



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Combustion Engines

Course

Field of study

Year/Semester

Transport

3/5

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

elective

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

15

Tutorials

Projects/seminars

0

0

Number of credit points

Lecturers

Responsible for the course/lecturer:

Piotr Lijewski DSc., DEng.

Responsible for the course/lecturer:

prof. Jerzy Merkisz

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Faculty of Civil Engineering and Transport

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Prerequisites

The knowledge of the basics of machine construction and mathematical analysis.

The ability to analyze and synthesize information, draw conclusions, formulate and justify opinions.

Being open to acquiring new social skills.

Course objective

Understanding basic concepts related to the design and operation of internal combustion piston engines, especially traction engines.

Course-related learning outcomes

Knowledge

The student has ordered and theoretically founded general knowledge in the field of key issues of



technology and detailed knowledge in the field of selected issues in this discipline of transport engineering

The student has a basic knowledge of the life cycle of means of transport, both equipment and software, and in particular about the key processes occurring in the product life cycle

Skills

The student is able to properly plan and conduct perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions

The student is able - in accordance with the given specification - to design (create a model of a fragment of reality), formulate a functional specification in the form of use cases, formulate non-functional requirements for selected quality characteristics) and implement a device or a widely understood system in the field of means of transport, using appropriate methods, techniques and tools

Social competences

The student understands that in technology, knowledge and skills very quickly become obsolete

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Discussions during lectures. Exam and an individual interview, the purpose of which is to check the understanding of the essence of the issues described in the program content

Programme content

history of the development of internal combustion engines. Alternative solutions for combustion engines. Design and operation of combustion engine. Types of engine. Engine operation parameters; fuel consumption, power, torque, efficiency. Types of engine fuels, alternatives fuels. Combustion in engine cylinder, change of cylinder pressure. Engine fuel systems. Exhaust emissions, toxic compounds of engine exhausts. Aftertreatment systems. Engine turbocharging. Crank and pistons engine system. Lubrication and engine oils. Engines on-boards diagnostics systems.

Teaching methods

Lecture with multimedia presentation. Discussion with students.

Classes in the engine laboratory.

Bibliography

Basic

1. Serdecki W. (red.): Badania silników spalinowych Laboratorium. WPP, Poznań, 2012 lub późniejsze wydania.



2. Wajand Jan A., Wajand Jan T.: Tłokowe silniki spalinowe średnio- i szybkoobrotowe. WNT, Warszawa, 2005.

3. Niewiarowski K.: Tłokowe silniki spalinowe. WKiŁ, Warszawa, 1983.

Additional

Scientific journals and papers (e.g. Combustions Engines, SAE, MTZ).

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	45	2,0

¹ delete or add other activities as appropriate