



# FKF3420 Synchrotron Characterization Methods in Fibre and Polymer Technology - Theory

## 2.0 credits

Synkrotron karaktäriseringsmetoder för Fiber och Polymerteknologi - Teori

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

### Establishment

Course syllabus for FKF3420 valid from Spring 2022

### Grading scale

P, F

### Education cycle

Third cycle

### Specific prerequisites

Eligible for studies at the third-cycle level and M.Sc. in chemistry, physics or comparable areas.

### Language of instruction

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

## Intended learning outcomes

After completion of the course the doctoral student should have the knowledge and ability to

- explain the principles of synchrotron radiation generation and focusing
- explain the functioning of a beamline at a 3rd generation synchrotron source
- deduce key features in scattering patterns
- analyze quantitatively atomistic and nanoscale information from experimental data
- suggest characterization methods that give similar/complementary information, and decide when synchrotron based characterization methods are more suitable

## Course contents

Theoretical descriptions on:

- X-ray interaction with matter
- basics of synchrotron radiation and x-ray source
- refraction and reflection from interfaces
- diffraction: X-ray diffraction, grazing incidence wide-angle X-ray scattering
- scattering: X-ray reflectivity, small-angle X-ray scattering, grazing incidence small-angle X-ray scattering
- coherence: Coherent diffraction imaging, X-ray Photon Correlation Spectroscopy
- applied examples of in situ and in operando measurements will deepen the understanding for the process/system that is being investigated

## Examination

- HEM1 - Home assignments, 2.0 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.

Course requirements: fulfilled home assignments.

## 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.