# MJ2640 Cleaner Production 6.0 credits

## Cleaner Production

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

## Establishment

Course syllabus for MJ2640 valid from Spring 2012

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering

## Specific prerequisites

At least 120 academic credits (ECTS) in a program of engineering or natural science or the course MJ1502 or MJ1500 or MJ2611 or corresponding knowledge. Documented profieciency 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

The overall aim of the course is to provide theoretical and applied knowledge and understanding of strategies and technologies for a cleaner industrial production.

This means that after the course the student should be able to:

- Propose and motivate strategies and actions for different industrial environmental problems, based on a system analysis perspective.
- Describe and explain how to use different unit operations as process integrated cleaning stages (as kidney or recovery function) in an industrial production process in order to minimize pollutions to air or water.
- State and describe other process internal solutions to minimize air pollution emissions (flue gas pollutants and VOC) and emissions through waste water discharges.
- Describe and explain the function of different process external methods that can be used in order to minimize pollutions to air or water.
- Discuss advantages and disadvantages for different environmental technical solutions.
- Propose and motivate the choice of different environmental technical solutions in order to solve or minimize pollutions to air or water from industrial production processes.

## Course contents

Strategies for a better environment: Process internal solutions (process changes, raw materials changes etc.), process external solutions, product changes and other. Advantages and disadvantages using different strategies.

Basic concepts of Cleaner Production. Process Management, Product Design and Material selection as components of Cleaner Production development

Air pollution control and gas cleaning technology. Process internal solutions (process changes, raw material changes) and external solutions (gas treatment) in order to minimize air pollutions (both gaseous compounds and particles). Two main applications will be discussed – emissions of VOC connected to handling of organic solvents and emissions of flue gases from energy production. Advantages and disadvantages with different methods.

Waste water treatment. Process internal solutions (process changes, raw material changes) and external solutions (different methods to treat waste water) in order to minimize water pollutions. A number of common applications will be discussed. Advantages and disadvantages with different methods.

## Disposition

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| Lectures | 22 h |
| Seminars | 18 h |
| Written examination | 4 h |

## Course literature

- UNEP (2002) Global status 2002: Cleaner Productionhttp://www.uneptie.org/pc/cp/library/catalogue/regional_reports.htm#cpgs2002
- Per Olof Perssonet al. "Cleaner Production – strategies and technology for environmental protection". Industrial Ecology, KTH, Stockholm 2011.
- Slide-copies and Notes from lectures.

## Examination

- SEM1 - Exercise, 1.0 credits, grading scale: P, F
- PROA - Project Work, 2.5 credits, grading scale: P, F
- TENA - Examination, 2.5 credits, grading scale: A, B, C, D, E, FX, 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.