教學大綱(Syllabus)-研究所

updated: 2008/09/01

課程編碼 (course no.)	D006			**學分 (credits)**	3
課程名稱 (course name)	(中) 材料缺陷				
	(英) Defects in Materials				
開課系所班級 (dept. & year)	材料系碩/博班 (Dept. Materials Engineering, Master-PhD Program)			**授課教師 (teacher)**	呂福興教授 (Prof. Fu-Hsing Lu)
課程類別 (course type)	選修 (Elective)	**授課語言 (language)**	中文 (Chinese)	**開課學期 (semester)**	上 (fall)
課程簡述 (course description)	(中) 介紹材料中缺陷的本質以及缺陷對材料可能之影響。本課程將從點缺陷之探討出發，包括其成因、控制、與影響等。進而而以其他缺陷的探討為輔，並藉由報告撰寫，期使學生對材料缺陷有進一步之認識與理解。				
	(Eng.) To introduce mainly the characteristics of defects in materials and influences of defects on materials. This class will start from discussions of point defects including formation mechanism, process control, influences, etc. Other defects will also be discussed. Writing a research report is also emphasized to broaden students' horizons.				
課程目標 (course objectives)	(中) 1. 瞭解缺陷理論(本課程基礎裡論) 2. 瞭解各種缺陷的本質與成因 3. 瞭解缺陷對材料之影響與應用 4. 訓練學生撰寫報告及上台報告能力				
	(Eng.) 1. To understand basic defect theories 2. To understand characteristics and formation mechanisms of defects 3. To understand influences of defects on materials applications 4. To train students capabilities of writing and presenting reports				

先修課程(prerequisites)

課程編碼 (course no.)	課程名稱 (course name)	與課程銜接的重要概念、原理與技能 (relation to the current course)

教學模式 (teaching methodology)	模式 (methodology)	講授 (teaching)	討論/報告 (discussion & report)	實驗/參訪 (exp./fab visit)	遠距/網路教學 (remote/web teaching)	合計 (sum)
	學分分配 (credit distrib.)	3				3
	授課時數分配 (hour distrib.)	3				3

授課進度與內容（週次、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)	備註 (remark)
01	Syllabus (Class begins)		
02	Introduction		
03	Point defects in metallic systems: theory-vacancies and interstitials		
04	Point defects in metallic systems: theory: defects complexes		
05	Point defects in metallic systems experimental	Report-title due	
06	Point defects: thermal disorder in nonmetallic systems		
07	Point defects: thermal disorder in nonmetallic systems		
08	Point defects: component activity dependent disorder in nonmetallic systems (nonstoichiometric compounds)	Report-table of contents due	
09	Prelim		
10	Point defects: component activity dependent disorder in nonmetallic systems (nonstoichiometric compounds)		
11	Point defects in nonstoichiometric compounds: experimental		
12	Point defects: component activity dependent disorder in nonmetallic systems		
13	Point defects: component activity dependent disorder in nonmetallic systems: dopant effects		
14	Si crystal growth and oxidation: processes and defects	Report due	
15	Dislocations/oxidation-induced stacking faults		
16	Holiday (No class)		
17	Oral report	Oral report	Student oral report

18	Final remark		

學習評量方式
(evaluation)

1. 期中考 (Prelim) (30%)
2. 期末報告(Final report)* (40%)
   含口頭報告（including oral report）
3. 期末考 (Final exam) (30%)

教科書（書名、作者、書局、代理商、說明）
(textbook)

無教科書用自編講義
(Lecture notes)

參考書目（書名、作者、書局、代理商、說明
(other references)

1. W. Hayes and A.M. Stoneham, *Defects and Defect Processes in Nonmetallic Solids*, Wiley, New York (1985).
2. K.V. Ravi, *Imperfections and Impurities in Semiconductor Silicon*, John Wiley & Sons, Inc., New York, (1981).
3. R. Dieckmann, Cornell University, *Solid State Reactions- Class Notes*.

課程教材（教師個人網址請列在本校內之網址。）
(teaching aids & teacher's website)

1. Class notes
2. web.nchu.edu.tw/~fhlu

與學系教育目標之關聯性(材料系)
(relation to educational objective of materials engineering department)

1. 提供材料性質、製程與應用及跨領域知識與訓練
   To provide interdisciplinary know-how and training on materials properties, processing, and applications
2. 培育具獨立思考、創新與實作能力之材料科技人才
   To train materials technology students for independent thinking, innovation, and practical skills
3. 培養團隊合作精神與溝通協調整合能力
   To cultivate the spirit of teamwork and the capacity of integrated cooperation
4. 建立多元價值與國際觀
   To inculcate multifarious values and cosmopolitan worldview
5. 強化綠色材料科技教育
   To implement educational programs in eco-materials technology

與學系教育核心能力之關聯性(材料系)
(relation to educational core abilities for materials engineering department)

(A) 特定材料之專業知識
Specialized knowledge in Materials science and Engineering
(B) 策劃及執行專題研究之能力
Ability to plan and execute a research project
(C) 撰寫專業論文之能力
Ability to write journal articles
(D) 創新思考及獨立解決問題之能力
Ability to do innovative thinking and independent problem solving
(E) 跨領域協調整合之能力
Ability to work in an interdisciplinary setting
(F) 國際觀及綠色材料意識
A fine international scope and general concept of eco-material
(G) 領導、管理及規劃之能力
Ability in leadership, management, and organization
(H) 終身自我學習成長之能力
Ability for life-long learning
(I) 學術專業倫理
Professional ethics in Science and Engineering

課程內涵達成學系【教育目標】比對資料

授課進度與內容	教育目標				
	目標一	目標二	目標三	目標四	目標五
	提供材料性質、製程與應用及跨領域知識與訓練	培育具獨立思考、創新與實作能力之材料科技人才	培養團隊合作精神與溝通協調整合能力	建立多元價值與國際觀	強調綠色材料科技教育
請勾選關聯性☑	☑	☑	☑	☐	☑
Introduction	1	1			1
Point defects in metallic systems: theory-vacancies and interstitials	1	1			
Point defects in metallic systems: theory: defects complexes	1	1			
Point defects in metallic systems experimental	1	1			
Point defects: thermal disorder in nonmetallic systems	1	1			
Point defects: component activity dependent disorder in nonmetallic systems (nonstoichiometric compounds)	1	1			
Point defects in nonstoichiometric compounds: experimental	1	1			
Point defects: component activity dependent disorder in nonmetallic systems: dopant effects	1	1			
Si crystal growth and oxidation: processes and defects	1				
Dislocations/oxidation-induced stacking faults	1				
Written/Oral report	1		1		
總計(%)	100	73	9		9

註：
1. 所有必修課均須填寫此表。
2. 矩陣中請填入關聯性； 1 表示相關，0 表示無相關。
3. 學系教育目標項次請依據表1填寫。

課程內涵達成學系【核心能力】比對資料(研究所)

授課進度與內容	核心能力								
	A	B	C	D	E	F	G	H	I
	特定材料之專業知識	策劃及執行專題研究之能力	撰寫專業論文之能力	創新思考及獨立解決問題之能力	跨領域協調整合之能力	國際觀及綠色材料意識	領導、管理及規劃之能力	終身自我學習成長之能力	學術專業倫理
請勾選關聯性☑	☑	☑	□	☑	☑	☑	☑	☑	☑
Introduction	1	1		1		1	1	1	1
Point defects in metallic systems: theory-vacancies and interstitials	1			1					
Point defects in metallic systems: theory: defects complexes	1			1					
Point defects in metallic systems experimental	1			1					
Point defects: thermal disorder in nonmetallic systems	1			1					
Point defects: component activity dependent disorder in nonmetallic systems (nonstoichiometric compounds)	1			1					
Point defects in nonstoichiometric compounds: experimental	1			1					
Point defects: component activity dependent disorder in nonmetallic systems: dopant effects	1			1					
Si crystal growth and oxidation: processes and defects	1								
Dislocations/oxidation-induced stacking faults	1								
Written/Oral report	1	1			1	1	1	1	1
總計(%)	100	18		73	9	18	18	18	18

註：
1. 所有必修課均須填寫此表。
2. 矩陣中請填入關聯性； 1 表示相關，0 表示無相關。
3. 學系教育目標項次請依據表1填寫。