SK2550 X-ray Physics and Applications 6.0 credits

Röntgenfysik och tillämpningar

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 SK2550 valid from Spring 2012

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics,Physics

Specific prerequisites

Recommended prerequisites: The course is designed for final year students (F4), Master and PhD-students. Knowledge of the physics of electromagnetic radiation corresponding to SK1120 (Waves, 6 hp) and in basic mathematics (vector analysis, integrals, differential equations) is a prerequisite. Moreover, knowledge in optics corresponding to SK2300 (Optical Physics, 6 hp) is of advantage.

Language of instruction

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

Intended learning outcomes

After the course you should be able to:

- describe the x-ray optical properties of materials for different x-ray energies on the basis of the general laws of x-ray radiation interaction with matter
- explain different possibilities to generate x-ray radiation
- explain the working principle of different x-ray optics on the basis of their material x-ray optical properties
- apply the knowledge on x-ray sources and optics to explain experimental arrangements in the field of modern x-ray physics
- apply the knowledge on x-ray interaction with matter to explain different types of analytical methods that use x-ray radiation as a probe
- give an oral presentation about a scientific topic and explain the physical background in a small discussion.

Course contents

Part 1: X-ray basics

X-ray interaction with matter, X-ray sources, X-ray optics, X-ray detectors

Part 2: Application examples and special topics

To be chosen by the course participants (see website)

Course literature

David Attwood, Soft X-ray and Extreme Ultraviolet Radiation, Cambridge University Press (the edition used will be announced on the course homepage at least four weeks prior to start of the course).

Examination

- INLA - Home Assignment, 3.0 credits, grading scale: P, F
- REDA - Examination, 3.0 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

The course is examined by home assignments (INLA, 3 hp, grading P/F) and an oral presentation and examination (REDA, 3 hp, grading A-F). A successful oral presentation will lead to the lowest grade E, while this grade can be improved by a voluntary oral examination.

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.