



# **SH2705 Kompakt reaktorsimulator- övningar i reaktorkinetik och reaktordynamik 6,0 hp**

**Compact Reactor Simulator- Exercises in Reactor Kinetics and Dynamics**

**Fastställande**

**Betygsskala**

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

**Utbildningsnivå**

Avancerad nivå

**Huvudområden**

Teknisk fysik

**Särskild behörighet**

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

**Undervisningsspråk**

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

## Lärandemål

KTH operates a unique Compact Reactor Simulator - a simulator of a real Boiling Water Reactor at Forsmark, the Forsmark 3 reactor. The operator control panel of the simulator is modelled of the real control room at Forsmark 3. The simulator enables a large number of initial conditions of the reactor system to be set-up and then dynamically develop reactor responses to operators actions. Consequently the students can dynamically interact with the reactor and analyze the output from the reactor control system in real-time. The simulations can address various topics, such as the power/circulation state diagram, scram conditionsm and control rod operation. The physics of the reactor can be very pedagogically studied, e.g. reactivity, criticality, void, and xenon build-up. Safety aspects of the reactor system can also be simulated.

After completed course the student:

- will be able to give an account for the basic underlying physics of nuclear reactors, in particular reactor kinetics, reactor dynamicsm and thermal hydruic feedbacks
- will be able to undertake the adequate steps in various reactor operation conditions
- will be able to sketch and implement an accident scenario for a Boiling Water Reactor
- will be able to demonstrate how reactor simulators can be used in training and safety culture developmet.

## Kursinnehåll

Basics of reactor kinetics and reactor dynamics.

Reactor Transients.

Main feedback mechanism in Boiling Water Reactors.

Reactor operator's routine.

Running reactor simulator for different routine and accidental conditions.

Developing and implementation of different scenarious for normal and abnormal reactor operation.

## Kurslitteratur

Lecture handouts.

## Examination

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Written examination, 3 cr.

Computer-based reactor simulator.

## **Etiskt förhållningssätt**

- Vid grupperbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.