



MF2047 Internal Combustion Engines 1 6.0 credits

Förbränningsmotorteknik 1

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

On 09/04/2021, the Dean of the ITM School has decided to establish this official course syllabus to apply from autumn term 2021 (registration number M-2021-0528).

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student shall be able to

- **Describe the following:**

- The working principles for two-stroke and four-stroke engines

- **Explain the following:**

- Combustion in otto and diesel engines
- Gas exchange in combustion engines
- Production of fuels and use of fuels in engines

- **Discuss the following:**

- Emission formation, emission adjustment and exhaust treatment
- The role of the transport sector in society and its effect on environment and climate

- **Solve problems connected to:**

- The crank motion, mass forces and vibrations of the engine
- Basic thermodynamic cycles for combustion engines
- Stoichiometry for combustion in engines

Course contents

Ever since the start of the industrial revolution, the combustion engine has been central in our daily lives. While the combustion engine contributes to social development in production, construction, mobility and transport, its use also leads to different emissions.

Emissions of locally harmful substances, such as nitrogen oxides (NO_x), hydrocarbons and particles, are regulated by law.

Statutes on greenhouse gases, such as carbon dioxide and methane, also exist for certain applications and are being developed for others.

Internal combustion engine technology is an interdisciplinary subject. Knowledge from several different technical disciplines is used to develop components that are subsequently integrated in a system in the form of the power train of the vehicle.

The modern research focuses on decreasing emissions of harmful subjects, increased energy efficiency, and sustainability in society.

It implies for example that the introduction of renewable fuels plays a central role.

The course in internal combustion engine technology intends to give a good basis for the use of engines in vehicles and transport systems, and for how the engine and its fuel interacts with its surroundings, i.e. the vehicle, the operator, the environment and the climate

Specific prerequisites

Bachelor of Science in technology, the subject area mechanical engineering or the equivalent.

Examination

- INL2 - Written assignments, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB2 - Laboratory exercises, 1.0 credits, grading scale: P, F
- TEN2 - Oral examination, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Transitional regulations

For students who have passed on either LAB1 or TEN1 according to earlier versions of the examination requirements, an adapted examination format, decided by the examiner, is used for the other item.

This applies up to and including spring semester 2022.

Thereafter, the re-examination requirements apply to these students.

For students who neither is passed on LAB1 or TEN1 according to earlier versions of the examination requirements, the new examination requirements, valid from the autumn semester 2021, apply

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.