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| **112(1)/2023 Fall Semester TIGP-ESS課程資訊表**  **112(1)/2023 Fall Semester TIGP-ESS course information form** | | | |
| 科目名稱(中文) | | 高等電磁探勘學 | |
| Course Title (English) | | Advanced Electromagnetic Exploration | |
| 授課時間  Time | | Tue. 2:00-4:00 pm | |
| 授課地點  Location | | RECE 4032 | |
| 學分數  Course Credits | | 2 | |
| 主要授課老師 Main Instructors | | 張竝瑜 | |
| 聯絡郵件  E-mail | | pingyuc@gmail.com/pingyuc@ncu.edu.tw | |
| 辦公時間 Office Hours | | By appointment | |
| 課程目標 Course Objectives | | Learn the the principle to the electromagnetic exploration and methods | |
| 授課內容 Course Description | | Introduction of the principle to the electromagnetic exploration and the application of the EM methods in the geosciences surveys | |
| 教科書/參考書 Textbooks/References | | 1. Electromagnetic methods in applied geophysics, Editor: Nabighian, SEG, investigation in geophysics no.3  2. Applied Geophysics, Telford  3. Exploration Geophysics of the Shallow subsurfaces, Burger, Princeton Hall PTR | |
| 自編教材比例  Self-compiled Textbook/References Proportion(if any) | | 100% | |
| 授課方式 Course Requirements | | V講授(Lecture)；  V研討(Seminar)；  □實習/實驗(Internship/Experiment)；  □個別指導(Individual Discussion)；  □其他(Other) | |
| 評量配分比重 Course Grade | | 出席表現/attendance 10%、個人報告/personal report50%、期末報告/term report 40% | |
| 課程領域Areas | | V基礎學科(共同)(Basic subjects (common))  V固態地球科學(Solid earth sciences)  □水圈科學(Aquatic sciences)  □應用語言(Applied Languages)  □大氣科學(Atmospheric sciences) | |
| 產業領域Areas | | V地探科技(Geological monitoring technology)  □氣象科技(meteorological science and technology)  □太空科技(Space Technology)  □環保科技(environmental protection science and technology)  □資訊科技(Informational Technology)  □教學研究(Teaching & research)  V地質科技(Geosciences and technology) | |
| 課程進度與內容  Lecture outline and content | | | |
| 週次  week | 主題  Topic | | 授課教師/指定閱讀或作業  Instructor/Readings or assignments |
| **1** | 電磁地球物理探勘方法簡介/Introduction to EM Geopysics | |  |
| **2** | 電磁學與電磁場原理(1)/Principle of EM theory(1) | |  |
| **3** | 電磁學與電磁場原理(2)/Principle of EM theory(2) | |  |
| **4** | 岩石與礦物電磁特性/EM characteristics of minerals and rocks | |  |
| **5** | 岩石與礦物電磁特性/EM characteristics of minerals and rocks | |  |
| **6** | 大地電磁方法原理與儀器/The Magnetotelluric methods | |  |
| **7** | 大地電磁野外學期計畫討論/Term projects for MT surveys | |  |
| **8** | 暫態時域電磁方法原理與儀器/TEM method | |  |
| **9** | 暫態時域電磁方法野外學期計畫討論/ Term projects for TEM method | |  |
| **10** | 頻域電磁方法原理與儀器/FEM method | |  |
| **11** | 極低頻電磁方法原理/VLF method | |  |
| **12** | **個人簡報:極低頻探勘方法之應用/Student report on VLF applications** | |  |
| **13** | **個人簡報:頻域電磁方法之應用/Student report on FEM applications** | |  |
| **14** | **個人簡報:暫態時域電磁方法之應用/Student report on TEM applications** | |  |
| **15** | **個人簡報:大地電磁方法之應用/Student report on MT applications** | |  |
| **16** | **學期計畫報告I/student report on term project** | |  |
| **17** | **學期計畫報告II/student report on term project** | |  |
| **18** | **學期計畫報告III/student report on term project** | |  |
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| 課程所屬學制(Educational System): 博士班(Doctoral Program) | | | |
| 核心能力I: 請點選本課程培養學生具備核心能力之強度指數，並填寫對應之評量方式  Please select core abilities and its corresponding assessments of this course | | | |
| 請勾選學程所訂之核心能力(可複選)  V獨立思考與研究能力Independent thinking and research capacity  V進階數理及專業知識能力Advanced mathematical and professional knowledge and ability  □觀測模擬及分析推理能力Observation simulation and analysis of reasoning ability  □電腦及程式語言運用能力Computer and programming language proficiency  V國際視野與語文溝通能力International perspective and language communication skills  □專業倫理及服務學習能力Professional ethics and service-learning ability | | | |
| 核心能力II: 請點選本課程培養學生具備核心能力之強度指數，並填寫對應之評量方式  Please select the core abilities and its corresponding assessments of this course | | | |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 強度指數 Overall rating of Core Abilities | 1 非常低 Very Low | 2 低 Low | 3 普通 Medium | 4 高 High | 5 非常高 Very High | 評量方式 Corresponding Assessments | | 獨立思考與研究能力 Independent thinking and research capacity | □ | □ | □ | V | □ | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演  (Products/Creative Performance)  □其他(Others) | | 進階數理及專業知識能力 Advanced mathematical and professional knowledge and ability | □ | □ | □ | □ | V | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演(Products/Creative Performance)  □其他(Others) | | 觀測模擬及分析推理能力 Observation simulation and analysis of reasoning ability | □ | □ | □ | V | □ | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演(Products/Creative Performance)  □其他(Others) | | 電腦及程式語言運用能力Computer and programming language proficiency | □ | □ | □ | V | □ | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演(Products/Creative Performance)  □其他(Others) | | 國際視野與語文溝通能力 International perspective and language communication skills | □ | □ | □ | V | □ | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演(Products/Creative Performance)  □其他(Others) | | 專業倫理及服務學習之能力 Professional ethics and service-learning ability | □ | □ | V | □ | □ | □紙筆測驗/會考(Test/Exam)  □作業練習(Assignments)  □口頭報告/口試(Presentation/Oral Exam)  □專題研究報告(書面)  (Research Report(printed on paper))  □實作/實驗(Practices/Experiments)  □出席/課堂表現(Attendance/Performance)  □學習檔案評量(Portfolios Assessment)  □自我評量/同儕互評  (Self-Assessment/ Peer Assessment)  □作品/創作展演(Products/Creative Performance)  □其他(Others) | | | | |