



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Combustion Engines [S1Trans1>SSp]

Course

Field of study

Transport

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

4,00

Coordinators

prof. dr hab. inż. Piotr Lijewski
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Lecturers

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:

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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.

Course topics

none

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	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	2,00