



## Subject card

Subject name and code	Transmission of Media and Energy, PG_00049660						
Field of study	Engineering and Technologies of Energy Carriers						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to practical vocational preparation		
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			2.0		
Learning profile	practical profile	Assessment form			assessment		
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Ewa Klugmann-Radziemska				
	Teachers		dr inż. Małgorzata Rudnicka				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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		5.0		15.0	50
Subject objectives	The aim of the course is to enable students to acquire knowledge about the types and construction of water supply networks, heat sources and heat transfer to facilities, power distribution networks, types of gas networks and principles of their design and technical requirements related to the design of transmission networks.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W02		student knows and understands the phenomena occurring in industrial apparatus, has detailed knowledge of energy carriers and the possibilities of its processing		[SW1] Assessment of factual knowledge		
	K7_W05		student knows and understands the processes occurring in devices for energy production and conversion, knows the rules for generating energy from conventional and renewable sources, and the possibilities of their transmission and storage		[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>Water and sewage networks: ·</p> <ul style="list-style-type: none"> <li>Water flow in branched and annular systems of water and sewage networks.</li> <li>Methods of network design, preparation of water balances, presentation of principles for the construction of water supply networks.</li> <li>Location of transmission lines, utilities of water supply networks.</li> <li>The rules for the acceptance of the installation, the basis for the operation of the existing water supply networks.</li> <li>Wastewater transport.</li> <li>Basics of sewerage network design.</li> </ul> <p>System heat: ·</p> <ul style="list-style-type: none"> <li>Heat production.</li> <li>Design and operation of the heating network.</li> <li>Calculation of the demand for power of heating networks with high parameters.</li> <li>Thermal centers in district heating systems.</li> <li>Installation and operation of the heating network.</li> </ul> <p>Gas networks:</p> <ul style="list-style-type: none"> <li>Types of combustible gases and their properties as well as exhaust properties.</li> <li>Types of gas networks and their equipment.</li> <li>Designing gas networks and installations.</li> </ul> <p>Power networks:</p> <ul style="list-style-type: none"> <li>Characteristics of electrical distribution networks.</li> <li>Forecasting of electric power loads of distribution networks.</li> <li>Reliability of supply and quality of electricity.</li> <li>Operation and optimization of distribution networks</li> </ul>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 954 794 981">Subject passing criteria</th> <th data-bbox="801 954 1139 981">Passing threshold</th> <th data-bbox="1145 954 1482 981">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 990 794 1016">tests</td> <td data-bbox="801 990 1139 1016">60.0%</td> <td data-bbox="1145 990 1482 1016">50.0%</td> </tr> <tr> <td data-bbox="456 1025 794 1052">project</td> <td data-bbox="801 1025 1139 1052">80.0%</td> <td data-bbox="1145 1025 1482 1052">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	tests	60.0%	50.0%	project	80.0%	50.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
tests	60.0%	50.0%										
project	80.0%	50.0%										
Recommended reading	<p>Basic literature</p>	<ul style="list-style-type: none"> <li>Petrozolin W., Projektowanie sieci wodociagowych, Arkady, Warszawa, 1974</li> <li>Szpindor A., Zaopatrzenie w wodę i kanalizacja wsi, Arkady, Warszawa, 1998</li> <li>Praca zbiorowa, Przykłady obliczeń z wodociągów i kanalizacji, WSziP, Warszawa, 1983</li> <li>Denczew S., Królikowski A., Podstawy nowoczesnej eksploatacji układów wodociagowych i kanalizacyjnych, Arkady, Warszawa 2002</li> <li>Zaborowska E.: Zasady projektowania wodnych węzłów ciepłowniczych, Wydawnictwo Politechniki Gdańskiej, 2012</li> <li>Warunki techniczne projektowania, wykonania, odbioru i eksploatacji sieci ciepłowniczych z rur i elementów preizolowanych. COBRTI „Instal” 1996</li> <li>Kamler W.: Ciepłownictwo. PWN 1976</li> <li>Żarski K.: Obiegi wodne i parowe w kotłowniach - poradnik projektanta W-wa 2000</li> <li>Szarkowski A., Łatowki L.: Ciepłownictwo, WNT W-wa 2006</li> <li>Poradnik Inżyniera Elektryka, tom III, WNT 2011</li> <li>Kujaszczyk Sz.: Elektroenergetyczne Sieci rozdzielcze, PWN, W-wa 1994;</li> <li>Kahl T.: Sieci Elektroenergetyczne, WNT, W-wa 1984</li> <li>Bąkowski K.: Gazyfikacja, WNT, Warszawa 2006</li> <li>Bąkowski K.: Sieci i instalacje gazowe, WNT, Warszawa 2008</li> </ul>										
	<p>Supplementary literature</p>	<ul style="list-style-type: none"> <li>Catalogues of heating equipment and boilers</li> <li>Guides for the design of heating pipe networks by system manufacturers)</li> <li>Polish and Interantional Standards</li> <li>Information bulletins of the URE President</li> </ul>										
	<p>eResources addresses</p>	<p>Adresy na platformie eNauczanie:</p>										
Example issues/ example questions/ tasks being completed	<p>Power and energy losses in power grids.</p> <p>Selection of the cross-section of wires.</p> <p>Calculate the demand for water, the amount of sewage, the volume of the water tank.</p>											
Work placement	<p>Not applicable</p>											