



KE2195 Experimental Process Design 7.5 credits

Experimentell processdesign

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 KE2195 valid from Autumn 2018

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering

Specific prerequisites

Courses in KE1160 thermodynamics, KE1175 Chemical Process Technology, KE1170 Transport Phenomena or corresponding courses.

Language of instruction

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

Intended learning outcomes

The course comprises of hands-on laboratory work with intensive experiments relying on design principles based on statistical principles and methods for the process/reaction optimizations. The work is related to ongoing research activities, where synthesis of catalysts (homogeneous and heterogeneous), precipitation and crystallization, separation methods, electrodes and electrochemical analyses, aqueous and gaseous reaction products are analyzed and characterized. Furthermore, a final report with thorough discussions of the results in relation to current literature in respective field are presented.

Course contents

In this practical laboratory course, a study of different parameters affecting the outcome of a reaction will be carried out. The skills and knowledge gained in such studies are useful by analogy when solving problems that are typical for the chemical industry or research. The different projects to study are related to energy or environmental processes. The laboratory to be performed by the course participants is mainly ascribed to either homogeneous or heterogeneous catalysis, different preparation steps of catalysts and their application on porous electrodes or other reactor formulations, or in purification methods. The laboratory requires study and measurement of flow rates of gases or liquids, effect of temperatures and concentrations, types of separation techniques, electrochemical assessments as well as other instrumental techniques for the characterisation of gases, liquids and solids.

Besides the laboratory skill, the course demands basic knowledge in mass and energy balances as well as kinetic models for calculation of chemical reactors as well as electrochemical systems. An introduction to factorial and experimental process design useful statistical principles and methods for practical application in process optimization will also be covered during the course. Main emphasis on the design of experiments related to various factors affecting product yield, purity, etc. are of special interest for analytical work. The course is an exercise in process development, optimization and integration with analysis, planning and evaluation of the results obtained for the particular project task. The examination is a result of the experimental work, submission of a technical report and an oral presentation at a seminar.

Course literature

Scientific papers related to the specific laboratory assignments have to be sought from the library using search engines or samples given by the supervisor. Course book to be announced later on.

Laboratory safety compendium to be handed out.

Examination

- LAB1 - Laboratory work, 7.5 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.

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.