



# CE2010 Nuclear Chemistry 7.5 credits

Kärnkemi

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

## Establishment

Course syllabus for CE2010 valid from Autumn 2023

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Chemistry and Chemical Engineering

## Specific prerequisites

Bachelor's degree in engineering or in sciences including 75 credits in chemistry or chemical engineering and 20 credits in mathematics and programming, English B/6.

## Language of instruction

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

# Intended learning outcomes

After graduating from the course, the students should be able to:

- explain and apply basic concepts and relations within nuclear chemistry
- calculate doses and recommend suitable radiation protection for different exposure situations
- describe all steps of different nuclear fuel cycles
- describe and explain the use of radionuclides in nuclear medicine
- explain how radionuclides affect and accumulate in natural systems
- give example of and explain principles for industrial applications for non-nuclear sectors

## Course contents

Basic nuclear chemistry including radiation protection

- Radioactive decay
- Interaction of radiation with matter
- Principles for measuring ionizing radiation
- The first principles for chemical and biological effects of ionizing radiation
- Basic radiation protection

The nuclear fuel cycle

- Open and closed nuclear fuel cycles
- How nuclear energy is converted to electricity
- Production and reprocessing of nuclear fuel
- Geological repositories for used nuclear fuel

Nuclear medicine

- The use of radionuclides within diagnostics and treatment

Radio ecology

- Radionuclides in the environment

Industrial applications for non-nuclear sectors

## Examination

- TEN1 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO1 - Project assignment, 2.5 credits, grading scale: P, 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.