



KD2430 Nuclear Fuel Cycle 9.0

credits

Kärnbränslecykelns kemi

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

Establishment

Course syllabus for KD2430 valid from Spring 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering

Specific prerequisites

Admission requirements for independent students:

75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

****Admission requirements for programme students at KTH:**

****At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:**

75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to:

- Describe radioactive decay and explain how different types of radiation interact with different media
- Calculate the activity of a substance by knowing the mass
- Understand how biological material is influenced by ionizing radiation
- Describe how radionuclides are enriched in natural systems
- Outline all the different parts of the Nuclear Fuel Cycle and describe them in chemical terms
- Explain the chemical impact of the different parts and describe the environmental impact
- Understand what principles a geological repository of spent nuclear fuel lean on and describe the important chemical processes within this system
- Relate the properties of the actinides to their chemistry

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Course contents

- Radioactive decay
- Interaction between ionizing radiation and materia
- Chemical and biological impact of ionizing radiation
- Mining of Uranium
- Enrichment of Uranium and fuel production
- Reactor chemistry
- Reprocessing of nuclear fuel
- Accidents related to the Nuclear industry
- Nuclear bomb testing

-Risk philosophy

Study visits at nuclear power plants

Course literature

G. Choppin, J. Rydberg, J.O. Liljenzin. _Radiochemistry and Nuclear Chemistry
_Handouts

Examination

- PRO1 - Project, 2.0 credits, grading scale: P, F
- STU1 - Study Visits, 1.0 credits, grading scale: P, F
- TEN1 - Examination, 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.

Other requirements for final grade

Study visits (STU1; 1 hp)

Project (PRO1; 2 hp)

Examination (TEN1; 6 hp)

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.