EPFL

MSE-675

Introduction to SEM and FIB microanalysis

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Cursus	Sem.	Type
Materials Science and Engineering		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Written
Workload	60h
Hours	**29**
Courses	27
TP	2
Number of positions	**16**

Frequency

Every year

Remark

Students should register via the website : https://www.epfl.ch/research/domains/ccmx/2024sem/

Summary

Modern Scanning Electron Microscopes, when combined with focused ion beams (Dual beam FIBs), provide a larger number of multi-modal imaging and different analytical methods. The course format consists of introductory lectures, lectures on advanced techniques and practical work.

Content

SEM and FIB: Instrumentation and Principles
SEM+FIB: mode of operation
SEM+FIB: Image formation and interpretation
FIB: Milling and Fabrication
Elemental analyses with FIB-TOFSIMS

Elemental analyses with EDS
Elemental analyses with WDS and µ-XRF
Introduction to Auger Electron Spectroscopy (AES)
Introduction to Atom Probe Tomography (APT)
Demonstration and teaching in front of the SEM

Introduction to ECCI
Introduction to EBSD
EBSD techniques: Texture, advanced EBSD indexing, 3D-EBSD, TKD
Advanced EBSD techniques: HR-EBSD

Advanced diffraction technique in SEM: LEND
Introduction to TEM: TEM vs SEM for imaging and diffraction
Advanced SEM in-situ techniques

Keywords

SEM, FIB

Learning Prerequisites

Required courses

This course is open to participants with a basic background in materials science, mechanical engineering, chemical engineering, micro-technology or physics. It is taught in English and is limited to a maximum of 16 participants.

Resources

Bibliography

This course is building on the old version:
https://www.epfl.ch/research/domains/ccmx/courses-and-events/sem23/

Websites

- https://www.epfl.ch/research/domains/ccmx/2024sem/?utm_medium=email&utm_source=Upcoming+Courses+for+Materials+Scienti