國立台灣科技大學 114學年 第2學期 課程大綱

Spring 2026 NTUST Course Outline

授課教師：Adhimoorthy

Instructor:Adhimoorthy Pra

課程名稱：材料光譜學及分析技術

Course Title：Spectroscopy and Analytical Techniques in Materials

2026/11/3

課程代號： TX5022701 Course Code 學分數： 3 Credits	必選修：選修/半學年 Required/Electve:Elective/Half Yr. 先修課程： Prerequisites

節次教室： M3(T4-404) M4(T4-404) M5(T4-404)
Time/Location

專業核心能力：
Core Professional Competencies

1.具備基礎科學與材料工程專業知識之整合、創新能力。
2.具備收集文獻、建構研究規劃、設計實驗流程與整合分析之能力。
3.具備執行專題研究、應用研究成果，以及口頭發表與報告撰寫之能力。
4.具備創新思考，並可獨立解決複雜性問題之能力。
5.具備良好團隊分工合作之能力。
6.具備語文能力及良好之國際觀，尊重多元價值觀點。
7.具備管理、規劃與領導之能力。
8.體認及實踐工程倫理與社會永續發展之觀念，具備終身自我學習與成長之能力。

課程網址：
Course Website

課程宗旨：
Course Objectives

Overview: This course will provide an insight of various spectroscopic and analytical techniques for the characterization of materials to the students. An introduction to each spectroscopic technique will be covered with explanations of how data was recorded and interpreted with appropriate examples, and case studies will be included to illustrate the technique.

The main purpose of this course, "Spectroscopic methods and analytical technique for material analysis is to literate and educate materials researchers to understand the deep knowledge for the evaluation of the elemental, chemical/molecular composition, structural identifications including their surface of interphase boundaries and nanostructures, methods. This course will provide wider knowledge of the mentioned disciplines towards practice-oriented analysis through teaching the basics of modern spectroscopic methods of analysis of materials such as inorganic materials, polymers, biomaterials, and metals.

Overall, at the end of this course students will be familiarized with the complete understanding of common spectroscopic methods and their applicability for the materials analysis.

課程大綱：
Outline of Lectures

該課程包含以下主題：
1. 導論
2. 基本鑑定技術
3. 光學檢測和顯微鏡
4. 分子光譜
5. 原子光譜
6. X線光譜技術
7. 質譜法
8. 層析法和電泳法
9. 核磁共振分析

本課程特色
1. 清楚與系統性介紹用於材料的各種光譜分析技術
2. 對於特定材料，包括無機、高分子、生物和金屬材料等，教授其適當的分析與評估方法。 1. Introduction
2. Basic identification techniques.
3. Light examination and microscopy.
4. Molecular spectroscopy.
5. Atomic spectroscopy.
6. X-ray spectroscopy.
7. Mass spectrometry.
8. Chromatography and electrophoresis.
9. Nuclear magnetic resonance analysis

Features in this course
1. Effortless and clear introduction to various spectroscopic and analytical techniques were used to characterize the materials.
2. Straightforward evaluation for appropriate techniques to be used for studying specific type of materials including inorganic materials, polymers, biomaterials and metals.

授課方式： Method of Instruction	講授 Lecture：60% 分組討論 Group discussion：15% 案例研討 Case study：15% 操做練習 Practical exercises：10% 講授 Lecture：%
教科書： Textbooks	
參考書目： References	
修課須知： Notice	
評量方式： Grading	• Assessment I&II (Exam): 60 marks • Assignments: 20 marks • Attendance & Participation: 20 marks
備註說明： Notes	