



Subject card

Subject name and code	WATER TREATMENT, PG_00060003						
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			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						
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 different types of water						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U06	is able to use the known methods and mathematical models, if necessary modifying them as appropriate, to: analyse and design elements, systems and water supply systems or water flows, migration of pollutants or water and sewage treatment and sewage sludge treatment	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	K7_W07	has in-depth, well-structured, theoretically based knowledge of municipal management, including water treatment and restoration technologies, technologies for the treatment of various types of waste water, including landfill leachate, technologies for sewage sludge treatment; knowledge of natural methods used in water and waste water treatment or the construction, operation, maintenance and closure of landfill sites	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K7_U10	Can design water and sewerage systems, a complex heat source or energy storage, or a ventilation and air-conditioning system, or a hydro-engineering system, water treatment technology and a sewage treatment plant.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	K7_U07	Is able to plan and carry out an experimental or laboratory, field or computer simulation study leading to an evaluation of the effectiveness of applied environmental engineering solutions Is prepared to carry out field and laboratory studies necessary for the proper evaluation of parameters required for the design of facilities such as water treatment plants and wastewater treatment plants.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	K7_U12	is able to design: an extensive water supply and sewerage system, a complex heat source, a swimming pool water treatment technology, a mechanical ventilation system or a groundwater intake, a drainage from an urbanised catchment area, a control system for a retention reservoir during the capture of a surge or a water treatment technology, a sewage treatment plant, a domestic treatment facility	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
Subject contents	Quality of natural waters (including surface waters, groundwater, 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 <i>Environmental biology and chemistry</i>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tutorials - presentation	60.0%	35.0%
	Lecture - test	60.0%	30.0%
	Project - design task	60.0%	35.0%

Recommended reading	Basic literature	<p>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.</p> <p>2. Droste, R. L., & Gehr, R. L. (2018). <i>Theory and practice of water and wastewater treatment</i>. John Wiley & Sons.</p> <p>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.</p> <p>4. Baruth, E. E. (2004). <i>Water treatment plant design</i>. ASCE.</p>
	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>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<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 filtration process.</p>	
Work placement	Not applicable	

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