraulic and mechanical mixers, reaction chambers, settling tanks, filters, clean water tanks.		
Prerequisites and co-requisites	Knowledge from the subject Environmental biology and chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Projekt - design task	60.0%	50.0%
	Tutorials - presentation	60.0%	50.0%
	Lecture - presence	80.0%	0.0%
Recommended reading	Basic literature	1. Howe, K. J., Hand, D. W., Crittenden, J. C., Trussell, R. R., & Tchobanoglous, G. (2012). <i>Principles of water treatment</i> . John Wiley & Sons. 2. Droste, R. L., & Gehr, R. L. (2018). <i>Theory and practice of water and wastewater treatment</i> . John Wiley & Sons. 3. Crittenden, J. C., Trussell, R. R., Hand, D. W., Howe, K. J., & Tchobanoglous, G. (2012). <i>MWH's water treatment: principles and design</i> . John Wiley & Sons. 4. Baruth, E. E. (2004). <i>Water treatment plant design</i> . ASCE.	

	Supplementary literature	<p>1. Murphy, E. A., Post, G. B., Buckley, B. T., Lippincott, R. L., & Robson, M. G. (2012). Future challenges to protecting public health from drinking-water contaminants. <i>Annual review of public health</i>, 33, 209-224.</p> <p>2. Geissen, V., Mol, H., Klumpp, E., Umlauf, G., Nadal, M., van der Ploeg, M., ... & Ritsema, C. J. (2015). Emerging pollutants in the environment: a challenge for water resource management. <i>International soil and water conservation research</i>, 3(1), 57-65.</p>
Example issues/ example questions/ tasks being completed	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Water quality characteristics (physical, chemical, biological indicators).</p> <p>Water intake.</p> <p>Designing the coagulation process.</p> <p>Overview of the mechanism of the filtration process.</p>
Work placement		Not applicable