



SH2701 Thermal-Hydraulics in Nuclear Energy Engineering 6.0 credits

Termohydraulik i kärnkraftsanläggningar

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

Establishment

The official course syllabus is valid from spring alt. autumn semester 2026 as decided by the Director of First and Second Cycle Education. Decision date:2026-08-14

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

Completed degree work at undergraduate level in the main field of technology.

At least 120 credits in technology and natural sciences.

English B/English 6

Intended learning outcomes

The objective of the course is to provide an overview of the basic thermal processes that take place in nuclear systems. After successful completion of the course students will be able to

- (a) describe the thermal and thermodynamic processes that take place in a nuclear power plant,
- (b) formulate, analyze and solve simple problems in heat transfer in complex systems,
- (c) formulate, analyze and solve simple problems in single- and two-phase flows,
- (d) analyze dynamic and thermal loads in complex systems,
- (e) perform a simple thermal design of a nuclear power plant,
- (f) reflect on thermal limitations in nuclear power plant.

Course contents

The course is focusing on the thermal and thermodynamic processes in nuclear systems. Examples of the covered topics:

- (1) transport equations of mass, momentum and energy,
- (2) flow in pipes,
- (3) mechanisms for heat transfer,
- (4) convection, boiling and condensation,
- (5) critical heat flux,
- (6) laminar and turbulent flows,
- (7) two-phase flows,
- (8) critical flow,
- (9) reaction forces.

Examination

- TENA - Exam, 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.