# MJ2430 Thermal Turbomachinery 6.0 credits

## Termiska strömningsmaskiner

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

## Establishment

On 22/04/2022, the Dean of the ITM school has decided to establish this official course syllabus to apply from spring term 2022 (registration number M-2022-0616).

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering

## Specific prerequisites

MJ2429 Turbomachinery 6 credits, or the equivalent

## Language of instruction

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

## Intended learning outcomes

The course intends to give an overview of important aspects of thermal turbomachines with a focus on applications in the transport sector and in the energy sector

After passing the course, the student should be able to:

1. Explain the 2D and 3D steady flow phenomena in turbomachine components and relate to their design
2. Solve aerothermodynamic problems for 3D design of turbomachinery blades
3. Explain interaction of fluid and structure in thermal turbomachines and relate to the design of included vital components
4. Describe non-stationary flow phenomena in turbomachines
5. Solve problems regarding aeromechanics for turbomachinery blades
6. Describe heat transfer for warm components, material aspects, combustion chamber principles and operational characteristics for thermal turbomachines

## Course contents

The course intends to give an overview of important aspects in the thermal turbomachines with a focus on applications in the transport sector and in the energy sector

The course aims both at people who want receive more general information about aero and thermodynamic design problems in thermal turbomachines and to people who see themselves utilising thermal turbomachines for different purposes in their future professions.

The course is a continuation of MJ2429 Turbomachinery, and therefore starts at an advanced level. Starting from simple 1D analysis of turbomachine components the view is extended to 2D and 3D analysis

Important aspects such as gas turbine cooling technology, mechanical integrity, materials and system behaviour are elucidated and brought into context.

Critical review of scientific articles will be carried out performed to trigger discussions in an interdisciplinary environment. Calculation exercises will be performed to deepen the understanding of treated phenomena. A study visit to a gas turbine manufacturer or a relevant company is planned.

The course is given in English

If a low number of students are admitted to the course, it can be given in modified form, i.e. mainly as self-studies with guidance when necessary.

## Examination

- TEN2 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Exercise, 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.

Quizzes (non-mandatory) are given weekly and a minimum of 75% correct answers give bonus points at TEN1 if the exam grade awarded is E or higher. Furthermore, if the 6 first of in total 7 quizzes are passed with at least 75% correct answers, grade E will be given for intended learning outcomes #4 and #6 and the corresponding problems in the written exam need thereby not be answered. Expired examination items will be examined through supplementary tasks or complementary assignments during three years after expiration. Thereafter, the examination items according to the current official course syllabus, must be carried out.

## Other requirements for final grade

Written examination.

## 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.