



## 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:** Second cycle

### 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)

### Content and teaching methods

Nil

**Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)**

Nil

### Other credits in programs

<b>INCH23</b>	Troisième année du programme conduisant au grade d'ingénieur civil chimiste	(4 credits)	
<b>MATR21</b>	Première année du programme conduisant au grade d'ingénieur civil en science des matériaux	(4 credits)	Mandatory
<b>MECA21</b>	Première année du programme conduisant au grade d'ingénieur civil mécanicien	(4 credits)	