



## Subject card

Subject name and code	Innovative sanitation approaches, PG_00057252						
Field of study	Power 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			Polish		
Semester of study	1	ECTS credits			3.0		
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 hab. inż. Jakub Drewnowski					
	Teachers	dr hab. inż. Jakub Drewnowski dr inż. Joanna Majtacz dr inż. Przemysław Kowal					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45	9.0		21.0	75	
Subject objectives	The aim of the classes is to present the basic theoretical knowledge on conventional and modern solutions used in sanitary water and sewage installations, rainwater management, the use of conventional and ecological energy sources. Students will gain practical knowledge of the available technical and material solutions. In addition to presenting theoretical knowledge, another goal of the classes is for students to acquire practical skills in designing sanitary installations.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations	The student is able to use the acquired knowledge of basic sciences in order to understand the principles of operation and the practical application of knowledge for the design of internal installations	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_W10] knows the basic installations of advanced energy systems, transmission networks and internal installations and their impact on the environment	The student is able to use the acquired knowledge of basic sciences to understand the principles of operation and the practical application of knowledge for the design of internal installations with particular emphasis on solutions based on the use of renewable energy sources	[SW3] Assessment of knowledge contained in written work and projects
	[K7_K71] is able to explain the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	The student is able to find and properly use sources of information, legal acts and standards relating to the problem area of designing internal installations	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK2] Assessment of progress of work
Subject contents	LECTURES Conventional and modern solutions in water supply systems. Conventional and modern solutions in sanitary sewage systems Conventional energy sources for domestic hot water preparation and central heating C.O. Sanitary techniques using renewable energy sources (RES): Photovoltaic cells; Heat pumps; Solar panels Design and functional issues of fire protection installations Project. Project of a water and sewage internal installations project based on the use of renewable energy and gray water management in accordance with applicable legal regulations, engineering practice and the scope of topics presented in the lectures.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture - exam	60.0%	65.0%
	Project of the internal installation	60.0%	35.0%

Recommended reading	Basic literature	<p>1) Chudzicki, J., Sosnowski, S. (2011). Instalacje wodociagowe projektowanie, wykonanie i eksploatacja, Wydawnictwo Seidel-Przywecki, W-wa</p> <p>2) Chudzicki, J., Sosnowski, S. (2011). Instalacje kanalizacyjne projektowanie, wykonanie, eksploatacja, Wyd. Seidel-Przywecki, W-wa</p> <p>3) Gassner, A. (2008). Instalacje sanitarne, Wyd. Wydawnictwa Naukowo-Techniczne, W-wa</p> <p>4) Zajada, R. Instalacje gazowe na paliwa gazowe, Wyd. COBO Profil</p> <p>5) Bąkowski K. (2007). Sieci i instalacje gazowe, Wyd. Wydawnictwa Naukowo-Techniczne, W-wa</p> <p>6) Stec, A., Słyś, D. (2016). Instalacje ekologiczne w budownictwie mieszkaniowym Wyd. KaBe, Krosno</p> <p>7) Słyś, D., Kordana, S. (2013) Odzysk ciepła odpadowego w instalacjach i systemach kanalizacyjnych Wyd. KaBe, Krosno</p> <p>8) Oszczak W., (2019) Kolektory słoneczne i fotoogniwa w Twoim domu Wyd. Komunikacji i Łączności sp. z o.o.</p> <p>9) Dedykowane normy i akty prawne.</p>
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	Supplementary literature	<p>1. PN-92/B-01706 Instalacje wodociągowe. Wymagania w projektowaniu.</p> <p>2. PN-88/M-54907 Wodomierze śrubowe z pionową osią miernika</p> <p>3. Rozporządzenie Ministra Infrastruktury z 6 listopada 2008r. w sprawie warunków technicznych jakim powinny odpowiadać budynki i ich usytuowanie. PN-EN 33-2011 Miski ustępowe i zestawy WC</p> <p>5. PNEN31-2011 Umywalki wymiary połączeniowe</p> <p>6. PN-EN 695:2005 Zlewozmywaki kuchenne wymiarowanie połączeniowe</p> <p>7. PN-EN 232:2005 Wanny kąpielowe wymiary połączeniowe</p> <p>8. Wymagania techniczne Cobrti Instal. Warunki techniczne wykonania i odbioru instalacji wodociągowych.</p> <p>9. PN-B-10725:1997 Wodociągi przewody zewnętrzne wymagania i badania</p> <p>10. PN-EN 12056-2 Systemy kanalizacji grawitacyjnej wewnątrz budynków, kanalizacja sanitarna, projektowanie układu i obliczeń</p> <p>11. Wymagania techniczne Cobrti Instal. Warunki techniczne wykonania i odbioru instalacji kanalizacyjnej.</p> <p>12. PN EN 1610 Budowa i badanie przewodów kanalizacyjnych</p> <p>13. PNB-01707 Instalacje kanalizacyjne wymagania w projektowaniu</p> <p>14. PNEN 1917:2004 Studzienki włączowe i niewłączowe z betonu niezbrojonego, z betonuzbrojonego włóknem stalowym i żelbetowym</p> <p>15. PN-B-10729:1999 Kanalizacja studzienki kanalizacyjne</p> <p>16. Rozporządzeniem Ministra Spraw Wewnętrznych i Administracji z dnia 16 sierpnia 1999 r.w sprawie warunków technicznych użytkowania budynków mieszkalnych</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Development of drawing documentation and carrying out engineering calculations in the field of internal installations - conventional, as well based on the use of renewable energy sources and the principles of sustainable development through the management of gray wastewater and rainwater.	
Work placement	Not applicable	