FED3340 Fusion Technology 8.0 credits

Fusionsteknologi

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

Establishment

Course syllabus for FED3340 valid from Autumn 2011

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Language of instruction

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

Intended learning outcomes

After completed course the students should have knowledge on the construction of a fusion reactor; the processes decisive for wall erosion and fuel retention; the criteria for material selection for reactor components; operation of the fuel plant; analysis of reactor materials:

effects of neutrons on material damage; assessment of power loads; construction and application of diagnostics.

Course contents

Reactor-class fusion devices: concepts and structure. D – T fusion and consequences of energy release: power handling, material erosion and damage, selection and qualification of materials, armour materials, magnets. Vacuum technology for a reactor: vacuum vessel and vacuum pumps. Fuel handling: requirements, fuel cycle and fuel plant. Material testing and analysis, neutron-induced effects in construction and diagnostic materials; remote handling of components.

Disposition

The course is composed of 8 lectures given by the tutor and a number seminars (50 min talk) prepared by students. Seminars are followed by discussion.

Course literature

1. Monograph: “Physical Processes of the Interaction of Fusion Plasmas with Solids”, W. Hofer and J. Roth (eds), Academic Press 1996.

2. Review articles in the field fusion reactor materials and fusion technology

- Nuclear Fusion 41 (2001) 1697.
- ITER Physics Basis, Nuclear Fusion, Special Issue.

Articles from journals: Fusion Engineering and Design; Journal Nuclear Materials; Fusion Science and Technology.

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.

Other requirements for final grade

Final oral exam and seminar presentation.

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.