



課 綱 Course Outline
自然資源與環境學系碩士班一般組

中文課程名稱 Course Name in Chinese	拉曼光譜分析技術				
英文課程名稱 Course Name in English	Analytical Methods of Raman Spectroscopy				
科目代碼 Course Code	ES_50600	班 別 Degree	碩士班 Master' s		
修別 Type	選修 Elective	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite					
課程目標 Course Objectives					
顯微拉曼光譜儀是一種正在快速發展的分析研究工具，非常值得應用在各學科的研究題材上。本課程希望透過課程的講授及實際的儀器操作，使學生瞭解拉曼光譜的原理及實務的應用					
系教育目標 Dept.' s Education Objectives					
1	培養兼具國際視野與本土關懷的學生 To develop students who care about local issues and have an international perspective				
2	培養具備自然科學與社會科學知識的人才 To educate students to have knowledge of both the natural and social sciences				
3	培養具備環境倫理與人文素養的環境公民 To teach students to be environmental citizens (i.e., knowledgeable about environmental ethics and human issues)				
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	能覺知多元的自然科學與社會科學理論並具備研究能力 To have knowledge of natural and social science theories				
B	具備自然資源與人類社會議題之調查分析、規劃與經營之能力 To be able to investigate, analyze, plan, and manage both natural resource and human social issues				○

C	具備將環境倫理與生態思想落實於永續性生活型態的能力 To implement sustainable lifestyles based on environmental ethics and ecological principle	
D	能以整全式的觀點來解析環境問題，並具備發展系統性解決方案的能力 To resolve environmental issues and develop systematic solutions with a global perspective	
E	具備系統分析、未來思考、溝通協調與團隊合作的能力 The ability to analyze, plan, communicate, and coordinate with others (teamwork)	●
F	具備終身學習、國際視野與外語溝通的能力 To instill the values of lifelong learning, an international perspective, and the ability to communicate in a foreign language	●

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

課程大綱
Course Outline

1. 拉曼光譜基本原理介紹
2. 拉曼光譜的應用簡介
3. 拉曼光譜案例分析
4. 拉曼光譜儀實務操作
5. 分析結果報告

資源需求評估 (師資專長之聘任、儀器設備的配合...等)
Resources Required (e.g. qualifications and expertise, instrument and equipment, etc.)

本系自有的顯微拉曼光譜儀(型號：HORIBA JOBIN YVON HR-800)

課程要求和教學方式之建議
Course Requirements and Suggested Teaching Methods

- 課堂講授 Lecture
- 實驗操作

其他
Miscellaneous

教科書與參考書目：

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

1. Ewen Smith and Geoffrey Dent. (2005) Modern Raman Spectroscopy. John Wiley & Sons, Ltd.
2. Howell G.M. Edwards and John M. Chalmers (2005) Raman Spectroscopy in Archaeology and Art History. The Royal Society of Chemistry, Cambridge UK.
3. Colombari, Ph. (2008) On-site Raman identification and dating of ancient glasses: A review of procedures and tools: Journal of Cultural Heritage, 9, Supplement 1, e55-e60.