



教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	奈米科技概論AB		學年/學期 Academic Year/Semester	112/1	
課程名稱(英文) Course Name in English	Introduction to Nanotechnology				
科目代碼 Course Code	PHYS2100AB	系級 Department & Year	學三	開課單位 Course-offering Department	物理學系
修別 Type	學程 Program	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/馬遠榮				
先修課程 Prerequisite					
課程描述 Course Description					
介紹奈米科技與實際奈米相關技術與奈米材料，增進學生對奈米科技與技術的了解。					
課程目標 Course Objectives					
讓學生修習此一課程後，能對奈米科技對有深入了解，以利研究工作的進行。					
系專業能力 Basic Learning Outcomes				課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.'s Education Objectives	
A	具備物理之基礎背景知識Possessing fundamental knowledge in physical sciences.			●	
B	能運用基本物理知識與邏輯推理，分析解決物理問題Being able to analyze and solve physics problems based on basic knowledge in physics as well as logical reasoning.			●	
C	對目前測量器材有基礎認識，且具有操作物理實驗儀器的能力Being acquainted with modern equipment and being able to operate them for performing physics experiments.				
D	能使用基礎電腦程式語言解決物理問題Being able to use basic computer programming for solving physics problems.				
E	善用各種資訊平台進行論文資料蒐集的能力Being able to use various platforms for data collection benefiting a topical research.				
F	具備科技發展的國際視野以及外語溝通的能力Having an international view of the technology developments and being able to use a foreign language for communications				
G	能整合物理與其它領域知識Being able to integrate the knowledge of physics with that of other fields.			○	
圖示說明Illustration：● 高度相關 Highly correlated ○ 中度相關 Moderately correlated					
授課進度表 Teaching Schedule & Content					
週次Week	內容 Subject/Topics			備註Remarks	
1	Nanotechnology & Nanostructures and nanomaterials: What is nanometer? Definition of nanotechnology and nanomaterials 0D, 1D, 2D nanostructures and bulk				
2	See nanoworld: Electron microscopy, Scanning electron microscopy. Transmission electron microscopy, Selected area electron diffraction				
3	公差				

4	颱風停課	
5	Manipulate nanoworld: Scanning probe microscopy, scanning tunneling microscopy, Quantum mechanism, Atomic force microcopy, van der Waals force	
6	公差	
7	公差	
8	1st Report 口試書面報告	
9	Electronic structures of nanomaterials: Atomic physics and photoelectrons, X-ray photoelectron spectroscopy	
10	Structural and crystalline determinations: X-ray diffraction of molecules and solids, crystal structures and crystallinity	
11	Optical properties of nanomaterials: Raman scattering & photoluminescence spectroscopy	
12	2nd Report 口試書面報告	
13	Hot-filament (or hot-plate) metal and metal-oxide technique: Introduction & Operation	
14	Tube furnace deposition technique: Introduction & Operation	
15	Pulsed laser deposition (PLD) technique: Introduction & Operation	
16	Synthesis with Hot-filament (or hot-plate) metal and metal-oxide technique	
17	Synthesis with Tube furnace deposition technique	
18	3rd Report 口試書面報告	

教學策略 Teaching Strategies

- 課堂講授 Lecture
 分組討論 Group Discussion
 參觀實習 Field Trip
- 其他 Miscellaneous:

教學創新自評 Teaching Self-Evaluation

創新教學 (Innovative Teaching)

- 問題導向學習 (PBL)
 團體合作學習 (TBL)
 解決導向學習 (SBL)
- 翻轉教室 Flipped Classroom
 磨課師 Moocs

社會責任 (Social Responsibility)

- 在地實踐 Community Practice
 產學合作 Industry-Academia Cooperation

跨域合作 (Transdisciplinary Projects)

- 跨界教學 Transdisciplinary Teaching
 跨院系教學 Inter-collegiate Teaching

- 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

學期成績計算及多元評量方式 Grading & Assessments

配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績 General Performance	10%			✓					
期中考成績 Midterm Exam	60%	✓	✓						
期末考成績 Final Exam	30%	✓	✓						
作業成績 Homework and/or Assignments									
其他 Miscellaneous (_____)									

評量方式補充說明

Grading & Assessments Supplemental instructions

二次期中考與期末考90 %

教科書與參考書目 (書名、作者、書局、代理商、說明)

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

課程教材網址(含線上教學資訊, 教師個人網址請列位於本校內之網址)

Teaching Aids & Teacher's Website(Including online teaching information.
Personal website can be listed here.)

其他補充說明 (Supplemental instructions)