COURSE DESCRIPTION CARD - SYLLABUS

Course name

Thermal engine processes

Course

Field of study

Construction and Exploitation of Means of Transport

Year/Semester

1/2

Area of study (specialization)

Combustion Engines

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

9

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Tel.: 647 59 66

Faculty of Civil and Transport Engineering

Piotrowo 3, 60-965 Poznań, Poland

Responsible for the course/lecturer:

Prerequisites

Knowledge: The student should have elementary knowledge about combustion engines construction and operation of engine systems

Skills: The student can integrate information obtained from different sources and its interpretation, draw concluded, formulate and justify opinions

Social competence: The student is aware of around non-technical aspects and effects combustion engines using and its influence to the natural environment

Course objective

The course aims to give basics information about combustion engines construction and the principle of operation, taking into account modern technical solution

Course-related learning outcomes

Knowledge

The student has advanced knowledge about modern manufacturing technology of machine included the design production process of machine parts and it assembling process with CAM tools

The student has general knowledge including types of research and methodology of research working machines using advanced measuring technology and data acquisition systems

The student has advanced knowledge about working machine standards in terms of computational methods, working machines testing, safety, and road safety systems, environmental protection, mechanical and electrical interface

Skills

The student is able to formulate and test hypotheses related to basics research problems

The student is able to carry out elementary mechanical units measure on a working machine using modern measurements apparatus

The student is able to communicate with a different audience in terms of specialist topic

The student is able to cooperate in a working group and play the leader team role

Social competences

The student is prepared to evaluate self-knowledge and received information and received information

The student is prepared for the appreciation of comprehensive knowledge of cognitive and practical problem solving. Also is able to consult with experts his problem when self-knowledge is insufficient.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The student is assessed based on the current state of knowledge and class activity. Additionally, a student is obligated to preparing an individual report on each activity. The summarizing written test completes the course

Programme content

The program content in-cylinder pressure measurement on the running reciprocating combustion engine; in-cylinder measure methods discussion; Fuel injection and atomization analysis; Optical methods for diagnostic injection and combustion process; Analisis of internal and external energy balance

Teaching methods

1. Laboratory classes - tasks solving

Bibliography

Basic

1. Ireneusz Pielecha. Optyczne metody wtrysku i spalania benzyny. Wydawnictwo Politechniki Poznańkiej 2017

2. Wojciech Serdecki. Badania silników spalinowych. Wydawnictwo Politechniki Poznańkiej 2012

3. Sławomir Luft. Podstawy budowy silników. WKŁ Warszawa 2009

Additional

1. Andreas Wimmer, Josef Glaser. Indykowanie silnika. Warszawa 2004

2. Cieślik W., Pielecha I. Evaluation of mixture swirl in the cylinder chamber in a conceptual system withcombustion surrounded by inactive gases. Combustion Engines. 2018, 175(4), 40-47. doi:10.19206/CE2018-406

3. Pielecha I., Cieslik W. Thermodynamic analysis of indexes of operation of the engine with direct fuel injection for idle speed and acceleration. Journal of Thermal Analysis and Calorimetry. Mai 2016. doi:10.1007/s10973-016-5544-1

5. SZWAJCA, F., WISŁOCKI, K. Thermodynamic cycles variability of TJI gas engine with different mixture preparation systems. Combustion Engines. 2020, 181(2), 46-52. https://doi.org/10.19206/CE-2020-207

6. Bueschke, W., Szwajca, F., and Wislocki, K., "Experimental Study on Ignitability of Lean CNG/Air Mixture in the Multi-Stage Cascade Engine Combustion System," SAE Technical Paper 2020-01-2084, 2020.

7. Articles published in Combustion Engines journal

Breakdown of average student's workload

	Hours	ECTS
Total workload	18	1,0
Classes requiring direct contact with the teacher	9	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	9	0,5

[1] delete or add other activities as appropriate