



## Subject card

Subject name and code	Building Internal Systems, PG_00047997						
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		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			7.0		
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. Ryszard Orłowski					
	Teachers	dr inż. Przemysław Kowal dr inż. Ryszard Orłowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	25.0	20.0	0.0	10.0	0.0	55
	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	55	10.0		110.0	175	
Subject objectives	The purpose of the subject is familiarization students with some individual kind of sanitary installation, construction of these systems, employment , project principles, advantages and disadvantages of individual solutions and technologies and taking advantage of this knowledge in professional practice of sanitary engineer.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas	He can design installations of high complexity.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
	[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	Knows current norms polish standard and PN-EN and current dispositions and directions (guidelines) with reference to project design of sanitary installation.	[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	Elaborating projects from a range of indoor sanitary installation he is able to take advantage of acquired knowledge from a range of installation materials.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_U07] can read architectural, construction and geodesy drawings, and can use the known computer programs to prepare a drawing part of technical documentation for the sanitary industry	Is able to make use of professional architectonic - construction base drawings in his design works. Drawing part of engineering documentation of sanitary sector is able to execute with utilization of proper professional software.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
	[K6_U06] knows and applies the basic provisions of construction law, water law and environmental law	Elaborating projects from a range of indoor sanitary installation he is able to use all current law regulations in civil engineering.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[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	It is able to prepare project documentation and to substantiate adopted project solutions in time of defense /presentation of project.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task	
Subject contents	LECTURES Discussing of wide literature of the subject. Kinds of outdoor networks of municipal infrastructure and of indoor installations. Stepless regulation of pump discharge: theoretical basis. Cold water supply installations: Introduction (engineering materials, technologies, required inlet pressure). Installations supplied indirectly from the pipe of municipal water supply system: without using of pressure reducing valve (PRV) and with the use of it. High buildings supplied with water with the use of steplessly controlled pumps; evaluation and comparison of some different cases. Zoning of pressure in an installation. Hot water supply installations: Kinds of hot water systems. Installations of individual conditioning of hot water. Central conditioning of hot water: engineering materials, typical schemes of the installation and manners of regulation of hot water circulation Systems of central heating: Engineering materials, kinds of heating systems, typical schemes of the central heating installation and manners of its regulation. Sewage system installations: typical technical solutions depending on the height of building. Systems of rain-water installation: technical materials, typical technical solutions, vacuum installations. Gas installation: Actual tendencies, methods of calculation. Pressure and vacuum outdoor sewage systems: application, basic rules of design. AUDITORIAL CLASSES Rules of dimensioning and exemplary calculations for the installations such as: supply, sewage, rain-water and gas; LABORATORY CLASSES: application of professional computer programs. ENGINEERING DESIGN CLASSES Design of sanitary installations for an apartment building.		
Prerequisites and co-requisites	Passed the basic program of building engineering. Passed the basic program of installations in building engineering.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	60.0%	60.0%
	exercises	60.0%	10.0%
	design	85.0%	30.0%

Recommended reading	Basic literature	<p>1. Sosnowski S., Tabernacki J., Chudzicki J.: Instalacje wodociągowe i kanalizacyjne. Wyd. Instalator Polski, Warszawa, 2000. 2. Poradnik: Instalacje wodociągowe, kanalizacyjne i gazowe. Praca zbiorowa pod red. M. Chudzickiego, Arkady, Warszawa, 1976. 3. Krygier K., Klinke T., Seweryniuk J.: Ogrzewnictwo, wentylacja, klimatyzacja. Wyd. Szkolne i Pedagogiczne SA, Warszawa, 2000. 4. K. Bąkowski, J. Bartuś, R. Zajda: Projektowanie instalacji gazowych, Arkady, Warszawa, 197</p> <p>1. Sosnowski S., Tabernacki J., Chudzicki J.: Instalacje wodociągowe i kanalizacyjne. Wyd. Instalator Polski, Warszawa, 2000.</p> <p>2. Poradnik: Instalacje wodociągowe, kanalizacyjne i gazowe. Praca zbiorowa pod red. M. Chudzickiego, Arkady, Warszawa, 1976.</p> <p>3. Krygier K., Klinke T., Seweryniuk J.: Ogrzewnictwo, wentylacja, klimatyzacja. Wyd. Szkolne i Pedagogiczne SA, Warszawa, 2000. 4. K. Bąkowski, J. Bartuś, R. Zajda: Projektowanie instalacji gazowych, Arkady, Warszawa, 197</p> <p>4. Ścieranka Grzegorz: Przeciwpożarowe instalacje hydrantowe. Nowe przepisy. Rynek Instalacyjny 10/201</p> <p>5. Zajda Ryszard: Instalacje gazowe na paliwa gazowe. Warunki techniczne z komentarzami. Wymagania odbioru i użytkowania. Przepisy prawne i normy. Wydawnictwo: Cobo-Profil, 2003 Wydanie 4</p>
	Supplementary literature	<p>1. Catalogues of: Geberit Danfoss, COMAP, PURMO, KanTherm, PoWoGaz S.A., Metron AQUATHERM (fusiotherm), Cuprum, COPRAX, ROCKWOOL (Thermorock), Thermaflex PipeLife, Wavin, GRUNDFOS i in. (w większości dostępne w Internecie). 2. Obowiązujące liczne normy, przepisy i wytyczne podane na wykładzie</p> <p>2. Orłowska-Szostak M., Orłowski R.: Cyrkulacja w instalacjach centralnej ciepłej wody użytkowej; budowa modelu komputerowego, algorytmy wymiarowania i sposoby regulacji, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016 r.</p> <p>3. Ewa Zaborowska: Zasady projektowania wodnych węzłów ciepłowniczych, Wydawnictwo Politechniki Gdańskiej, Gdańsk (wyd.7) 2019</p> <p>4. Orłowski R.: Techniczne i ekonomiczne aspekty płynnego sterowania pracą pomp w systemach i instalacjach wodociągowych, kanalizacyjnych, ciepłej wody i c. o.. Gaz Woda i Technika Sanitarna, nr 12/1999. p. 449-458</p>
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Instalacje wewnętrzne - niestacjonarne_2022/2023 - Nowy - Moodle ID: 25007</p> <p><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25007">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25007</a></p>

<p>Example issues/ example questions/ tasks being completed</p>	<p>Names and destination of some basic professional software for computer aided design of sanitary installation.</p> <p>Connection of water-supply installation for wire of water-supply network.</p> <p>Materials applicable in water-supply installations.</p> <p>Fire-protection installations in buildings.</p> <p>Gas Installations material, gas meters.</p> <p>Installations of warm waters classification, regulation.</p> <p>Heating installations classification, regulation.</p>
<p>Work placement</p>	<p>Not applicable</p>