



教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	相變態		學年/學期 Academic Year/Semester		114/2			
課程名稱(英文) Course Name in English	Phase Transformation							
科目代碼 Course Code	MS_51700	系級 Department & Year	碩士	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	/魏茂國							
先修課程 Prerequisite								

課程描述 Course Description

The purpose of this course is focused in fundamentals of phase transformation in solid materials including phase diagrams, diffusion, crystal interfaces and microstructure, solidification, and diffusional phase transformation.

課程目標 Course Objectives

讓學生在修習此一課程後，能對材料的相變態的理論、機制與原因有深入的了解，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	具備進階的英文能力，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	Chapter 0: Introduction	
2	Chapter 1: Thermodynamics and phase diagrams (1)	
3	Chapter 1: Thermodynamics and phase diagrams (2)	
4	Chapter 2: Diffusion (1)	
5	Chapter 2: Diffusion (2)	

6	Chapter 3: Crystal interfaces and microstructure (1)	
7	Holiday	
8	Chapter 3: Crystal interfaces and microstructure (2)	
9	期中考試週 Midterm Exam	
10	Chapter 3: Crystal interfaces and microstructure (3)	
11	Chapter 4: Solidification (1)	
12	Chapter 4: Solidification (2)	
13	Chapter5: Diffusional transformations (1)	
14	Chapter5: Diffusional transformations (1)	
15	Chapter5: Diffusional transformations (3)	
16	Chapter 6: Diffusionless transformations (1)	
17	期末考試週 Final Exam	
18		

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 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
平時成績(含出缺席) General Performance (Attendance Record)	10%							出席
期中考成績 Midterm Exam	35%	✓						
期末考成績 Final Exam	35%	✓						
作業成績 Homework and/or Assignments	20%		✓					
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.)

D. A. Porter, K. E. Easterling, and M. Y. Sherif, Phase Transformations in Metals and Alloys, 3rd ed., CRC Press, 2009. (高立圖書)

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.)

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其他補充說明 (Supplemental instructions)