



## Subject card

Subject name and code	Water supply systems II, PG_00043647						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
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	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Dominika Sobotka				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	30.0	0.0	30
	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	30		3.0		20.0	53
Subject objectives	The aim of the course is to acquire by the student the ability to use technical knowledge to solve problems using the classical methods of designing elements of the water distribution system.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U03] can prepare documentation regarding the implementation of an engineering task/project and prepare a text or presentation including a discussion of the results of the implementation	The student is able to independently make a preliminary design, including hydraulic calculations and drawings. In addition, it defines the parameters of devices and selects them from the catalog.	[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
	[K6_W07] has a structured and theoretically founded knowledge in the field of materials used in the sanitary industry, their physico-chemical properties; knows and understands the basic processes of their production	The student knows the physical and mechanical properties of materials used in the construction of water networks and devices.	[SW1] Assessment of factual knowledge
	[K6_W09] has ordered, theoretically founded knowledge in the field of water supply, sewage, heating, ventilation and air conditioning, and the principles of shaping the microclimate of rooms; knows legal regulations, standardization issues and recommendations for the design of water supply, sewage, heating and gas networks and installations	The student knows and is able to use the standards and recommendations for the design of water supply systems contained in the regulations.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of the sanitary industry engineer's activity; is aware of the importance and understands the non-technical aspects and effects of engineering activities; makes efforts to provide such information and opinions in a widely understandable way, presenting different points of view	The student is aware of and understands the consequences of the environmental impact of activities in the field of engineering design and operation of water supply.	[SK5] Assessment of ability to solve problems that arise in practice
	[K6_U11] can use selected computer programs to support design, including CAD graphics programs	The student is able to use computer programs supporting hydraulic calculations of the water supply network and the selection of pumps.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas	The student is able to define the technological scheme of objects and define the parameters of devices.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_U13] knows the rules of application and can choose the materials of the sanitary industry	The student knows the properties of materials used in the construction of water networks and devices and is able to choose them.	[SU2] Assessment of ability to analyse information
Subject contents	<p>Design a water distribution system for a medium-sized city (up to 100,000 inhabitants) together with facilities (intake, pumping stations, network reservoir) based on the output data, along with the location and height plan and spatial development plan for the city. The project is a conceptual design stage with elements of a construction project in the field of:</p> <ul style="list-style-type: none"> <li>• water balance for residents and industry,</li> <li>• water supply network routing on a city plan,</li> <li>• dimensioning of the trunk network using the Cross method along with its infrastructure,</li> <li>• determination of the pressure line run on the profile for <math>Q_{dmax}</math>, <math>Q_{hmax}</math> and <math>Q_{hmax} + Q_{ppoż}</math>,</li> <li>• determining the dimensions of the network tank and pump parameters along with their selection from the catalog,</li> <li>• zoning of the water supply network.</li> </ul>		
Prerequisites and co-requisites	Basic knowledge of fluid mechanics and hydraulics, geology. Knowledge of the principles of hydraulic calculations, knowledge of the following subjects: installation materials and soil mechanics.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	A technical description	70.0%	30.0%
	Graphic part	70.0%	35.0%
	Calculations	70.0%	35.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Materials for classes from the 5th semester of the Water supply course</li> <li>2. Projektowanie sieci wodociagowych, Wiktor Petrozolin , wyd. ARKADY, 1967</li> <li>3. Wodociagi: zapotrzebowanie, ujęcie, dostarczenie, gromadzenie, rozprowadzenie wody, Tadeusz Gabryszewski, PWN, 1973 3. Obliczanie systemów zaopatrzenia w wodę, Edward Mielcarzewicz , wyd. ARKADY, 2001</li> <li>4. Zaopatrzenie w wodę i odprowadzenie ścieków, Marek Kalenik , wyd. SGGW, 2009</li> <li>5. Zaopatrzenie w wodę, Ziemowit Suligowski, Sylwia Fudala Książek, wyd. Seidel Przywecki, 2014</li> <li>6. Sieci i obiekty wodociagowe, Elżbieta Osuch Pajdzińska , Marek Roman, Oficyna Wydawnicza Politechniki Warszawskiej, 2008</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Rozporządzenie Ministra Infrastruktury z dnia 2 września 2004 w sprawie szczegółowego zakresu i formy dokumentacji projektowej, specyfikacji technicznych wykonania i odbioru robót budowlanych oraz programu funkcjonalno użytkowego. Dziennik Ustaw 202/2004.</li> <li>2. PN-ENV1046: Systemy z tworzyw sztucznych. Systemy do przesyłania wody i ścieków na zewnątrz konstrukcji budowli. Praktyczne zalecenia układania przewodów pod ziemią i nad ziemią</li> <li>3. Rozporządzenie Ministra Infrastruktury z dnia 3 lipca 2003 w sprawie szczegółowego zakresu i formy projektu budowlanego. Dziennik Ustaw 120/2003</li> <li>4. PN-EN805 Zaopatrzenie w wodę. Wymagania dotyczące systemów zewnętrznych i ich części składowych."</li> <li>5. Ustawa z dnia 7 czerwca 2001 r. o zbiorowym zaopatrzeniu w wodę i zbiorowym odprowadzaniu ścieków z późniejszymi zmianami, DU 72/2001</li> </ol>	
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Wodociagi II sem.VI (lato 2023/2024, ST) - Moodle ID: 37337  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37337">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37337</a></p>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		