

MS 40000 Materials Characterization

Instructor	Dr. Li-Chia Tien	Phone	(03) 863-3208
Office	Science B122	E-mail	lctien@mail.ndhu.edu.tw
Office Hours	Wed 10-12 pm	Class	Wed 2:10 pm-4 pm Thu 09:10 am-10 am

Required Textbook:

- Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, Yang Leng, John Wiley & Sons 2008. ISBN: 978-0-470-82298-2

Suggested References:

- Scanning Electron Microscopy and X-Ray Microanalysis J. Goldstein, Kluwer Academic/ Plenum Publishers, 2003
- Physical Methods for Materials Characterization, P. E. Flewitt and R. K. Wild, IOP, 1994
- Encyclopedia of Materials Characterization, C. R. Brundle, C. A. Evans and S. Wilson, Manning, 1992

Description:

This course introduces students to the basics of materials characterization. It will cover the latest advanced technologies with fundamental mathematics, chemistry, and physics concepts. The lectures also provide a more realistic picture of materials characterization.

Topics:

- Concepts of materials characterization **(Ch1)**
- Principles of optical microscopy **(Ch2)**
- Introduction to Spectroscopy **(Ch3)**
- Photoluminescence (PL) **(Ch3)**
- UV-Vis Absorption Spectroscopy (UV/Vis) **(Ch3)**
- Cathodoluminescence (CL) **(Ch3)**
- Raman Spectroscopy **(Ch3)**
- Scanning Electron Microscopy (SEM) **(Ch4)**
- Transmission Electron Microscopy (TEM) **(Ch4)**
- Energy-dispersive Spectrometry (EDS) **(Ch4)**
- Wavelength-dispersive Spectrometry (WDS) **(Ch4)**
- X-ray Diffraction (XRD) **(Ch5)**

課程雲端資料夾：Microsoft Teams 團隊代碼 **anx0pkc**

Course Schedule:

Week	Topic	Required Reading
1	Concepts of Materials Characterization	Ch1
2	Concepts of Materials Characterization	Ch1
3	Principles of optical microscopy	Ch2
4	Principles of optical microscopy	Ch2
5	Introduction to Spectroscopy	Ch3
6	Photoluminescence (PL)	Ch3
7	UV-Vis Absorption Spectroscopy (UV/Vis)	Ch3
8	Cathodoluminescence (CL) Raman Spectroscopy	Ch3
9	4/16 (Wed) Midterm	Ch1-Ch3
10	SEM	Ch4
11	SEM	Ch4
12	EDS/WDS	Ch4
13	TEM	Ch5
14	XRD	Ch5
15	XRD	Ch5
16		
17	6/11 (Wed) Final Exam	Ch4-Ch5

Note:

Lectures will be based on class notes. Students are encouraged to take notes and attend the class. However, no attendance will be counted. Review sessions will be available before midterm and final exams. The final exam is not comprehensive.

Evaluation:

☐ **Midterm 35% (4/16) Wed**

☐ **Final Exam 35% (6/11) Wed**