Course description

1 General information

Course name	Combustion Engines
Course code	M4-CE
Level of study (B.Sc, M.Sc., Ph.D.)	B.Sc.
ECTS	4
Course manager	Dr hab. inż. Władysław Mitianiec – Institute of Automobiles and Internal Combustion Engines
Course length	One (1) semester
Coordinator for international programs	erasmus@mech.pk.edu.pl

2 Prerequisites

- The basic knowledge of mechanics and thermodynamics

2 Program

Type	Lectures	Classes	Labs	Computer labs	Project	Seminar
Hours	30	0	30	0	0	

3 Contents

Lectures		
No.		Hours
1	The engine types and their operation	2
2	The principles of piston engines work	2
3	Engine design and operating parameters	3
4	Formation of burning mixtures in piston engines	1
5	Properties of fuels applied in combustion engines	2
6	Ideal models of engine cycles	3
7	Combustion in spark ignition engines	3
8	Combustion in compression ignition engines	3
9	Fuelling systems in spark ignition and compression ignition engines	3
10	Exhaust gas emission and its elimination	2
11	Engine operating characteristics	3
12	Charging systems in internal combustion engines	3
13	The basics of operation of turbine engines	2

Labs		
No.		Hours
1	Getting acquainted with the laboratory and its equipments	3
2	Performance of speed characteristic in spark ignition engine	4
….	Performance of load and universal characteristic in spark ignition engine	4
	Regulation characteristics of mixture composition	4
	Visualization of pressure traces and emission on working diesel engine	4
	Influence of injection advance on diesel engine working parameters	4
	Measurement of thermodynamic parameters in turbocharged diesel engine	4
	Methods for the development measurement results	3

3 Learning Outcomes (skills and knowledge):

- Basic knowledge of engine work, knowledge of engine construction, methods of engine testing, methods of increasing of engine parameters, measurement of exhaust gas emission, comparison working parameters for diesel and spark ignition engines

4 Assessment policy (examination):

- Theoretical working cycles of piston engines, knowledge of engine characteristics, fuelling types, charging systems, difference between spark and diesel engines

5 Literature

1. Heywood J., Internal Combustion Engines Fundamentals, Mc Graw-Hill Book Compant, New York 1988
2. Ramos J. I., Internal Combustion Engine Modeling, Hemisphere Publishing Corporation, New York, 1989
3. Mitianiec W., Fundamentals of Fuel Injection and Emission in Two-Stroke Engines, Nova Science Publishers, New York, 2018
4. Blair G. P., Design and Simulation of Four-Stroke Engines, SAE Warrendale, 1999
5. Rajput R. K., A Textbook of Internal Combustion Engines, https://pl.scribd.com/document/193194568/A-Textbook-of-IC-Engines-by-R-K-Rajput