



## 教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	材料結構與顯微分析		學年/學期 Academic Year/Semester	112/1	
課程名稱(英文) Course Name in English	Structure and Microstructure Analysis of Materials				
科目代碼 Course Code	MS_D0190	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	/陳怡嘉				
先修課程 Prerequisite					
課程描述 Course Description					
The purpose of this course is focused in two primary material characterization methods, Scanning Electron Microscope (SEM) and X-ray Diffraction. The content of this course includes lecture and lab work, and both theory and practical applications will be covered in this course.					
課程目標 Course Objectives					
After taking this course, students can have an in-depth understanding of X-ray diffraction and electron microscopy to facilitate research.					
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	X-ray radiation (9/14)				
2	Theoretical Background of Diffraction Diffraction Geometry Bragg's Law and Reciprocal Lattice (9/21)				

3	Theoretical Background of Diffraction Diffraction Geometry Ewald Sphere (9/28)中秋節	
4	Theoretical Background of Diffraction Diffraction Geometry Ewald Sphere (10/05)	
5	Theoretical Background of Diffraction Diffraction Intensity Structure Factor and Structure Extinction (10/12)	
6	X-ray Powder Diffractometry (10/19)	
7	Distortions of Diffraction Spectra (10/26)	
8	Wide Angle X-ray Diffraction and Scattering (11/02)	
9	期中考 Midterm Exam (11/09)	期中考試週 Midterm Exam
10	全校運動會 (11/16)	
11	Microscopy with light and electrons (11/23)	
12	Imaging (11/30)	
13	Electron detectors (12/07)	
14	Probe size, signal noise, and operational variables (12/14)	
15	EDS and WDS (12/21)	
16	Image optimization (12/28)	
17	期末考 Final Exam (2022/01/04)	期末考試週 Final Exam
18	Selected topics (01/11)	第18週教師彈性補充教學 (01/8-14)

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:

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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	30%	✓							
期末考成績 Final Exam	40%	✓							
作業成績 Homework and/or Assignments	20%	✓							
其他 Miscellaneous (_____)									

評量方式補充說明

Grading & Assessments Supplemental instructions

任課教授有依學生與課程高度相關之其他表現調整學期總分數約10 %之權線

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.)

XRD: B. D. Cullity, Elements of X-ray Diffraction (NDHU Lib. QC482.D5/C967/1978)

SEM: Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, Yang Leng, John Wiley & Sons (Asia) Pte Ltd 2008. (Online ISBN: 9780470823002)

Reference: R.E. Lee, Scanning Electron Microscopy and X-Ray Microanalysis. (NDHU Lib. QH212.S3/L479/1993)

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)