教學大綱(Syllabus)-大學部

系務會議通過修訂日期：2007/9/12
updated: 2007/09/20

課程編碼 (course no.)	U024			**學分 (credits)**	3
課程名稱 (course name)	(中)　化學冶金				
	(Eng.)　Chemical Metallurgy				
開課系所班級 (dept. & year)	材料科學與工程學系大學部三年級 (Dept. of Mat. Sci. & Engr., Junior)			**授課教師 (teacher)**	鍾仁傑 (Assistant Prof. Ren-Jei Chung)
課程類別 (course type)	選修 (Elective)	**授課語言 (language)**	中文 (Chinese)	**開課學期 (semester)**	上學期 (Fall)
課程簡述 (course description)	(中)化學冶金探討材料(金屬及無機材料)製備或應用中之化學相關程序及其原理，包含金屬的萃取、精煉、液態金屬處理、防蝕及金屬表面處理，電化學，無機材料之化學合成，仿生合成，並介紹其它有關化學反應的合成方法。				
	(Eng.)Chemical metallurgy deals with those chemical procedures of inorganic materials preparation and application. It encompasses the extraction and refining of metals, liquid metal treatments, corrosion protection and surface treatment and metallurgical electrochemistry. Chemical syntheses of inorganic materials, bio-mimetic syntheses and other materials preparation methods will be introduced.				
課程目標 (course objectives)	(中)使學生瞭解冶金學中之化學現象，並對無機材料之化學合成有通盤的瞭解。				
	(Eng.)The students will know the chemical phenomena in metallurgical and will have overall view on chemical preparation of inorganic materials.				

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)

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.)	3				3

	授課時數分配 (hour distrib.)	2	1			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	Review on metallurgical thermodynamics and kinetics (I)		不定期隨堂考或作業
02	Review on metallurgical thermodynamics and kinetics (II)		不定期隨堂考或作業
03	Metal melting and liquid metal solution (I)		不定期隨堂考或作業
04	Metal melting and liquid metal solution (II)		不定期隨堂考或作業
05	Metallurgical electrochemistry (I)		不定期隨堂考或作業
06	Metallurgical electrochemistry (II)		不定期隨堂考或作業
07	Metal extraction		不定期隨堂考或作業
08	期中報告	期中報告	
09	Metal melting and recycling		不定期隨堂考或作業
10	Corrosion of metals		不定期隨堂考或作業
11	Solid state and co-precipitation syntheses of inorganic materials (I)		不定期隨堂考或作業
12	Solid state and co-precipitation syntheses of inorganic materials (II)		不定期隨堂考或作業
13	Sol-gel processing of inorganic materials (I)		不定期隨堂考或作業
14	Sol-gel processing of inorganic materials (II)		不定期隨堂考或作業
15	Preparation of nano-particles		不定期隨堂考或作業
16	Bio-mimetic materials synthesis (I)		不定期隨堂考或作業
17	Bio-mimetic materials synthesis (II)		不定期隨堂考或作業
18	期末報告	期末報告	

學習評量方式
(evaluation)

平時成績 20%，期中報告 40%，期末報告 40%

教科書（書名、作者、書局、代理商、說明）
(textbook)

Chemical Metallurgy、J.J. Moore、Butterworth&Co.

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

其它研究文獻
課程教材（教師個人網址請列在本校內之網址。） **(teaching aids & teacher's website)**
E-Campus

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【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☑	☑	☑	☑	☑	☑
Review on metallurgical thermodynamics and kinetics (I)	1	1	1	1	1
Review on metallurgical thermodynamics and kinetics (II)	1	1	0	0	1
Metal melting and liquid metal solution (I)	1	1	0	0	1
Metal melting and liquid metal solution (II)	1	1	0	0	1
Metallurgical electrochemistry (I)	1	1	0	0	1
Metallurgical electrochemistry (II)	1	1	0	0	1
Metal extraction	1	1	0	0	1
Metal melting and recycling	1	1	0	0	1
Corrosion of metals	1	1	0	1	1
Solid state and co-precipitation syntheses of inorganic materials (I)	1	1	0	0	1
Solid state and co-precipitation syntheses of inorganic materials (II)	1	1	1	1	1
Sol-gel processing of inorganic materials (I)	1	1	0	0	1
Sol-gel processing of inorganic materials (II)	1	1	0	0	1
Preparation of nano-particles	1	1	1	1	1
Bio-mimetic materials synthesis (I)	1	1	0	0	1
Bio-mimetic materials synthesis (II)	1	1	1	1	1
總計(%)	100%	100%	25%	31%	100%

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。
3. 學系教育目標項次請依據表1填寫。

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
	運用數學、科學及材料工程知識能力	設計與執行材料實驗及分析數據之能力	執行材料工程實務所需之技術與能力	製程整合及及元件實作之能力	溝通協調之能力與團隊合作之精神	獨立思考及解決問題之能力	培養國際觀及認識綠色材料對全球環境的影響	終身學習之習慣與能力	瞭解材料工程人員的社會責任與專業倫理
請勾選關聯性☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Review on metallurgical thermodynamics and kinetics (I)	1	1	1	1	0	1	1	0	1
Review on metallurgical thermodynamics and kinetics (II)	1	1	1	1	0	1	1	0	1
Metal melting and liquid metal solution (I)	1	0	1	1	0	1	1	0	0
Metal melting and liquid metal solution (II)	1	0	1	0	0	0	1	0	0
Metallurgical electrochemistry (I)	1	1	1	0	0	1	1	0	0
Metallurgical electrochemistry (II)	1	1	1	0	0	0	1	0	1
Metal extraction	1	1	1	1	0	0	1	0	1
Metal melting and recycling	1	1	1	1	1	1	1	1	1
Corrosion of metals	1	0	1	0	0	0	1	1	0
Solid state and co-precipitation syntheses of inorganic materials (I)	1	1	1	0	0	0	1	0	0
Solid state and co-precipitation syntheses of inorganic materials (II)	1	1	1	1	0	1	1	1	0
Sol-gel processing of inorganic materials (I)	1	1	1	0	0	0	1	0	0
Sol-gel processing of inorganic materials (II)	1	1	1	1	0	0	1	1	0
Preparation of nano-particles	1	1	1	1	0	1	1	1	1
Bio-mimetic materials synthesis (I)	1	1	1	0	0	1	1	0	1
Bio-mimetic materials synthesis (II)	1	1	1	1	1	0	1	1	1
總計(%)	100%	81%	100%	56%	13%	50%	100%	38%	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。
3. 學系教育目標項次請依據表1填寫。