



Subject card

Subject name and code	Water Supply Systems II, PG_00042692						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
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	Part-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		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		dr inż. Dominika Sobotka				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	15.0	0.0	40
	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	40		5.0		65.0	110
Subject objectives	The course aims to acquire the student the ability to use technical knowledge to solve tasks 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 perform a preliminary design, including hydraulic calculations and drawings. In addition, he determines the parameters of equipment and performs their selection from the catalog.	[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
	[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 supply networks and equipment and is able to make their selection.	[SU2] Assessment of ability to analyse information
	[K6_U11] can use selected computer programs to support design, including CAD graphics programs	The student is able to use computer programs to support hydraulic calculations of water supply networks and pump selection.	[SU1] Assessment of task fulfillment [SU4] Assessment of ability to use methods and tools
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas	The student knows how to design a water supply network with utilities. The student is able to determine the technological scheme of the facilities and determine the parameters of the facilities.	[SU1] Assessment of task fulfillment [SU4] Assessment of ability to use methods and tools
	[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 effects on the environment of engineering activities in the design and operation of water supply systems.	[SK5] Assessment of ability to solve problems that arise in practice
	[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 can use the standards and recommendations for the design of water supply systems contained in the regulations.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[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 networks and water supply equipment.	[SW1] Assessment of factual knowledge

Subject contents	<p>Lectures:</p> <p>Principles of construction of water supply networks, network infrastructure, materials used to build a water supply network, location of pipes and utilities in the water supply network in the cross-section of the street. Trenchless methods of renovation of the water supply network. Water supply system control, preparation of I&C guidelines, water supply system monitoring, application of modern IT techniques in the design and operation of water supply systems. Flow characteristics of the pumping station, hydrophore and water treatment plant. Analytical and graphical calculation of power systems; interaction of tanks and pumping stations.</p> <p>Studios:</p> <p>Practical use of the material presented on the Waterworks I course: Exercise 1 - Routing the water network and determining the water demand. Exercise 2 - Preparation of calculation diagrams for a water supply network and dimensioning of water pipes. Exercise 3 - Selection of the network tank.</p> <p>Case studies:</p> <p>Design a water distribution system for a medium-sized city (up to 100,000 inhabitants) 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"> - water balance for residents and industry, - water supply network routing on a city plan, - dimensioning of the trunk network using the Cross method along with its infrastructure, - determination of the pressure line run for Q_{dmax}, Q_{hmax} and $Q_{hmax} + Q_{ppoż}$ on the profile, - determining the dimensions of the network tank and pump parameters along with their selection from the catalog, - zoning of the water supply network. 														
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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>60.0%</td> <td>20.0%</td> </tr> <tr> <td>Case study</td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td>Studios</td> <td>60.0%</td> <td>30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lectures	60.0%	20.0%	Case study	60.0%	50.0%	Studios	60.0%	30.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Materiały do zajęć z V semestru kursu Wodociągi 2. Projektowanie sieci wodociągowych, Wiktor Petrozolin , wyd. ARKADY, 1967 3. Wodociągi: zapotrzebowanie, ujęcie, dostarczanie, gromadzenie, rozprowadzenie wody, Tadeusz Gabryszewski, PWN, 1973 4. Obliczanie systemów zaopatrzenia w wodę, Edward Mielcarzewicz , wyd. ARKADY, 2001 5. Zaopatrzenie w wodę i odprowadzenie ścieków, Marek Kalenik , wyd. SGGW, 2009 6. Zaopatrzenie w wodę, Ziemowit Suligowski, Sylwia Fudala Książek, wyd. Seidel Przywecki, 2014 7. Sieci i obiekty wodociągowe, Elżbieta Osuch Pajdzińska , Marek Roman, Oficyna Wydawnicza Politechniki Warszawskiej, 2008 													
	Supplementary literature	<ol style="list-style-type: none"> 1. Rozporządzenie Ministra Rozwoju i Technologii z dnia 20 grudnia 2021 r. w sprawie szczegółowego zakresu i formy dokumentacji projektowej, specyfikacji technicznych wykonania i odbioru robót budowlanych oraz programu funkcjonalno-użytkowego. Dz.U. 2021 poz. 2454. 2. Rozporządzenie Ministra Infrastruktury z dnia 3 lipca 2003 w sprawie szczegółowego zakresu i formy projektu budowlanego. Dziennik Ustaw 120/2003. 3. Rozporządzenie Ministra Spraw Wewnętrznych i Administracji z dnia 24 lipca 2009 r. w sprawie przeciwpożarowego zaopatrzenia w wodę oraz dróg pożarowych. Dz.U.2009.124.1030. 4. Ustawa z dnia 7 czerwca 2001 r. o zbiorowym zaopatrzeniu w wodę i zbiorowym odprowadzaniu ścieków z późniejszymi zmianami, DU 72/2001 5. PN-EN805 Zaopatrzenie w wodę. Wymagania dotyczące systemów zewnętrznych i ich części składowych" 6. 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. 													
	eResources addresses	Adresy na platformie eNauczanie:													

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable