



# FKE3070 Catalyst Deactivation

## 5.0 credits

Katalysatordeaktivering

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

### Establishment

Course syllabus for FKE3070 valid from Autumn 2011

### Grading scale

G

### Education cycle

Third cycle

### Specific prerequisites

MSc in chemical engineering or chemistry with a specialization in materials chemistry and/or catalysis.

### Language of instruction

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

### Intended learning outcomes

Design of industrial reactors is often dictated by secondary phenomena such as catalyst deactivation. The course gives an introduction to important deactivation phenomena illustrated

by industrial examples. The course discusses application of catalysts in industrial processes and how to evaluate deactivation mechanisms.

## Course contents

Secondary phenomena and plant design, sintering (support, metal crystals), poisoning (chemisorption, Ni/H<sub>2</sub>S example, diffusion, dynamics, regeneration, elution, other mechanisms, effectiveness factor & poisoning), routes to carbon (FCC example, gum formation, coke from pyrolysis), carbon formation on metals (steam reforming example, whisker carbon, criteria for carbon, regeneration),

Fouling of Catalysts (interparticle (HDS example), intraparticle (flue gas catalysis),

process influence on catalyst deactivation (feed, fuel and impurities, industrial examples), process influence on catalyst deactivation (influence of ash, dust and mechanical problems, industrial examples), Catalyst deactivation studies (field vs. laboratory evaluations).

Lectures and seminars are given by Aff. Prof. Jens Rostrup-Nielsen, Haldor Topsøe and Adj. Prof. Ann-Charlotte Larsson, Alstom.

## Course literature

Hand-outs of relevant scientific papers concerning catalyst deactivation.

## Examination

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.

Mandatory active participation in more than 80 % of seminars and lectures.

Approved written seminar assignments and oral presentations.

## 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.