

課程名稱 (course name)	(中) 高等薄膜製程 (D019)				
	(Eng.) Advanced thin film process				
開課系所班級 (dept. & year)	材料系博士班	學分 (credits)	3	授課教師 (teacher)	林克偉
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) 薄膜是實踐電子元件輕薄短小、低損耗能量之關鍵技術，也使得固態電子產品能精確控制其品質。本課程除了介紹各種物理氣象沉積法(PVD)、化學氣象沉積法(CVD)及真空原件之原理應用外，也將介紹利用熱力學與動力學觀點來探討薄膜的成長機制。				
	(Eng.) Thin film technology is largely utilized in that it is a part of other technologies that are central to analysis, research, development, and manufacturing. This course will focus on kinds of methods for PVD、CVD technology、principle and applications of vacuum equipment, and discusses the mechanism of thin film nucleation using thermodynamic and kinetic theory.				
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	
<p>學生可藉由此課程了解薄膜製程之基本原理與其重要性，未來學生投入職場時也可學以致用，與產業界結合。</p> <p>Student can make use of this course to understand the basic principle of thin film process and its importance. Student can put into practice what has been learned when they get a job in the future.</p>	<input checked="" type="checkbox"/> 1. 特定材料之專業知識	50	講授 實作	測驗 口頭報告 書面報告 實作	
	<input type="checkbox"/> 2. 策劃及執行專題研究之能力				
	<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	50			
	<input type="checkbox"/> 5. 跨領域協調整合之能力				
	<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)					
01 Kinetic theory of gas 02 Vacuum system 03 Thin-film evaporation process 04 Film thickness uniformity and purity - Operation#1 05 Physics of sputtering					

06 Plasma and ion beam processing of thin-film - Operation#2 07 Midterm exam 08 DC,AC, and reactive sputtering processes - Operation#3 09 Plasma etching 10 Midterm exam - Operation#4 11 CVD introduction 12 Thermodynamics of CVD - Operation#5 13 An atomic view of substrate surfaces 14 Thermodynamic aspects of nucleation - Operation#6 15 Kinetic process in nucleation and growth 16 Experimental studies of nucleation and growth 17 Final presentation 18 Final presentation	
學習評量方式 (evaluation)	
(1) Midterm exam: 30% (2) Final presentation: 40% (3) Operation exam: 30%	
教科書&參考書目 (書名、作者、書局、代理商、說明) (textbook& other references)	
教科書 Materials Science of Thin Films, 2nd , Milton Ohring, Academic Press, (2002). 歐亞書局有限公司 (02-8912-1188)	
參考書目 Vacuum technology, 3rd ed., A. Roth, Elsevier Science Publishers B. V., (1990). Physics Library.	
課程教材 (教師個人網址請列在本校內之網址。) (teaching aids & teacher's website)	
Power point files.	
課程輔導時間(office hours)	星期二上午 10:00~12:00