



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Theory of Combustion Engines

Course

Field of study

Mechanics&Maschine Design

Area of study (specialization)

Combustion Engines

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Prof. Krzysztof Wislocki, DSc, DEng.

Responsible for the course/lecturer:

Filip Sz wajca, MEng

Prerequisites

Completion of basic courses in mechanics, physics, thermodynamics, technical drawing

Course objective

Teaching the students of fundamentals and definitions of the combustion engines theory, of thermodynamical concepts from the combustion engines theory, from the theoretical and real thermal engine cycles. Teaching of cycles modeling and designing for better economy and engine operating skills. Teaching of understanding of thermal and mechanical strength of engines and engine elements. Shaping awareness of students on rational and ecological use of primary fuel energy. Explanation of the basics of functioning and operating of combustion engines. Explanation of essence and course of individual processes of primary energy conversion into mechanical work. Discussing of basic constructional and functional skills of engine construction elements. Explanation of engine control possibilities and their shaping.

Course-related learning outcomes

Knowledge



The student has overall knowledge concerning mechanics, physics, chemistry, technical drawing, material strength, suitable to I level of technical studies.

Skills

The student is able to integrate acquired informations, to interpret them, formulate conclusions and justify opinions, especially concerning processes and phenomena occurring in combustion engines; he demonstrates also technical type of thinking, associating of cause and effect relationships in mechanics, physics and chemistry.

Social competences

The student is aware of social and economic meaning and importance of energy and resources wearing; he demonstrates his own independence in solving technical problems, acquiring and improving of his knowledge and skills.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written or oral examination, semestral work, computing and laboratory exercises

Programme content

Principles of combustion engines functioning and operation, basic engine elements and processes; Systematization of combustion engines and their fields of application. Thermodynamic thermal engine cycles, their types and analysis. Theoretical vs. real engine cycles. Parametrization of engine operation. Fundamentals of engine thermal and energetic analysis. Characteristics of engine operation. Thermal balancing of engine. Principles of mixture formation and engine load control. Systematization of combustion systems and their constructional skills. Combustion process course. Fundamentals of functioning, design and operation of two-stroke and four-stroke engines. Tendencies and direction in engine development.

Teaching methods

1. Lectures including multimedia presentations. 2. Laboratory exercises and computing exercises.

Bibliography

Basic

1. Rychter T., Teodorczyk A.: Teoria silników spalinowych. WKiŁ, Warszawa 2005.
2. Luft S.: Podstawy budowy silników. WKiŁ, Warszawa, 2000.
3. Serdecki W. (red.): Badania silników spalinowych. Wyd.PP, 2001, 2013.
4. Serdecki W. (red.): Badania układów silników spalinowych. Wyd.PP, 2000.

Additional

1. Kowalewicz A.: Podstawy procesów spalania. WNT. Warszawa 2000.



2. Niewiarowski K.: Tłokowe silniki spalinowe. WKiŁ, Warszawa 1983.
3. Kowalewicz A.: Systemy spalania szybkoobrotowych tłokowych silników spalinowych. WKiŁ. W-wa, 1980.

Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,0
Classes requiring direct contact with the teacher	45	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	35	1,0

¹ delete or add other activities as appropriate