



## 課 綱 Course Outline

自然資源與環境學系碩士班

中文課程名稱 Course Name in Chinese	地球化學專題				
英文課程名稱 Course Name in English	Special Topics on Geochemistry				
科目代碼 Course Code	NRES54080	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					
<p>一、認識地球化學與地球科學、環境的關聯性。</p> <p>二、增加相關的化學知識。</p> <p>三、利用相關的數據和分析方法。</p> <p>四、持續關注地球化學的未來發展。</p> <p>五、具備執行專題研究的基本能力。</p>					
系教育目標 Dept.' s Education Objectives					
1	<p>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</p>				
2	<p>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</p>				
3	<p>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)</p>				
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	<p>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</p>			●	
B	<p>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</p>			●	

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 principles	○
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

一、地質過程: 能量、平衡、動力學、水溶液

Geological processes: energy, equilibrium, kinetics, aqueous solutions

二、元素性質: 電子波、週期表、化學鍵、矽酸鹽晶體、重要地質元素

The properties of elements: electronic waves, the periodic table, chemical bonding, silicate crystals, geologically important elements

三、地球化學數據: 分析方法、數據分析、微量元素數據

Geochemical data: analytical methods, data analysis, trace element data

四、同位素: 地球年代學、放射性同位素、穩定同位素

Isotope: geochronology, radiogenic isotopes, stable isotopes

五、特定主題

Selected topics

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.)

需投影機。

### 課程要求和教學方式之建議

### Course Requirements and Suggested Teaching Methods

課程講授與討論、文獻閱讀與報告(含口頭及書面)等。

### 其他

### Miscellaneous

平時成績 (出席、課堂活動、課堂討論等) 25%、作業與報告 25%、測驗 50%。

一、指定書目:

1. Robin Gill. (地質化學基礎知識) Chemical fundamentals of geochemistry, 2nd ed., 1996, Chapman & Hall. ISBN: 0412549301.

二、參考書目:

1. Hugh Rollinson. (地球化學數據應用) Using geochemical data: evaluation, presentation, interpretation, 1993, Longman Scientific & Technical. ISBN: 0582067014.

2. Albarede, Francis. (地球化學: 入門篇) Geochemistry: An introduction, 2nd ed., 2009, Cambridge University Press. ISBN: 9780521880794.

3. John V. Walther. (地球化學要點) Essentials of Geochemistry, 2nd ed., 2009, Jones & Bartlett Publishers. ISBN: 9780763759223.