



SH2705 Compact Reactor Simulator- Exercises in Reactor Kinetics and Dynamics 6.0 credits

Kompakt reaktorsimulator- övningar i reaktorkinetik och reaktordynamik

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

Establishment

Course syllabus for SH2705 valid from Autumn 2013

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

Courses in reactor physics (SH2600, or equivalent) and reactor power engineering/nuclear reactor technology (SH2702, or equivalent)

Language of instruction

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

Intended learning outcomes

Nuclear reactor power plants are very complex systems that may go through various transients during normal and accident situations. This course is designed to simulate the transients and explain their nature. The power plant simulations are based on Apros - the process simulation software for nuclear and thermal power plant applications.

After the course, students will be able to:

- describe various design bases and beyond design bases accidents,
- explain the behavior of the nuclear reactor and the power plant during normal operation and the transients,
- explain the effect of various feedbacks in the nuclear reactor and the power plant during the transients,
- recognize the cause of a complex transient, and take an appropriate action.

Course contents

Disposition

The course gives 6 credits for a group project work (a report and presentation); possible group project topics are:

- Loss of coolant accident (LOCA)
- Reactivity initiated accident (RIA)
- Instability events
- Complex scenarios

The report and presentation have each two parts. The first part is based on a theory study, and it should contain:

- a description of possible accident scenarios studied within the selected project topic (based on the literature study and exercising the simulator)
- a classification of the identified scenarios into the design bases, beyond design bases and severe accidents
- mitigation measures for returning to the normal operation or measures for ensuring safety of public and environment for each of the identified accident scenarios

The second part in the report and presentation should show results obtained from simulations of the studied transients.

Course literature

Lecture handouts.

Examination

- PRO1 - Projects, 6.0 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.