Course description

1 General information

Course name	Engineering Thermodynamics
Course code	
Level of study (B.Sc, M.Sc., Ph.D.)	B.Sc.
ECTS	4
Course manager	Prof. dr hab. inż Piotr Cyklis M5
Course length	One (1) semester
Coordinator for international programs	erasmus@mech.pk.edu.pl

2 Prerequisites

- Engineering Mathematics

2 Program

Type	Lectures	Classes	Labs	Computer labs	Project	Seminar
Hours	30	15	15			

3 Contents

Lectures		
No.		Hours
1	Thermodynamic parameters and functions, equation of state for gas	3
2	First and second law of thermodynamics, work, heat, entropy	3
3	Characteristic processes, heat work and flow work	3
4	Mixtures, parameters and functions	3
5	Thermodynamic cycles Carnot, Otto etc.	3
6	Steam parameters and state functions, steam charts and software	3
7	Clausius Rankine and Linde cycles theory and real examples	3
8	Wet gases, Molliere diagram, air conditioning basics	3
9	Elements of combustion – thermodynamic and stechiometric calculations	3
10	Basis of heat transfer	3

Classes		
No.		Hours
1	State of matter calculations	3
2	Process energy analysis	3
3	Thermodynamic cycle calculation	3
4	Steam calculations	3
5	Wet air calculation	3

Labs		
No.		Hours
1	Temperature measurements	3
2	Pressure measurements	3
3	Wet gases measurements	3
4	Steam measurements and calculations	3
5	Fluid flow measurements (different methods and comparison)	3

3 Learning Outcomes (skills and knowledge):

- The student is able to define state of matter, system and components of thermal energy
- The student knows the energy transformation process from heat to work and from low to high temperatures
- The student is able to calculate energy of steam and wet gas.
- The student knows basic state and calorific equation for main energy carriers.
- The student is able to measure thermodynamic parameters of matter
- The student knows elementary basics of combustion and heat transfer methods.

4 Assessment policy (examination):

- Laboratory reports 30%, written exam (theoretical questions - written) 30%, solving examples 40% (written colloquium)

5 Literature

1. Witold Szewczyk, Lectures in Engineering Thermodynamics –Selected Problems AGH Kraków 2009
2. Dilip Kondepudi, Ilya Prigogine “Modern Thermodynamics” John Wiley & Sons NY 1998
3. Adrian Bejan “Advanced Engineering Thermodynamics John Wiley & Sons NY 2016