

COURSE TITLE**TECHNOLOGY OF CLEAN COMBUSTION**

Institute/Division	Institute of Automobiles and Internal Combustion Engines / Faculty of Mechanical Engineering
Erasmus subject code	06.1
Number of contact hours	45
Course duration	1 semester
ETCS credits	3
Course description	<p>Theory of combustion process. Processes of ignition, self-ignition and detonation. Theory of flame – flow and thermal parameters. Combustion of gaseous fuels, types of gas combustion. Combustion rates of gaseous fuels and their dependence on thermal conditions. Furnaces and gaseous burners. Combustion process of liquid fuels, injection of liquid fuels, evaporation, oil burners. Combustion of solid fuels particularly of coal. Speed and intensity of coal combustion in layer and in mechanical stokers. Combustion of coal dust, combustion of solid fuels in fluid layer. Fluid boiler systems. Methods of coal cleaning before combustion and methods of reduction of sulphur in furnaces. Combustion technologies in order to reduce nitrogen oxygen by temperature control. Ecological aspects of fuels combustion and exhaust gas emissions. Low emission technologies in power engineering. Design of new low emission coal combustion systems in industry with steam and gas turbines. Coal gasification technology. Reduction of exhaust emission in internal combustion engines by changing the combustion process and by external devices. Measurements of flame parameters at combustion of different fuels. Experiments with reduction of exhaust emission of hydrocarbons, nitrogen oxides, soot and others. Calculations of combustion processes of different fuels, burners, furnaces, combustion rates and others.</p>
Literature	<p>Chigier W.A., Energy, Combustion and Environment, New York, McGraw Hill, 1981; Jarosiński J., Technology of clean combustion (in polish), WNT Warsaw, 1996 Jarosiński Jozef, Combustion Phenomena: Selected Mechanisms of Flame Formation, Propagation and Extinction, 2008 Carvalhoc, Combustion Technologies for Clean Environment, V.1, CRC, 1985 Smoot L. Douglas, Coal Combustion and Gasification, Springer, 1985</p>
Course type	Lectures, classes and experimental laboratories
Assessment	Final test
Prerequisites	Combustion Chemistry and Power Engineering Systems
Primary target group	3 rd year Mechanical Engineering and Power Engineering students
Lecturer	DSc PhD Eng. Wladyslaw Mitianiec
Contact person	DSc PhD Eng. Wladyslaw Mitianiec, phone #: +48 12 628 3692, e-mail: wmitanie@usk.pk.edu.pl
Deadline for application	June 30 or November 30