



MF2083 Internal Combustion Engines 2 9.0 credits

Förbränningsmotorteknik 2

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

Establishment

On 2019-10-15, the Dean of the ITM school has decided to establish this official course syllabus to apply from autumn term 2020 (registration number M-2019-2227).

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Completed the course MF2047 Internal Combustion Engines 1.

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 should be able to:

1. Analyse the energy release during the combustion in a piston engine based on experimental input from an engine test rig
2. Model the heat losses during the combustion in the engine according to the Woschni heat transfer model
3. Model Otto engine combustion with Wiebe functions
4. Model and analyse the effect of the engine parameters λ , combustion phasing, fuel quantity and compression ratio, on the efficiency of the thermodynamic cycle
5. Discuss advantages and disadvantages with the adapted combustion models
6. Model how the pulse dynamics of the gas exchange at varying geometry and how valve curves influence volumetric efficiency of the engine
7. Model and discuss exhaust turbocharger advantages and disadvantages

Course contents

The course deals with applied issues in the following fields:

- Energy release calculations with associated analysis of combustion in piston engines
- Introduction to and application of one-dimensional engine simulation in the software "GT Power"
- Modelling of combustion in Otto engines
- Modelling of how the fundamental performance related design parameters and choices of operating variables of the engine influence combustion and gas exchange

Examination

- INL1 - Written assignment, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- INL2 - Written assignment, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- INL3 - Written assignment, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM1 - Seminar, 1.0 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.

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

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.