

教學大綱(Syllabus)-研究所

系務會議通過修訂日期：2007/9/12
updated: 2009/12/23

課程編碼 (course no.)	M063			學分 (credits)	3	
課程名稱 (course name)	(中) 光學薄膜 (Eng.) Optical Thin Films					
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)			授課教師 (teacher)	李正中教授/ 林佳鋒副教授 (Prof. Cheng-Chung Lee/ Associate Prof. Chia-Feng Lin)	
課程類別 (course type)	選修 (Elective)	授課語言 (language)	中文 (Chinese)	開課學期 (semester)	下學期 (Spring)	
課程簡述 (course description)	<p>(中) 針對光學薄膜應用於抗反射膜、高反射雷射用反射鏡與 edge filter，授課講解此三種光學薄膜鏡片之結構與設計原理，進行材料選擇與結構模擬，實作部份將學習電子槍蒸鍍技術與膜厚監控系統，將所製作之光學鏡片進行穿透反射率量測與橢圓儀分析，將設計結構與實際鍍膜結果分析討論並撰寫實驗報告，由教師講解分析方法與實驗結果統整，使學生藉由課程學習到光學薄膜設計、製作、分析與檢測技術。</p> <p>(Eng.) Focus the optical thin film on the antireflection coating, high reflection laser mirror, and edge filter application. Teaching the structures, design rules, and optical principles of these three optical thin films. After designed and selected materials, the optical thin films are deposited through the E-gun evaporator with the thickness monitor system. These three optical thin films are analyzed through the transmittance and reflection measurement and an ellipsometer. The comparison of the designed structure and final coated optical thin films can be analyzed and discussed in the course.</p>					
課程目標 (course objectives)	<p>(中)</p> <ol style="list-style-type: none"> 1. 各種光學薄膜濾光片設計 2. 光學薄膜製鍍 3. 光學薄膜光電特性檢測 <p>(Eng.)</p> <ol style="list-style-type: none"> 1. Design of optical thin film filters. 2. Coating of optical thin film filters. 3. Testing of optical thin film filters. 					
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)				
M025	薄膜科學	需先修薄膜科學理論課一學期且經授課教師同意				
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.)	0.25	0.25	2	0.5	3
	授課時數分配 (hour distrib.)	0.25	0.25	2	0.5	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	Overall Introduction		
02	Design of antireflection coating		
03	Design of antireflection coating		
04	Coating of antireflection coating		
05	Coating and testing of antireflection coating		
06	1 st presentation and test	1 st test	
07	Design of high reflection and laser mirror		
08	Coating and testing of high reflection and laser mirror		
09	Coating and testing of high reflection and laser mirror		
10	Coating and testing of high reflection and laser mirror		
11	2 nd presentation and test	2 nd test	
12	Design of edge filter		
13	Design of edge filter		
14	Coating and testing of edge filter		
15	Coating and testing of edge filter		
16	Coating and testing of edge filter		
17	3 rd presentation and test	3 rd test	
18	Final presentation & Term paper	Final presentation & Term paper	
學習評量方式 (evaluation)			
(1) 1 st presentation and test : 20% 2 nd presentation and test : 20% 3 rd presentation and test :20% (2) Final presentation & Term paper: 40% 期中考 (Midterm) : 目的在評估學生對課堂講授資料的了解程度。 期末報告及簡易書面報告 (Final presentation & term paper) : 每位同學從設計及實驗中，於學期末提出報告。目的是要培養學生設計能力、鍍膜技術、檢測技術、以及整理資料與分析資料的能力，並訓練學生表達與溝通的能力。			
教科書 (書名、作者、書局、代理商、說明) (textbook)			



李正中, “薄膜光學與鍍膜技術”, 藝軒出版社, 台北, (第六版, 2009 年 7 月, ISBN 978-957-616-951-9)

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

1. “Thin-Film Optical Filters”, 3rd ed. by H. A. Macleod (IoP)
2. “Handbook of Thin Film Technology” by E. I. Maissel and R. Glang (McGraw-Hill,1970.

**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.ncu.edu.tw/~tftc>



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 提供材料性質、製程與應用及跨領域知識與訓練	目標二 培育具獨立思考、創新與實作能力之材料科技人才	目標三 培養團隊合作精神與溝通協調整合能力	目標四 建立多元價值與國際觀	目標五 強調綠色材料科技教育
請勾選關聯性 <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Overall Introduction	1	0	0	0	1
Design of antireflection coating	1	0	0	0	0
Design of antireflection coating	1	0	0	0	1
Coating of antireflection coating	1	1	0	0	1
Coating and testing of antireflection coating	1	1	1	0	1
Coating and testing of antireflection coating	1	1	1	0	1
Design of high reflection and laser mirror	1	0	0	0	0
Coating and testing of high reflection and laser mirror	1	1	1	0	1
Coating and testing of high reflection and laser mirror	1	1	1	0	1
Midterm presentation and test	0	0	0	0	0
Design of edge filter	1	0	0	0	0
Coating and testing of edge filter	1	1	1	0	1
Coating and testing of edge filter	1	1	1	0	1
Coating and testing of edge filter	1	1	1	0	1
Coating and testing of edge filter	1	1	1	0	1
Final presentation and test	0	0	0	0	0
Final presentation and test	0	0	0	0	0
Final presentation and test	0	0	0	0	0
總計(%)	78%	50%	44%	0%	61%

- 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。

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 特定材料之專業知識	B 策劃及執行專題研究之能力	C 撰寫專業論文之能力	D 創新思考及獨立解決問題之能力	E 跨領域協調整合之能力	F 國際觀及綠色材料意識	G 領導、管理及規劃之能力	H 終身自我學習成長之能力	I 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Overall Introduction	1	1	1	1	1	1	0	1	1
Design of antireflection coating	1	0	0	1	1	1	0	1	0
Design of antireflection coating	1	0	1	1	1	1	0	1	0
Coating of antireflection coating	1	0	0	1	1	1	0	0	1
Coating and testing of antireflection coating	1	0	1	1	1	1	0	1	1
Coating and testing of antireflection coating	1	1	1	1	1	1	0	1	1
Design of high reflection and laser mirror	1	1	1	0	1	1	0	1	0
Coating and testing of high reflection and laser mirror	1	1	0	0	1	1	0	1	0
Coating and testing of high reflection and laser mirror	1	1	1	0	1	1	0	1	1
Midterm presentation and test	0	0	0	0	0	0	0	0	0
Design of edge filter	1	0	1	1	1	1	0	1	0
Coating and testing of edge filter	1	0	1	1	1	1	0	1	0
Coating and testing of edge filter	1	0	1	1	1	1	0	1	0
Coating and testing of edge filter	1	0	1	1	1	1	0	1	0
Coating and testing of edge filter	1	1	1	1	1	1	0	1	1
Final presentation and test	1	1	1	1	1	1	0	1	1
Final presentation and test	1	1	1	1	1	1	0	1	1
Final presentation and test	1	1	1	1	1	1	0	1	1
總計(%)	94%	50%	78%	78%	94%	94%	0%	89%	50%

- 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。