



Faculté des sciences appliquées

FSA

MAPR2460 **INTRODUCTION TO MATERIALS CHARACTERIZATION**

[30h+15h exercises] 4 credits

This course is taught in the 2nd semester

Teacher(s): Patrick Bertrand (coord.), Jacques Devaux, Alain Jonas, Bernard Nysten
Language: french
Level: 2nd cycle course

Aims

Understanding of fundamental phenomena related to the techniques used in materials characterization

Main themes

1 Introduction

Physical characterization methods: classification, application fields

2 Radiation- matter interaction

- Radiation types: photons, electrons, ions
- Absorption, stopping power, range
- Reflection, scattering (elastic and inelastic)
- Refraction, diffraction
- Secondary emission

3 Basic principles of the different spectroscopies and chemical composition analysis

Atomic absorption and emission, electron spectroscopies, X-ray fluorescence, vibration spectroscopies, mass spectrometries, ion backscattering spectrometries and resonance methods

4 Basic principles of the different microscopies and morphology analysis

Optic, electron and near field microscopies

5 Diffraction techniques and structure analysis

Light, RX, electron and neutron diffractions

6 Application to materials characterization

Case studies (labs and exercises)

Other credits in programs

MATR21	Première année du programme conduisant au grade d'ingénieur (4 credits) civil en science des matériaux	Mandatory
---------------	---	-----------