

國立中興大學教學大綱

課程名稱 (course name)	(中) 奈米電子技術				
	(Eng.) Nano Electronics				
開課系所班級 (dept. & year)	物理系(奈米電子與光電能源)中科碩士在職專班	學分 (credits)	3	授課教師 (teacher)	郭華丞
課程類別 (course type)	<input type="checkbox"/> 必修 <input checked="" type="checkbox"/> 選修	授課語言 (language)	中	開課學期 (semester)	
課程目標 (course objectives)	(中) 講授奈米尺度下的電子傳輸現象以及電子元件原理。				
	(Eng.) Discuss the electron transport phenomena in nanometer scale and the principles of nanoelectronic devices.				
課程簡述 (course description)	(中) 講授奈米尺度下的電子傳輸現象以及電子元件原理。課程內容包括低維度系統，如量子阱，量子線，量子點等奈米電子元件。探討電子波長所造成的量子侷限現象及低維度傳導性質。在 dephasing 長度中所觀察到的量子干涉現象，如弱局域，A-B 效應，電導漲落等。穿隧元件中的共振穿隧現象和庫侖阻斷現象。				
	(Eng.) The lecture course is about the electron transport phenomena in nanometer scale and the principles of nanoelectronic devices. The content includes low-dimensional systems, such as quantum wells, quantum wires, and quantum dots, and nanodevices made therefrom; quantum localization and low-dimensional transport properties due to wave nature of electrons; quantum interference effects, such as weak localization, A-B effect, and universal conductance fluctuations; tunneling and coulomb blockade in tunneling devices.				
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)			
量子物理					
固態物理					
教學模式 (teaching methodology) 【請勾選】	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)	
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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)

1. Basics of Nanoelectronics
2. Quantum confined systems
3. Transmission in nanostructures
4. Interference in diffusive transport
5. Tunneling and single electronics
6. Quantum dots
7. Molecular electronics
8. Spin transport in nanodevices

學習評量方式

(evaluation)

教科書&參考書目 (書名、作者、書局、代理商、說明)

(textbook & other references)

Karl Goser, Peter Glosekotter, Jan Dienstuhl, *Nanoelectronics and nanosystems :from transistors to molecular and quantum devices*, Berlin Springer, 2004

D. K. Ferry and S. M. Goodnick, *Transport in nanostructures*, Cambridge university press, Cambridge, U.K., 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)

課程輔導時間

(office hours)