



MJ2426 Applied Heat and Power Technology 6.0 credits

Tillämpad kraft- och värmeteknologi

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 2019-10-15, the Dean of the ITM School has decided to establish this official course syllabus to apply from spring term 2020 (registration number M-2019-1416).

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 should be able to:

ILO1: Evaluate the operational characteristics of the most common systems for thermal power generation to identify practical limitations of operational performance

ILO2: Identify and quantify the way to improve the total energy efficiency by means of system integration concepts

ILO3: Design adapted energy systems for realistic applications and evaluate its technical-economical feasibility, environmental impact and the sustainability of the proposed concepts.

Course contents

The aim of the course is to provide a technical assessment to implement theoretical aspects and the practical borders for thermal power generation systems, operational performance for thermal power plants, concepts of system upgrades for recycling of waste heat to utilise technology solutions by carrying out combined energy systems for higher total efficiency improvement. The course contains six main subjects;

- Theoretical concepts and operational performance of common thermal power stations, e. g. different applications of steam turbines, combustion turbines and gas engine based power stations.
- Basic concepts of the design and practical limitations of both electricity and thermal power distribution network.
- Analysis of the power cycles to estimate the quality and the quantity of the potential for recycling from thermal power generation systems and provide technical solutions to utilise waste energy in the appropriate combined power generation applications.
- Performance evaluations of thermal power systems converted from fossil fuels to renewable fuels.
- Evaluation of concepts and operational performance for the more advanced thermal power systems, e. g. combined power generation (Combined Power Generation systems - CPG), combined heat and power (Combined Heat and Power systems - CHP) and combined heat, force and cooling (Combined Heat, Power and Cooling system - CHPC) through case studies.
- Sustainability and mitigation of environmental impact that is caused by thermal power plants.

Specific prerequisites

MJ1112 "Applied thermodynamics" 9 credits (or the equivalent) and
MJ1401 "Heat transfer" 6 credits (or the equivalent)

Recommended

The course MJ2405 "Sustainable power generation" 9 credits

Examination

- TEN1 - Written exam, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercises, 1.5 credits, grading scale: P, F
- ÖVN2 - Exercises, 1.5 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.

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.