



# MJ2405 Sustainable Power Generation 9.0 credits

## Uthållig kraftproduktion

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

Course syllabus for MJ2405 valid from Autumn 2019

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering

## Specific prerequisites

B.Sc. in Engineering with prerequisite in MJ1112 Thermodynamics 9 ECTS, MJ1401 Heat Transfer 6 ECTS and SG1220 Fluid Mechanics 6 ECTS or a combination of these subjects of at least 15 ECTS.

Documented proficiency in english B or equivalent.

# Language of instruction

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

# Intended learning outcomes

After the course the student should be able to

- Describe the fundamental principles behind thermal energy conversion processes together with their environmental footprint in both conventional and renewable power generation cycles and systems.
- Evaluate the sustainability aspects of combustion processes and boiler technology for hydrocarbon fuels.
- Characterize the parameters, draw the schematic layout, calculate the performance and assess the sustainability factors for Steam Cycles, Gas Cycles and Combined Cycles in power generation applications, in both conventional and renewable energy perspective.
- Estimate the feasibility and justify possible efficiency improvements for the application of innovative technologies or alternative energy solutions for the modern sustainable power generation and distribution system.

# Course contents

The course MJ2405 "Sustainable Power Generation" (SPG) provides a comprehensive overview of the most vital power generation technologies related to both conventional and alternative fuels for the production and distribution of electricity and heat. The focus is on thermal power; specifically, on the system's perspective and thermodynamic cycle design of thermal power plants in practice, regardless of the primary energy source.

The sustainability aspect of the MJ2405 course is closely linked to other three courses that proceed in parallel, are interrelated in focus and contents and complement each other: MJ2405, MJ2407, MJ2411, MJ2413. Together, these four courses cover the whole spectrum of necessary fundamental knowledge on energy conversion, heat and power generation, renewable energy sources, conventional and innovative technologies, pollution prevention and emissions reduction, refrigeration and energy utilization in the built environment, energy policies and system planning, global issues of geopolitics, human development and climate change.

# Course literature

CompeduHPT; [www.compedu.net](http://www.compedu.net)

# Examination

- TEN1 - Written exam, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercise, 1.5 credits, grading scale: P, F

- ÖVN2 - Exercise, 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.