FIH3606 Material Characterization for Electronics and Photonics 10.5 credits

Materialkarakterisering för elektronik och fotonik

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 FIH3606 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Basic knowledge in optics, electromagnetism, solid state physics and semiconductor physics.

Language of instruction

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

Intended learning outcomes

This course gives insight into basic structural, electrical and optical characterization techniques for semiconductor materials used in electronic and photonic applications. After finishing the course, the students should:

·be able to select measurement technique with appropriate sensitivity and resolution.

·possess sufficient hands-on experience from the instruments which are part of the laboratory course to be able to use them.

·be familiar to and able to analyze, interpret and validate spectra and measurement results from the techniques that are presented in the course.

·be able to correlate and cross-examine measurement results obtained using different techniques.

·reach a sufficient competence level in one of the studied techniques to be able to present own data in scientific journals.

Course contents

The lectures cover the theory and main operating principles for several commonly used characterization techniques, such as: X-ray diffraction (XRD), atom force microscopy (AFM), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), scanning electron microscopy (SEM), transmission electron microscopy (TEM), four-point probe resistivity measurements, Hall measurement and photoluminescence (PL). A large emphasis is also put on hands-on experience and individual training on the various analytical tools.

Examination

- EXA1 - Examination, 10.5 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.

Grading scale: Pass/Fail

Other requirements for final grade

For passing the course the student need to:

- pass the laborative exercises.
- Approved individual project after oral examination
- Oral presentation of principles and measured results for one selected technique.

Langugae of instruction: English only

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.