

課程名稱 (course name)	(中) 電子能譜表面分析 (M065)				
	(Eng.) Surface Analysis by XPS and AES				
開課系所班級 (dept. & year)	材料碩士班	學分 (credits)	3	授課教師 (teacher)	張立信
課程類別 (course type)	<input type="checkbox"/> 必修(Mandatory) <input checked="" type="checkbox"/> 選修(Elective)	授課語言 (language)	中文	開課學期 (semester)	上學期
課程簡述 (course description)	(中) 材料之化學組成是研究材料者必備的基礎資訊。電子能譜儀，包括 X 光光電子能譜儀(XPS)與歐傑電子能譜儀(AES)，是分析材料表面成分與鍵結所不可或缺的工具。本課程將教授以電子能譜儀分析材料表面成份所需具備的知識。使學生習得電子能譜儀之基礎概念、設計、定性定量詮釋與應用實例等。				
	(Eng.) The composition of a material is the basic information for a material researcher. The electron spectroscopy including the X-ray photoelectron spectroscopy (XPS) and the Auger electron spectroscopy (AES) is an essential tool for surface compositional analysis. In this course, the fundamental knowledge for surface analysis by XPS and AES is taught. Students learn the basic concepts, design, qualitative and quantitative interpretation and application examples of the electron spectroscopy.				
先修課程名稱 (prerequisites)					
課程目標與核心能力關聯配比(%) (relevance of course objectives and core learning outcomes)				教學方法與評量方法 (teaching and assessment methods)	
課程目標(中/ Eng.)		核心能力	配比	教學方法	評量方法
1. 了解 XPS, AES, SAM 之基礎概念 (To understand the basic concepts of XPS, AES and SAM)		<input checked="" type="checkbox"/> 1.特定材料之專業知識	20%	習作 講授	口頭報告 測驗 作業
2. 了解真空需求、X 光源、電子槍、分析器、偵測器 (To understand vacuum requirement, X-ray source, E-gun, analyzer, detector)		<input checked="" type="checkbox"/> 2.策劃及執行專題研究之能力	40%		
3. 了解小角度 XPS、XPS 成像、解析度、角度解析 XPS (To understand small-angle XPS, XPS imaging, resolution and angle-resolved XPS)		<input checked="" type="checkbox"/> 3.撰寫專業論文之能力	20%		
4. 了解成分定性與定量分析、化學組態分析 (To understand qualitative, quantitative analysis and chemical state information)		<input checked="" type="checkbox"/> 4.創新思考、解決問題與終身學習之能力	20%		
5. 了解非破壞縱深分析、濺擊縱深分析與機械分區 (To understand non-destructive depth-profiling, sputtering depth-profiling and mechanical sectioning)		<input type="checkbox"/> 5.跨領域協調整合之能力			
6. 了解應用實例，包括冶金、腐蝕、陶瓷觸媒、微電子與高分子 (To understand application examples including metallurgy, corrosion, ceramic catalysis, microelectronics and polymer)		<input type="checkbox"/> 6.國際觀及綠色材料知識			
		<input type="checkbox"/> 7.領導、管理及規劃之能力			
		<input type="checkbox"/> 8.學術專業倫理			

授課內容(單元名稱與內容、習作/考試進度、備註)
(course content and homework/ tests schedule)

週次 (week)	單元名稱與內容 (subject and content)	習作/考試進度 (homework and tests)
1.	課程簡介 (Course Introduction)	
2.	基礎概念 (Basic Concepts)	
3.	能譜儀設計 (Spectrometer Designs)	
4.	能譜儀功能 (Spectrometer Functions)	習作 1 (Homework 1)
5.	定性分析 (Qualitative Analysis)	
6.	定量分析 (Quantitative Analysis)	
7.	化學組態 (Chemical State Analysis)	習作 2 (Homework 2)
8.	作業檢討 (Homework Review)	
9.	期中考 (Midterm)	
10.	縱深分析 (Depth Profiling)	
11.	縱深分析 (Depth Profiling)	習作 3 (Homework 3)
12.	應用實例 (Application Examples)	
13.	應用實例 (Application Examples)	
14.	應用實例 (Application Examples)	
15.	應用實例 (Application Examples)	
16.	應用實例 (Application Examples)	習作 4 (Homework 4)
17.	作業檢討 (Homework Review)	
18.	期末報告 (Final Report)	

學習評量方式
(evaluation)

1. 學期成績計算項目及權重標準如下：(The percentages of items concerned:)
 - A. 期末報告 (Final Report) 30%
 - B. 期中考試 (Midterm) 30%
 - C. 課後作業 (Homework) 40%
2. 期末報告：

期末報告配合學校時程舉辦。題目則需與電子能譜表面分析相關。報告規定如附件。
(The final report is carried out according to the semester schedule. The topic of final report should relate to the application of surface analysis by XPS or AES. The provision of final report is attached.)
3. 期中考試：

期中考試配合學校時程舉辦。期中考試內容包含規定教科書範圍與補充講授內容。
(The midterm is carried out according to the semester schedule. The content taught in the course is the target of the midterm.)
4. 課後作業：

課後定期將指定練習題數題，要求學生完成，並於規定時間於課堂中討論。
(Homework is assigned regularly and discussed in the course as scheduled.)

教科書&參考書目 (書名、作者、書局、代理商、說明)
(textbook& other references)

教科書 (Textbook)

An Introduction to Surface Analysis by XPS and AES, J. F. Watts and J. Wohlstenholme, Wiley, 高立圖書，2003 (興大電子書 NetLibrary)

參考書 (References)

1. Surface Analysis Methods in Materials Science, edited D.J. O'Connor, B.A. Sexton and R.St.C.

Smart, Springer, 高立圖書, 1992

2. Modern Surface Analysis, L.E. Davis, Perkin-Elmer Corp., 1980

3. Comprehensive Analytical Chemistry, edited G. Svehla, Elsevier, 1979

課程教材 (教師個人網址請列在本校內之網址。)

(teaching aids & teacher's website)

<http://www.lib.nchu.edu.tw/>

課程輔導時間(office hours)

學期中每週二下午 04:00~05:00 (Tuesday, 04:00-05:00 pm in semester)