

## 表 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Electric and Thermal-Electric Power Plants, PG_00042178								
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering						eering		
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			3.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Electri	cal Power Engi	ngineering -> Faculty of Electrical and Control Engineering						
Name and surname	Subject supervisor		dr inż. Tomasz Minkiewicz						
of lecturer (lecturers)	Teachers		dr inż. Tomasz Minkiewicz						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	atory Project Se		Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	15.0	15.0	15.0 0.0		45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic led in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	45		5.0		25.0		75	
Subject objectives	The purpose of this course is to familiarize students with general characteristics of the Polish Power System energy sources with particular emphasis on the role of CHP plants. Students become familiar with basic equipment and technological systems on example of CHP plant "Elektrocieplownia Gdanska".								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U02		Student knows the principles of design and balancing various heat and fluid flow elements/ thermal cycles in CHP plant. Student can discuss the various elements included in thermal cycle power plant.			[SU3] Assessment of ability to use knowledge gained from the subject			
	K6_W08		The student is able to discuss a construction, principle of operation and funtions of power plants and combined heat and power plant.			[SW1] Assessment of factual knowledge			
Subject contents	<b>Lecture:</b> current operation data of the Polish Power System; electricity and heat generation processes; equipment of power units; impact of the power plant on the environment.								
	<b>Laboratory:</b> characteristics of the consumption of fuels and energy carriers, characteristics of electricity and heat production in Poland, Thermal calculations of power units and calculations of heat networks using computer tools.								
	<b>Project:</b> a preliminary design of a power source in district heating as a combined heat and power plant which contain heat units equipped with boilers and steam turbines as well as water boilers working as a peak-load source.								
Prerequisites and co-requisites	Good knowledge of elements of physics (basic lows, physical quantities and their units and measures, mechanics, electrical engineering, thermodinamics, heat transfer). Knowledge of electrical energy generation technologies: energy conversions, efficiency of single conversion, efficiency of conversioncycle and thermodinamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.								

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade		
	Exam	60.0%	50.0%		
	Laboratory reports	60.0%	15.0%		
	Project work	60.0%	35.0%		
Recommended reading	Basic literature	<ol> <li>Marecki J., <u>Podstawy przemian energetycznych</u>, WNT, Warszawa 2014</li> <li>Pawlik M., Strzelczyk F., <u>Elektrownie</u>, WNT, Warszawa 2012</li> <li>Chmielniak T., <u>Technologie energetyczne</u>, WNT, Warszawa 2013</li> </ol>			
	Supplementary literature	<ol> <li>Andrzejewski S., <i>Podstawy projektowania siłowni cieplnych</i>, WNT, Warszawa 1974</li> <li>Pawlik M., Skierski J., <i>Układy i urządzenia potrzeb własnych</i> <i>elektrowni</i>, WNT, Warszawa 1986</li> <li>Praca zbiorowa: <i>Poradnik inżyniera elektryka Tom III</i>, WNT, Warszawa 2007</li> <li>Szargut J., Ziębik A., <i>Podstawy energetyki cieplnej</i>, Wydawnictwo Naukowe PWN, Warszawa 2000</li> </ol>			
	eResources addresses	Adresy na platformie eNauczanie:			
Example issues/ example questions/ tasks being completed	<ul> <li>what is the role and significance of power engineering in country's economy,</li> <li>discuss national energy resources size and methods of their use,</li> <li>describe the principles of design and balancing various heat and fluid flow elements/ thermal cycles in CHP plant,</li> <li>function and principle of operation of the steam drum.</li> </ul>				
Work placement	Not applicable				