



Subject card

Subject name and code	District Heating, PG_00039899						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Optional subject group 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			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Jewartowski					
	Teachers	dr inż. Marcin Jewartowski dr hab. inż. Jan Wajs mgr inż. Piotr Jasiukiewicz dr hab. inż. Jacek Barański					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	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	60	6.0		34.0	100	
Subject objectives	Students acquire basic knowledge of heating in the dimension of theory and practice						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U03] is able to identify, formulate and develop the documentation of a simple design or technological task, including the description of the results of this task in Polish or in a foreign language and to present the results using computer software or other aiding tools	Student is able to calculate the thermal load of buildings and design simple heating installations with the use of auxiliary software.			[SU1] Assessment of task fulfilment		
	[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning	The student is able to characterize heating systems, their components and functioning.			[SW1] Assessment of factual knowledge		
Subject contents	LECTURE Basic concepts and regulations about heating and heat engineering. Designed heat load of buildings. Central heating systems. Hot tap water systems. Heat sources in heating. Heat centres. Radiators. Heating pipes and their thermal insulation. Guidelines for design and calculations of central heating systems. Hydraulic control. Passive buildings. LABORATORY Heat centres. Heat sources (water boiler, solar collector). Radiators. Calculations of designed heat load using commercial software. PROJECT: Design of central heating installation for a selected building						
Prerequisites and co-requisites	Knowledge from course of Thermodynamics						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	100.0%	30.0%
	Written exam	56.0%	50.0%
	Laboratory reports	100.0%	20.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>Pr. zbiorowa pod red. T.R.Fodemskiego, Wentylacja, klimatyzacja, ogrzewanie. Projektowanie, montaż, eksploatacja, modernizacja. Verlag Dashofer, Warszawa, 2010.</li> <li>Pieńkowski K., Krawczyk D., Tumel W., Ogrzewnictwo. Politechnika Białostocka, Białystok, 1999.</li> <li>Recknagel, Sprenger, Schramek, Kompendium ogrzewnictwa i klimatyzacji. Omni Scala, Wrocław, 2008.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>Pr. zbiorowa Albers J. i inni, Systemy centralnego ogrzewania i wentylacji. Poradnik. WNT, Warszawa, 2007.</li> <li>Mielnicki J.S., Centralne ogrzewanie, regulacja i eksploatacja. Arkady, Warszawa, 1974.</li> <li>Polskie Normy do obliczania obciążenia cieplnego budynków.</li> </ol>	
	eResources addresses	Adresy na platformie eNauczanie: Ogrzewnictwo, W/L/P, MiBM, sem.06, letni 22/23 - Moodle ID: 29400 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29400">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29400</a>	
Example issues/ example questions/ tasks being completed	Present classification of central heating systems. Characterize the pressure losses in pipes.		
Work placement	Not applicable		