國立東華大學

教學計劃表　Syllabus

課程名稱(中文) Course Name in Chinese	高等熱動力學			學年/學期 Academic Year/Semester	112/1
課程名稱(英文) Course Name in English	Advanced Thermodynamics and Kinetics				
科目代碼 Course Code	MS__D0030	系級 Department & Year	博士	開課單位 Course-Offering Department	材料科學與工程學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/紀渥德				
先修課程 Prerequisite					

課程描述　Course Description

The course will help to understand theoretical background of materials science as well as explain some phenomena based on thermodynamic description.

課程目標　Course Objectives

to help students understand thermodynamics background of materials science

	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	具備材料科學所需的進階物理、化學及數學的知識。Acquire required advanced physical, chemical, and mathematic knowledge for materials science and engineering.	●
B	具備材料科學的進階專業知識，並能應用於解決工程上之問題。Acquire required advanced professional knowledge for materials science and engineering, applicable in solving engineering problems.	●
C	具備獨立研究之能力。Equipped with capabilities of independent research.	○
D	具備專業道德及責任感，與良好的溝通及團隊合作的能力。Acquire professional morality and responsibility, and capability of quality communication and team cooperation.	○
E	具備適當的英文能力，應用於學習與交流。Acquire English capability used for learning and interaction.	○

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	Review of fundamentals. Thermodynamics of unary systems.	
2	Calculation of thermodynamic properties of unary system. Phase equilibria in unary system.	
3	Thermodynamics of binary solutions, part I.	
4	Thermodynamics of binary solutions, part II.	
5	Binary phase diagrams: temperature-composition, temperature-chemical potential.	

6	Phase diagrams topology.	
7	Solution phase models, part I	
8	Solution phase models, part II.	
9	期中考試週 Midterm Exam	
10	Chemical equilibria, part I.	
11	Chemical equilibria, part II.	
12	Chemical equilibria, part III.	
13	Phase diagrams for Ternary systems.	
14	Diffusion and self-diffusion.	
15	Diffusion in ternary systems.	
16	Application of computer software in material thermodynamics, part I.	
17	Application of computer software in material thermodynamics, part II	
18	期末考試週 Final Exam	

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: calculations

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 Industy-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	25%			✓		✓			
期中考成績 Midterm Exam	20%	✓							
期末考成績 Final Exam	30%	✓							
作業成績 Homework and/or Assignments	25%								homework
其他 Miscellaneous (_____)									

評量方式補充說明
Grading & Assessments Supplemental instructions

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.)

Y. Austin Chang, W. Alan Oates, Materials Thermodynamics, Willey 2010 (pdf available online)
David R. Gaskell, Introduction to the Thermodynamics of Materials, Taylor & Francis 2008

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)

Please, bring calculators to the classroom, we will resolve some problems during lectures.