



# HL2003 Radiation Physics and Biology 6.0 credits

Strålterapeutisk fysik och biologi

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

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for HL2003 valid from Autumn 2023

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Specific prerequisites

Bachelor's degree in technology or science. 4 credits in physics, 4 credits in anatomy and/or physiology. English 6/B

## Language of instruction

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

## Intended learning outcomes

The aim of the course is to give a basic knowledge in radiation physics and biological effects of ionising radiation in order to understand the principles of radiation therapy.

## Course contents

Basic interaction processes of ionising radiation with matter. Basic concepts of dosimetry, dosimetric quantities and units. Accelerators for radiation therapy, principles of linear and circular accelerators. Beam transport through treatment head to patient. Optimal design of the therapy beam. Principles of optimal treatment planning. Algorithms for calculations of dose distribution in the patient. Quality control and assurance.

Introduction to biology of the cell. Basic chemical reactions in cells. Lesions produced by radiation in DNA molecules. Cell survival models. Radiation effects on normal tissues and tumours. The biological basis of radiotherapy, oxygen effect, dose rate dependence, dose fractionation.

## Examination

- 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.

## Other requirements for final grade

Written examination and exercises.

## 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.