

## 表 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Geothermic, Geothermal and Solar Systems for Heat and Electricity Production, PG_00042214							
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering							
Date of commencement of studies	October 2020		Academic year of realisation of subject			2023/2024		
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	4		Language of instruction			Polish		
Semester of study	7		ECTS credits			2.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Zakład Ogrzewnictwa, Wentylacji, Klimatyzacji i Chłodnictwa -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						of Mechanical	
Name and surname	Subject supervisor	dr hab. inż. Jan Wajs						
of lecturer (lecturers)	Teachers		dr hab. inż. Ja mgr inż. Piotr					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study hours	15.0	0.0	8.0	0.0		0.0	23
	E-learning hours included: 0.0							
Learning activity and number of study hours	_earning activity Participation ir classes include plan		I didactic     Participation in consultation hours		Self-study SUM			
	Number of study hours	23		3.0		24.0		50
Subject objectives	Discussion on the power engineering technology applied to the energy from geothermal and solar resources conversion processes.							
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	K6_W13		Student is able to perform thermodynamic calculations of the geothermal/solar energy conversion system.			[SW1] Assessment of factual knowledge		
	K6_U08		Student is able to design the system for geothermal/solar energy conversion, select the auxiliary devices, estimate the profitability of the investment.			[SU4] Assessment of ability to use methods and tools		
Subject contents	LECTURE: Origin of geothermal energy and its characteristics and place in Europe and in the World, the basic concepts of geothermal energy. Selection of geothermal energy in Poland. Shallow geothermal energy and its use in heating. Systems supported by geothermic energy and geothermal energy. Solar radiation and evaluation of its resources, solar conditions in Poland. Thermal conversion of solar energy (solar collectors). Photoelectric conversion of solar energy (photovoltaic collectors). Energy systems supported by the solar energy.							
	LABORATORIES: Study trip to chosen company that use geothermal energy (cooperation with Geotermia Mazowiecka company plant in Mszczonow). Determination of energy efficiency of solar collector.							
Prerequisites and co-requisites	knowledge from course of Applied thermodynamics and Heat transfer							
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade		
	laboratory reports		100.0%			20.0%		
	written test		56.0%			80.0%		

Recommended reading Basic literature		<ol> <li>I. Stober, K. Bucher, Geothermal energy - from theoretical models to exploration and development. Springer, Berlin, 2013.</li> <li>G.N. Tiwari, A.S. Tiwari, Handbook of solar energy - theory, analysis and applications. Springer, Berlin 2016.</li> <li>A. Mcevoy, T. Markvart, L. Castaner, Practical handbook of photovoltaics. Academic Press, Cambridge, 2011.</li> </ol>					
	Supplementary literature	no requirements					
	eResources addresses	Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed	<ul> <li>The term of geothermal energy</li> <li>Discuss the operational principle of the evacuated tube solar collector</li> <li>Discuss the operational principle of flat-plate solar collector</li> <li>Design and use of the solar collectors</li> <li>Discuss the operational principle of photovoltaic cell</li> <li>Design and use of the photovoltaic modules</li> </ul>						
Work placement	Not applicable						