



教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	光性岩象分析		學年/學期 Academic Year/Semester	113/1	
課程名稱(英文) Course Name in English	Optical Petrography				
科目代碼 Course Code	NRES51400	系級 Department & Year	碩士	開課單位 Course-Offering Department	自然資源與環境學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/蔡金河				
先修課程 Prerequisite					
課程描述 Course Description					
<p>This course will introduce the optical polarizing microscopy and its applications to geosciences, environmental studies, and education. The content will focus on applied topics related to minerals and rocks. Students will gain practical experience through hands-on exercises. No prerequisites. We will work on some fun projects using the methods introduced in this course. A short field trip for (rock) sample collecting will be scheduled.</p>					
課程目標 Course Objectives					
<p>本課程旨在介紹光性礦物學岩象分析的技術原理、實作與應用。光性岩象分析主要以偏光顯微鏡(polarizing microscope)及其週邊輔助具為主為儀器設備，為研究地質構造與礦物岩石科學的基礎工具，亦可應用在材料科學、環境地質與醫學藥學等應用領域上。期望學生於修習本課程後能利用此技術於論文研究或未來專業應用等方面。</p> <p>This course aims to introduce the principles and applications of optical petrography. Students will learn how to use a polarizing microscope to identify minerals and rocks. This method is a traditional tool in geological sciences, but it can also be applied to other fields, such as materials science, archeology, environmental studies, forensic science, and medical sciences. Students will do some fun and meaningful projects and gain hands-on experience.</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	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 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					
授課進度表 Teaching Schedule & Content					
週次 Week	內容 Subject/Topics				備註 Remarks

1	Introduction; Organization	
2	Introduction to Petrographic Microscopes and Observations	
3	Field Trip for Sample Collecting (optional for some students)	The exact time is to be decided.
4	Optical Identification of Rock-forming Minerals (I)	
5	Optical Identification of Rock-forming Minerals (II)	
6	Optical Identification of Rock-forming Minerals (III)	
7	Optical Identification of Rock-forming Minerals (IV)	
8	Optical Identification of Rock-forming Minerals (V)	
9	Midterm Week (hands-on exercise for students)	
10	Textural Interpretations of Igneous Rocks (I)	
11	Textural Interpretations of Igneous Rocks (II)	
12	Textural Interpretations of Sedimentary Rocks (I)	
13	Textural Interpretations of Sedimentary Rocks (II)	
14	Textural Interpretations of Metamorphic Rocks (I)	
15	Textural Interpretations of Metamorphic Rocks (II)	
16	Textural Interpretations of Metamorphic Rocks (III)	
17	Students' Final Presentations	
18	Discussion	

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: using optical microscopes

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:

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

評量方式補充說明

Grading & Assessments Supplemental instructions

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.)

Barker, A. J. (2014) A Key for Identification of Rock-forming Minerals in Thin-Section, CRC Press.

Barker, A. J. (1998) Introduction to Metamorphic Textures and Microstructures (2nd Ed.), Stanley Thornes.

Hibbard, M. J. (1995) Petrography to Petrogenesis, Prentice Hall.

Shelley, D. (1993) Igneous and Metamorphic Rocks Under the Microscope, Chapman & Hall.

Vernon, R. H. (2018) A Practical Guide to Rock Microstructure (2nd Ed.), Cambridge University Press.

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.)

<http://faculty.ndhu.edu.tw/~tsaich/readings>

<https://mints.uwc.ac.za/mints/home.php>

其他補充說明 (Supplemental instructions)