GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Engineering Thermodynamics 1, PG_00042011		
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	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	6.0
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 hab. inż. Jan Wajs	
	Teachers	dr inż. Paweł Dąbrowski dr hab. inż. Jan Wajs mgr inż. Piotr Jasiukiewicz dr inż. Marcin Jewartowski mgr inż. Aleksandra Gołąbek	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	15.0	0.0	0.0	60

E-learning hours included: 0.0

Adresy na platformie eNauczanie:
Termodynamika techniczna I, C, Energetyka, sem.03, zimowy 21/22 (PG_00042011) - Moodle ID: 18664
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18664

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	84.0	150

Subject objectives

Student acquire basic knowledge of thermodynamics in the dimension of theory and practice.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W02	Student defines basic concepts of thermodynamic, 1st and 2nd Law of Thermodynamic and state equations of gases. Student describes gas/steam cycles.	[SW1] Assessment of factual knowledge
K6_U04	Student describes and analyses gas and steam thermodynamic processes and cycles and heat transport mechanisms. Student calculates gas and steam cycles. Student measures basic thermodynamic parameters and analysis energy balance of heat engines.	[SU1] Assessment of task fulfilment

Subject contents	LECTURE: Basic concepts. The first law of thermodynamics. Ideal gas model. Properties of ideal, semi-ideal and real gases. Gas laws, thermal and caloric equation of state. Characteristic processes of ideal gas. Gas mixtures. Thermodynamic gas cycles. The second law of thermodynamics and its consequences. Isobaric evaporation process. Properties of mono-component saturated steam. Properties of superheated steam. Characteristic processes of steam. Thermodynamic steam cycles. EXERCISES: Simple conversion of energy, heat, work. The balances of power of open or closed thermodynamics systems. State and functions of state of ideal and semi-ideal gases and gas mixtures. Characteristic processes of gases. Gas thermodynamic cycles. Characteristic changes of steam. Calculations thermodynamic steam cycles. LABORATORIES: Measurements of thermodynamic parameters: temperature and pressure. Determination of mass flow rate. Determination of air and water enthalpy. Energy balance of heat pump. Determination of calorific value of fuels.
Prerequisites and co-requisites	Knowledge from course of physics and mathematics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written examination	56.0%	50.0%
Midterm colloquium	56.0%	30.0%
Laboratory reports	100.0%	20.0%

Recommended reading

Basic literature	1. M.J. Moran, H.N. Shapiro, D.D. Boettner, M.B. Bailey, Fundamentals of Engineering Thermodynamics 8th Ed., Wiley, 2014 2. Y. Cengel, M. Boles, Thermodynamics An Engineering Approach, 8th Edition, Wiley, 2014
Supplementary literature	No requirements
eResources addresses	Termodynamika techniczna I, C, Energetyka, sem.03, zimowy 21/22 (PG_00042011) - Moodle ID: 18664 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18664

Example issues/ example questions/ tasks being completed	1. The first law of thermodynamics 2. The second law of thermodynamics 3. Thermodynamic gas cycles 4. Thermodynamic steam cycles
Work placement	Not applicable