



## Subject card

Subject name and code	Water Supply and Wastewater Disposal, PG_00059994						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2024		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	1		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Ewa Wojciechowska				
	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	Gaining advanced knowledge on modeling and analysis of waterworks and sewerage networks. Gaining knowledge and abilities on designing of the drainage systems. Gaining knowledge on the role and applications of Nature Based Solutions and Green Infrastructure.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W09		Student knows and understands problems arising from increasing pressure on water resources due to climate change and demographic growth. Student understands how these phenomena affect hydrological cycle and knows possible mitigation methods.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_U06		Student knows and can choose tools for designing of water supply and wastewater disposal system adequate for the size of residential area.		[SU4] Assessment of ability to use methods and tools		
	K7_U10		Student performs routing and computation of water demand, wastewater and stormwater computational flow rates. Student can perform hydraulic calculations.		[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
	K7_U12		Student can choose adequate solution of water treatment, collecting of domestic wastewater and management of stormwater, according to the local circumstances.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	Objectives and aims of water supply systems and wastewater disposal systems in XXI century. Pressure on water resources and necessity of adopting circular economy principles in the water sector. Solutions for decentralised wastewater treatment in the rural areas. Vacuum sewers and pressure sewer systems. On-site wastewater treatment: drainage, sand filters, constructed wetlands. Storm water drainage in the urban areas. Methods of calculation flow rates in storm water drainage systems. Pollution of storm water runoff and treatment possibilities. Sustainable urban drainage systems. Infiltration and retention of storm water. Possibilities of using Green Infrastructure and Nature Based Solutions in water supply and wastewater disposal. The basic aspects of water management in municipal and industrial sectors. Technological schemes of groundwater and surface water treatment. Unit processes used for removal of typical pollutants present in groundwater and surface water: coagulation, filtration, aeration, sorption, ion exchange, membrane processes. Selection of materials and dimensioning of devices for unit processes of water treatment. Cost analysis of selected elements of water treatment installation.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Report + oral presentation	100.0%	25.0%
	exam	50.0%	50.0%
	Designing exercise	100.0%	25.0%
Recommended reading	Basic literature	Viessman W Jr., Hammer M.J. Water Supply and Pollution Control.  Wang L.K., Okun D., A., Shammas N.K. Water Supply and Wastewater Removal.  Krenkel P.A., Arnhoff K., Imhoff K. Karl Imhoff's Handbook of Urban Drainage and Wastewater Disposal.	
	Supplementary literature	Sharma A.K., Swamee P.K. Design of Water Supply Pipe Networks.	
	eResources addresses	Adresy na platformie eNauczanie: Water Supply and Wastewater Disposal - Nowy - Nowy - Moodle ID: 17588 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17588">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17588</a>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		