



# SH2602 Transmutation av kärnavfall 8,0 hp

Transmutation of Nuclear Waste

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

## Fastställande

Kursplan för SH2602 gäller från och med HT07

## Betygsskala

P, F

## Utbildningsnivå

Avancerad nivå

## Huvudområden

Fysik, Teknisk fysik

## Särskild behörighet

Recommended prerequisites: You have to be able to apply basic knowledge about nuclear and reactor physics before the first meeting. A suitable background is e.g. the KTH course in reactor physics (SH2600).

## Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

## Lärandemål

The generation of radio-toxic nuclear waste is considered by the public to be one of the major drawbacks related to the use of nuclear power. Recycling of the waste in nuclear reactors may reduce the dimension of this problem considerably. After the course you will be able to make design choices that makes waste transmutation safe and reasonably economic. This objective is achieved if you show that you are able to

- assess nuclear and thermal hydraulic aspects of reactor safety when introducing plutonium, americium and curium into the fuel,
- select chemical forms for the fuel that provide acceptable compromises between high temperature stability, reprocessability and transmutation performance,
- select structural materials that combine irradiation and corrosion resistance with good mechanical properties.

Passing the course typically means that you have attended 30 hours of meetings, and performed 170 hours of work in your office. Most effort is thus to be done out of class.

## Kursinnehåll

### Kurslitteratur

- Transmutation of nuclear waste, J. Wallenius, 2006 (PDF-files).
- Computer code manuals
- Collection of scientific articles

### Examination

- PRO1 - Återanvändning av plutonium i PWR, 1,0 hp, betygsskala: P, F
- PRO2 - Transmutation in ett snabbneutronspektrum, 1,0 hp, betygsskala: P, F
- PRO3 - Transmutation i acceleratordrivna system, 1,0 hp, betygsskala: P, F
- PRO4 - Kylmedel- och kapslingstemperaturer, 1,0 hp, betygsskala: P, F
- PRO5 - Författande av konferenspapper, 2,0 hp, betygsskala: P, F
- TEN1 - Intervju om konferenspapper, 2,0 hp, betygsskala: P, F

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.

## Övriga krav för slutbetyg

To pass the course you should actively participate in all course meetings. With exception of the first meeting, the result of home assignments will be presented and discussed. If you cannot attend a meeting, report this in advance, and you will be given an extra written assignment to replace the meeting you missed.

You are further required to have participated in writing and presenting a conference paper with the title "Performance and safety of waste transmutation in a reactor of type A with coolant B and fuel C". The research for the paper will be done in groups. The paper is to be presented orally at one of the course meetings. The final examination constitutes of an individual discussion with the teacher about the contents of the paper, lasting 30-60 minutes.

## Etiskt förhållningssätt

- Vid grupparbete 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.