



Subject card

Subject name and code	WATER TREATMENT, PG_00039346						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-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	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 inż. Karolina Fitobór				
	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		35.0	100
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_U06] can use the known mathematical methods and models, if needed, to modify them, for: analysis and design of water systems and their components or water flows, migration of pollutants or water and wastewater treatment and sewage sludge handling	Student is able to use knowledge of methods for the analysis and design of elements and systems of water treatment plant.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K7_U12] can design: developed water and sewage system, complex heat source, pool water treatment technology, mechanical ventilation installation or underground water intake, drainage of urban water catchment, reservoir control system during flood seizure or water treatment technology, domestic waste water treatment plant	Student is able to design an installation for the treatment of groundwater or surface water.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K7_U07] can plan and carry out laboratory and field experiments leading to assessment of the efficiency of water treatment, waste water treatment, waste management and sewage sludge management	Student is able to assess the effectiveness of water treatment.	[SU1] Assessment of task fulfilment
	[K7_U14] can technically and economically analyze and evaluate the solutions and functioning of facilities and systems in the sanitary engineering or flood protection, water intakes and water infrastructure or water and wastewater treatment plants; can assess the suitability and potential of using new achievements in materials, fixtures, devices and methodologies for designing and modeling the analyzed technical infrastructure and industrial objects, including innovative solutions	Student is able to analyze and evaluate solutions and functioning of water treatment plant facilities in technical and economic terms.	[SU1] Assessment of task fulfilment
	[K7_W07] has an in-depth, structured and theoretical knowledge of municipal management, including water treatment and water renewal technologies, various types of wastewater treatment technologies, including landfill leachate, sewage sludge treatment technologies; knowledge of natural methods used in water and wastewater treatment or construction, functioning, operation and closure of waste landfills	Student has in-depth and well-structured knowledge of water purification technology.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
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
	Lecture - test	60.0%	30.0%
	Projekt - design task	60.0%	35.0%
	Tutorials - presentation	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 eNauzanie:
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 the filtration process.</p>	
Work placement	Not applicable	