



Universidade do Minho



## **Curricular Unit**

Advanced Physics Topics 1

## **Module**

Advanced materials preparation and characterization techniques

## **Type**

Lecture course

## **Contact hours**

18

## **Professor/Researcher in charge**

Bernardo Almeida, U. Minho

## **Summary of Contents**

Thin film preparation. Sputtering. Magnetron sputtering. Applications.

Laser Ablation deposition of thin films and nanostructures. Applications.

Structure and microstructure. X-ray diffraction. Low angle X-ray scattering, reflectometry, grazing incidence. Scanning electron microscopy (SEM). Transmission electron microscopy (TEM)

Infrared and Raman Spectroscopies. Lattice dynamics. Experimental setups. Applications.

Electrical properties. Dielectric relaxation. Impedance spectroscopy. Time and frequency domains.

Experimental setups. Electrical resistivity. Magnetoresistance.

Magnetic properties. Magnetic interactions and magnetization. Magnetometry. Measurement techniques.

Optical properties. Reflectance and transmittance. Absorption. Photoluminescence. Ellipsometry.

## **Evaluation**

Final exam

## **Juri**

Bernardo Almeida