

Course-PM: Nuclear Chemistry (CE2010) 2024

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

Teaching

12 Lectures

1 Exercise

2 Seminars (3 h per seminar) (Mandatory)

Examination

- Written exam (TEN1), 5.0 credits, Grading scale A-F
- Project assignment (PRO1), 2.5 credits, examined both in writing and orally, Grading scale P/F
- The final grade is given by the written exam

The project

- Choose a topic of your interest
- Search for literature
- Write a report (deadline 1 week before the seminar)
- Make a presentation at the seminar

Recommended course literature

Radiochemistry and Nuclear Chemistry: 2nd Edition of Nuclear Chemistry, Theory and Applications

Online version available via KTH-library (search in Primo)

Reading: Radiochemistry and Nuclear Chemistry

Activity	Topic	Chapter
Lecture 1	Introduction and overview	1
Lecture 2	Nuclear structure/stability and radioactive decay	2-4
Lecture 3	Interactions between ionizing radiation and matter/Principles for measuring ionizing radiation	6-8
Lecture 4	Basic radiation chemistry and radiation biology	6,7,18
Lecture 5	Radiochemistry and radioanalytical chemistry	9
Lecture 6	The nuclear power plant	19,20
Lecture 7	The nuclear fuel cycle, part 1	21
Lecture 8	The nuclear fuel cycle, part 2	21
Lecture 9	Nuclear medicine	18+handouts
Lecture 10	Radiopharmaceuticals	15+handouts
Lecture 11	Radioecology	22
Lecture 12	Industrial applications for non-nuclear sectors	Handouts

Teachers

Mats Jonsson (matsj@kth.se) (Examiner and course coordinator)

Mats Jansson (matsja@kth.se)