

課程名稱 (course name)	(中) 繞射原理 (M006)				
	(Eng.) Fundamental of Diffraction				
開課系所班級 (dept. & year)	材料碩士班	學分 (credits)	3	授課教師 (teacher)	吳宗明
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)	下學期
課程簡述 (course description)	(中) 本課程主要講解 X-ray 之基本原理與 X-ray 管之設計、材料之晶體結構、X-ray 對材料晶體結構之繞射現象、晶體結構對 X-ray 繞射強度之影響、晶體結構對 X-ray 繞射寬度之影響、以及 X-ray 對材料晶體結構之決定、材料結晶結構影響分析與 X-ray 對材料特性之分析,最後介紹 X-ray 對高分子材料結構分析與應用、此課程以課堂講授為主,並針對課程內容進行期中考與期末考來評量學生對於課堂講授資料之理解與思考判斷力				
	(Eng.) This course describes the principle of X-ray diffraction, the structure of crystalline material and their related X-ray intensity and width. The crystal structure is related in terms of the occupancy of atomic sites and lattice parameter. The reciprocal lattice provides the key to our understanding of diffraction and its interpretation of X-ray diffraction pattern through the work of Laue, Braggs and Eward. Then the X-ray diffraction of materials and the determination of their structure will be discussed. Then the application of X-ray analysis on the properties of polymer and other materials will be discussed.				
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)			課程目標之教學方法與評量方法 (teaching and assessment methods for course objectives)		
課程目標(中/Eng.)	核心能力	配比(%)	教學方法	評量方法	
1. 了解 X-ray 之基本原理與材料之晶體結構 2. 了解 X-ray 對材料晶體結構之繞射現象 3. 了解晶體結構對 X-ray 繞射強度之影響 4. 了解晶體結構對 X-ray 繞射寬度之影響 5. 了解 X-ray 對材料晶體結構之分析 6. 了解 X-ray 對材料特性之分析 7. 結構決定 8. X-ray 對高分子材料	<input checked="" type="checkbox"/> 1.特定材料之專業知識	54	講授	測驗	
	<input checked="" type="checkbox"/> 2.策劃及執行專題研究之能力	24			
	<input type="checkbox"/> 3.撰寫專業論文之能力				
	<input checked="" type="checkbox"/> 4.創新思考、解決問題與終身學習之能力	17			
	<input type="checkbox"/> 5.跨領域協調整合之能力				
	<input checked="" type="checkbox"/> 6.國際觀及綠色材料知識	2			
	<input type="checkbox"/> 7.領導、管理及規劃之能力				
	<input checked="" type="checkbox"/> 8.學術專業倫理	3			

分析				
9. X-ray 之應用				
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)				
01 Introduction 02 Properties of X-rays 03 Geometry of crystals (I) 04 Geometry of crystals (II) 05 Diffraction I: Geometry 06 Diffraction II: Intensity (I) 07 Diffraction II: Intensity (II) 08 Diffraction III: Real samples (I) 09 Phase identification by XRD 10 Mid-term Exam. 11 Determination of crystal structure (I) 12 Determination of crystal structure (II) 13 Diffraction of polymer 14 Small angle X-ray scattering (I) 15 Small angle X-ray scattering (II) 16 Application of XRD (I) 17 Application of XRD (II) 18 Final Exam.				
學習評量方式 (evaluation)				
(1) Mid-term Exam.: 50% (2) Final Exam.: 50% 以小考與作業來判斷學生對於課堂講授資料之理解、期中考與期末考來評量學生對於課堂講授資料之理解與思考判斷力				
教科書&參考書目 (書名、作者、書局、代理商、說明) (textbook& other references)				
Textbook: Elements of X-ray Diffraction, 3rd Ed., B. D. Cullity and S. R. Stock, Prentice Hall (2001) L. E. Alexander, "X-ray diffraction methods in polymer science" 課程有關 X-ray 基本原理、材料晶體結構與排列、X-ray 經材料晶體結構與排列產生繞射位置、強度與寬度之變化主要取自本教科書,詳細之結構決定方法可參考下列參考書目 M. F. C. Ladd and R. A. Palmer, "Structure determination by x-ray crystallography" G. H. Stout and L. H. Jensen, "X-ray structure determination" B. K. Vainshtein, "Modern Crystallography" L. E. Alexander, "X-ray diffraction methods in polymer science"				
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://audi.nchu.edu.tw/~tmwu				
課程輔導時間(office hours)				