CH-410

Physical and chemical analyses of materials

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Cursus	Sem.	Type
Chimiste	MA1, MA3	Opt.
Ing.-chim.	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	

Summary

The course relates on the use of electromagnetic (X-Ray) and corpuscular (electrons) radiations for physical and chemical analysis of solid materials.

Content

1. Fundamentals of beam interactions with materials

- Matter excitation: elastic, inelastic interactions of X-ray photons and electrons with matter
- Matter relaxation: spectroscopy and spectrometry

2. Microscopy

- Electron microscopy: Scanning and Transmission Electron Microscopies
- Scanning probe microscopy: Scanning Tunelling and Atomic Force Microscopies

3. Chemical analysis

- Bulk analysis of materials: X-ray emission and X-ray Fluorescence Spectrometries
- Surface analysis of materials: X-Ray Photoelectron and Auger Electron Spectrometries

4. Chemiometry

- Basics of statistics
- Analyses of variance ANOVA

Assessment methods

Final written exam