



國立中興大學教學大綱(Syllabus)-大學部

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

課程名稱 (course name)	(中) U029 電子材料				
	(Eng.) U029 Electronic Materials				
開課系所班級 (dept. & year)	材料工程學系大學 部四年級 (Dept. of Mat. Engr., Senior)	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. 了解電子材料的發展過程 2. 了解半導體之能態與載子 3. 了解載子於半導體內之傳導 4. 了解半導體之製作技術 5. 了解半導體之接面電子特性 6. 了解雙載子電晶體之作用原理 7. 了解場效電晶體之作用原理				
	(Eng.)				
課程簡述 (course description)	(中) 近年來積體電路為所有電子產品的核心，積體電路工業又稱為微電子工業，本課程內容主要為微電子材料，包含半導體理論基礎及應用，學生將對於微電子材料將有一概括的認識。				
	(Eng.) Recently, integrated circuit (IC) is the heart of the electronic products. The IC industry is so-called the microelectronic industry, The aim of this course is to introduce the microelectronic materials including the fundamental and application of semiconductors. The study of this course gives students some conception of microelectronic materials.				
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	Energy bands and charge carriers in semiconductors		
03	Energy bands and charge carriers in semiconductors		
04	Energy bands and charge carriers in semiconductors	Homework -1	
05	Excess carriers in semiconductors		
06	Excess carriers in semiconductors		
07	Excess carriers in semiconductors	Homework -2	
08	Semiconductor technology		
09	Junctions		
10	Midterm examination	Midterm examination	
11	Junctions		
12	Junctions	Homework -3	
13	Bipolar junction transistors		
14	Bipolar junction transistors		
15	Bipolar junction transistors		
16	Field-effect transistors		
17	Field-effect transistors		
18	Final examination	Final examination	
學習評量方式 (evaluation)			
(1) 期中考 30%			
(2) 期末考 40%			
(3) 作業 25%			
(3) 平時成績 5%			
教科書&參考書目 (書名、作者、書局、代理商、說明) (textbook & other references)			
教科書 B. G. Streetman and S. Banerjee, Solid state electronic devices, 6th Ed., Prentice Hall, New Jersey (2006).			
參考書目 * S. M. Sze, Semiconductor device – physics and technology, 2nd Ed., John Wiley & Sons, (2002).			
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) 運用數學、科學及材料工程知識能力
Ability to apply knowledge of mathematics, science, and materials engineering
- (B) 設計與執行材料實驗及分析數據之能力
Ability to design and conduct experiments, as well as analyze data
- (C) 執行材料工程實務所需之技術與能力
Ability to use techniques and skills for materials engineering practices
- (D) 製程整合及及元件實作之能力
Ability to integrate process and make devices
- (E) 溝通協調之能力與團隊合作之精神
Ability to communicate effectively and cultivate the spirit of teamwork
- (F) 獨立思考及解決問題之能力
Ability to think independently and solve problems
- (G) 培養國際觀及認識綠色材料對全球環境的影響
Cultivation of cosmopolitan worldview and understanding effects of eco-materials on global environment
- (H) 終身學習之習慣與能力
Ability to cultivate life-long learning habit
- (I) 瞭解材料工程人員的社會責任與專業倫理
Understanding materials engineers' social responsibility and professional ethics

課程內涵達成學系【核心能力】比對資料(大學部)

授課進度與內容	核心能力								
	A	B	C	D	E	F	G	H	I
<small>運用數學、科學及材料工程知識能力</small> <small>設計與執行材料實驗及分析數據之能力</small> <small>執行材料工程實務之技術與能力</small> <small>製程整合及元件製作之能力</small> <small>溝通協調之能力與團隊合作之精神</small> <small>獨立思考及解決問題之能力</small> <small>培養國際觀及認識綠色材料對全球環境的影響</small> <small>終身學習之習慣與能力</small> <small>瞭解工程師的專業與社會責任倫理</small>									
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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Introduction	1	0	0	0	0	1	0	0	0
Energy bands and charge carriers in semiconductors	1	0	0	0	0	1	0	0	0
Energy bands and charge carriers in semiconductors	1	0	0	0	0	1	0	0	0
Energy bands and charge carriers in semiconductors	1	0	0	0	0	1	0	0	0
Excess carriers in semiconductors	1	0	0	0	0	1	0	0	0
Excess carriers in semiconductors	1	0	0	0	0	1	0	0	0
Excess carriers in semiconductors	1	0	0	0	0	1	0	0	0
Semiconductor technology	1	0	0	0	0	1	0	0	0
Junctions	1	0	0	0	0	1	0	0	0
Junctions	1	0	0	0	0	1	0	0	0
Junctions	1	0	0	0	0	1	0	0	0
Bipolar junction transistors	1	0	0	0	0	1	0	0	0
Bipolar junction transistors	1	0	0	0	0	1	0	0	0
Bipolar junction transistors	1	0	0	0	0	1	0	0	0
Field-effect transistors	1	0	0	0	0	1	0	0	0
Field-effect transistors	1	0	0	0	0	1	0	0	0
總計(%)	100%	0%	0%	0%	0%	100%	0%	0%	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。