



## 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	114/1			
課程名稱(英文) Course Name in English	Structure and Microstructure Analysis of Materials							
科目代碼 Course Code	MS_51600	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	/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

讓學生在修習此一課程後，能對X光繞射學與電子顯微鏡學有深入的了解，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.	<input type="circle"/>
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.	<input checked="" type="circle"/>
C	具備獨立研究之能力。Equipped with capabilities of independent research.	<input checked="" type="circle"/>
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.	<input checked="" type="circle"/>
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.	<input type="circle"/>

圖示說明 Illustration : ● 高度相關 Highly correlated ○ 中度相關 Moderately correlated

## 授課進度表 Teaching Schedule &amp; Content

週次 Week	內容 Subject/Topics	備註 Remarks
1	(SEM) Microscopy with light and electrons (9/10)	
2	(SEM) Optical Arrangement (9/17)	
3	(SEM) Signal detection (9/24)	
4	(SEM) Probe size and current (10/01)	

5	(SEM) Quiz and discussion of Homeworks (10/08)	
6	(SEM) Contrast formation (10/15)	
7	(SEM) Operation variables (10/22)	
8	(SEM) Discussion of Quiz (11/29)	TACT2025 (10/26-29)
9	期中考 Midterm Exam (11/05)	期中考試週 Midterm Exam
10	(11/12)	全校運動會
11	X-ray radiation (11/19)	
12	X-ray absorption (11/26)	
13	Energy-Dispersive X-ray Spectroscopy (EDS) (12/03)	
14	X-ray Diffractometry - Samples and Data Acquisition (12/10)	
15	X-ray Diffractometry - Distortions of Diffraction Spectra (12/17)	
16	Wide Angle X-ray Diffraction and Scattering (12/24)	
17	期末考 Final Exam (2024/12/31)	期末考試週 Final Exam (2025/12/29- 2026/01/02)
18	WDS (01/07)	第18週教師彈性補充教學 (2026/01/05-09)

#### 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
平時成績(含出缺席) General Performance (Attendance Record)	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)