



國立中興大學教學大綱(Syllabus)-研究所

系務會議通過修訂日期：2010/1/13
updated: (year)/(month)/(day)

課程名稱 (course name)	(中) M013 表面科學				
	(Eng.) M013 Surface Science				
開課系所班級 (dept. & year)	材料科學與工程學 系碩士班一年級 (Dept. of Mat. Sci. & Engr., Master)	學分 (credits)	3	授課教師 (teacher)	許薰丰 助理教授 (Assistant Prof. Hsun-Feng Hsu)
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 (Chinese)	開課學期 (semester)	下學期 (Spring)
課程目標 (course objectives)	(中) 1. 了解真空技術 2. 了解表面結構及其相關的分析技術 3. 了解掃描探針式顯微鏡之應用 4. 了解表面電子結構及相關的分析技術 5. 了解表面化學分析技術				
	(Eng.) 1. To understand the vacuum technology. 2. To understand surface structure and related surface analysis techniques 3. To understand the application of SPM. 4. To understand electronic structure at surfaces and related surface analysis techniques. To understand the Surface chemical analysis.				
課程簡述 (course description)	(中) 材料表面的性質不同於塊材，尤其在材料尺寸縮小至奈米的範圍，表面特性更為重要，本課程將介紹表面結構和表面的電子特性及其相關的分析工具。				
	(Eng.) The surface of a solid is inherently different than the bulk. The properties at the surface are different than that in the bulk. Especially, when the size of the materials shrinks to the nano scale, the surface properties are more and more important. The aim of this course is to introduce the surface structure and the surface electronic property and the related analysis tools.				
先修課程(prerequisites)					
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)	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)
【請勾選】	<input checked="" type="radio"/>			



授課內容 (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	Introduction		
02	Vacuum technology		
03	Vacuum technology		
04	Surface structure and related surface analysis techniques (LEED, RHEED, SPM)		
05	Surface structure and related surface analysis techniques (LEED, RHEED, SPM)		
06	Surface structure and related surface analysis techniques (LEED, RHEED, SPM)		
07	Application of SPM		
08	Application of SPM		
09	Nanostructures on the surface		
10	Midterm examination	期中報告	
11	Nanostructures on the surface		
12	Electronic structure at surfaces and related surface analysis techniques (UPS, STS)		
13	Surface chemical analysis (AES, XPS, SIMS)		
14	Surface chemical analysis (AES, XPS, SIMS)		
15	Surface chemical analysis (AES, XPS, SIMS)		
16	Surface chemical analysis (AES, XPS, SIMS)		
17	Surface chemical analysis (AES, XPS, SIMS)		
18	Final examination	期末考	
學習評量方式 (evaluation)			
(1) 期中考 40%			
(2) 期末考 45%			



平時成績 10%

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

J. C., Vickerman, Surface analysis – the principal techniques, John Wiley & Sons, England (1997).

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)



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【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 <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Introduction	1	1	1	0	1	0	0	1	0
Vacuum technology	1	1	1	1	0	0	0	0	0
Surface structure and related surface analysis techniques (LEED, RHEED, SPM)	1	1	1	1	0	0	0	0	0
Application of SPM	1	1	1	1	0	0	0	0	0
Nanostructures on the surface	1	1	1	1	0	0	0	0	0
Electronic structure at surfaces and related surface analysis techniques (UPS, STS)	1	1	1	1	0	0	0	0	0
Surface chemical analysis (AES, XPS, SIMS)	1	1	1	1	0	0	0	0	0
總計(%)	24%	24%	24%	20%	4%	0%	0%	4%	0%

- 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。