



HL1202 Medical Imaging Systems 9.0 credits

Medicinska bildgivande system

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

Establishment

Grading scale

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

Education cycle

First cycle

Main field of study

Medical Engineering, Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in Swedish corresponding to Swedish B and English corresponding to English A.

Anatomy and Physiology corresponding to HL1201. Physics corresponding to SK1111 Electromagnetism and Waves and Modern Physics corresponding to SH1011.

Language of instruction

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

Intended learning outcomes

The course should give an overview and understanding of the different imaging modalities used in medical diagnostics and how they are used in the daily clinical practice.

After the course the student should be able to:

- Describe the physical processes behind magnetic resonance tomography, ultrasound, nuclear medicine, emission- and transmission imaging and the different apparatus, detectors and instruments for each modality
- Explain and give examples of how the modalities interact with biological tissue
- Give examples of the clinical usage of the modalities
- Account for the strengths and weaknesses of the modalities and how to improve the quality of the images
- Compare the strengths and weaknesses of the modalities and their ability to image organs in the body, and for a specific case understand which modality that gives the best images

Course contents

- Transmission imaging: X-ray, CT, interaction between ionizing radiation and matter, X-ray generation, image detection, image quality, dose, image reconstruction, detectors, medical diagnostics.
- Nuclear medicine: Gamma camera, SPECT, PET, radionuclides, interaction, detectors, image processing, medical diagnostics
- Magnetic resonance tomography: Physics, detector system, image processing, spectroscopy, medical diagnostics
- Ultrasound: Ultrasound physics, acoustic impedance, Doppler imaging, ultrasound transducers, medical diagnostics
- Endoscopy: Physics, medical diagnostics

Course literature

Physics for Diagnostic Radiology av Philip Palin Dendy, Brian Heaton, ISBN: 9781420083156

Examination

- TENB - Written exam, 9.0 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.

Compulsory participation in the web lectures

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.