國立中興大學教學大綱(Syllabus)-研究所

課程委員會議通過修訂日期：
updated: (year)/(month)/(day)

課程名稱 (course name)	(中)　超分子化學與奈米工程　(系課程代碼)				
	(Eng.)　Supramolecular Chemistry and Nanotechnology				
開課系所班級 (dept. & year)	材料系研究所	**學分 (credits)**	1	**授課教師 (teacher)**	待聘
課程類別 (course type)	□必修(Mandatory) ☑選修(Elective)	**授課語言 (language)**	英文	**開課學期 (semester)**	1081
課程簡述 (course description)	(中) 奈米科技發展日新月異，本課程目的在介紹奈米科技中重要一環–超分子化學。課程內容包括超分子化學背景與基礎介紹、以及其於材料、生科與奈米課題之應用，並介紹超分子化學在分子機器方便最新進展。				
	1) Backgrounds of nanotechnology and necessity of new nanotechnology 2) Basics of supramolecular chemistry 1: host-guest chemistry & molecular recognition 3) Basics of supramolecular chemistry 2: topological supramolecular objects 4) Basics of supramolecular chemistry 3: molecular assemblies 5) Application of supramolecular chemistry to materials science 6) Application of supramolecular chemistry to bio-related science 7) Application of supramolecular chemistry to nanotechnology 8) Hot topics: molecular machines and nanocars				
先修課程名稱 (prerequisites)					

課程目標與核心能力關聯配比(%) (relevance of course objectives and core learning outcomes)			**課程目標之教學方法與評量方法 (teaching and assessment methods for course objectives)**	
課程目標(中/ Eng.)	**核心能力**	**配比(%)**	**教學方法**	**評量方法**
讓學生了解超分子化學基礎與奈米科技材料技術與發展	■1.特定材料之專業知識	40%	講授 (100%)	出席率、隨堂考、期末考試
	■2.撰寫專業論文之能力	10%		
	■3.創新思考、解決問題與終身學習之能力	30%		
	■4.跨領域協調整合之能力	10%		
	■5.國際觀及綠色材料知識	10%		

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) Backgrounds of nanotechnology and necessity of new nanotechnology
2) Basics of supramolecular chemistry 1: host-guest chemistry & molecular recognition
3) Basics of supramolecular chemistry 2: topological supramolecular objects
4) Basics of supramolecular chemistry 3: molecular assemblies
5) Application of supramolecular chemistry to materials science

6) Application of supramolecular chemistry to bio-related science
7) Application of supramolecular chemistry to nanotechnology
8) Hot topics: molecular machines and nanocars
9) Lectures for current research
10) Final exam report

學習評量方式
(evaluation)

上課出席 (30%)
隨堂考、期末考(70%)

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

Supramolecular Chemistry - Fundamentals and Applications
Advanced Textbook
Authors: Ariga, Katsuhiko, Kunitake, Toyoki
Springer, 2006
https://www.springer.com/us/book/9783540012986

課程教材（教師個人網址請列在本校內之網址。）
(teaching aids & teacher's website)

上課投影片

課程輔導時間(office hours)	

國立中興大學材料科學與工程學系
(Department of Materials Science and Engineering, NCHU)

授課內容及達成學系【核心能力】比對資料(研究所)

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)				【核心能力】請勾選關聯性☑ 矩陣中請填入關聯性； 1 表示相關，0 表示無相關。								
週次 (Week)	單元名稱與內容 (subject and content)	習作/考試進度 (homework and tests)	教學模式 (teaching methodology) 註【請填代號】	☑ A 運用數學、科學及材料工程知識能力	☑ B 設計與執行材料實驗及分析數據之能力	☑C 執行材料工程實務所需之技術與能力	☑D 製程整合及及元件實作之能力	□ E 溝通協調之能力與團隊合作之精神	☑ F 獨立思考及解決問題之能力	☑ G 培養國際觀及認識綠色材料對全球環境的影響	☑H 終身學習之習慣與能力	□I 瞭解材料工程人員的社會責任與專業倫理
01	Backgrounds of nanotechnology and necessity of new nanotechnology		1	0	0	0	0		1	0	1	
02	Basics of supramolecular chemistry 1: host-guest chemistry & molecular recognition		1	1	1	1	0		1	0	1	
03	Basics of supramolecular chemistry 2: topological supramolecular objects		1	1	1	1	0		1	1	1	
04	Basics of supramolecular chemistry 3: molecular assemblies		1	1	1	1	0		1	1	1	
05	Application of supramolecular chemistry to materials science		1	1	1	1	1		1	1	1	
06	Application of supramolecular chemistry to bio-related science		1	1	1	1	1		1	0	1	
07	Application of supramolecular chemistry to nanotechnology		1	1	1	1	1		1	0	1	
08	Hot topics: molecular machines and nanocars		1	1	1	1	1		1	0	1	
09	Final exam report											
10												
11												
12												
13												
14												
15												
16												
17												

18	工廠參觀		3									
總計 (%)		100%										

註：【教學模式代號】1. 講授(teaching)　2. 討論/報告(discussion & report)　3. 實驗/參訪(exp./fab visit)　4.遠距/網路教學(remote/web teaching)

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-大學部)
(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