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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) | | 主動與被動基礎遙感探測 | |
| Course Title (English) | | Fundamentals of Active and Passive Remote Sensing | |
| 授課時間  Time | | 週三678 Wednesday 678 | |
| 授課地點  Location | | 地球所414 IES 414 | |
| 學分數  Course Credits | | 3 | |
| 主要授課老師 Main Instructors | | 王 昱、林玉儂 Yu Wang, Yunung Nina Lin | |
| 聯絡郵件  E-mail | | [wangyu79@ntu.edu.tw](mailto:wangyu79@ntu.edu.tw) [ninalin@earth.sinica.edu.tw](mailto:ninalin@earth.sinica.edu.tw) | |
| 辦公時間 Office Hours | | 週三 13:00-14:00  Wednesday 13:00-14:00 | |
| 課程目標 Course Objectives | | To help students obtain fundamental knowledge about active and passive remote sensing systems | |
| 授課內容 Course Description | | Introductions to remote sensing systems and hands-on exercises | |
| 教科書/參考書 Textbooks/References | | Campbell and Wynne, 2015, *Introduction to Remote Sensing*, 5th Edition  Maitre, 2008, *Processing of Synthetic Aperture Radar Images* | |
| 自編教材比例  Self-compiled Textbook/References Proportion(if any) | | 10% | |
| 授課方式 Course Requirements | | V講授(Lecture)；  □研討(Seminar)；  V實習/實驗(Internship/Experiment)；  □個別指導(Individual Discussion)；  □其他(Other) | |
| 評量配分比重 Course Grade | | Course Attendance: 30%  Lab Reports: 70% | |
| 課程領域Areas | | □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)  V應用語言(Applied Languages)  □大氣科學(Atmospheric sciences) | |
| 產業領域Areas | | □地探科技(Geological monitoring technology)  □氣象科技(meteorological science and technology)  V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)  □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** | Introduction to RS: Scope and History | | Yu Wang/C & W Chap 1 |
| **2** | Electromagnetic Radiation | | Yu Wang/C & W Chap 2 |
| **3** | **Lab 1:** Radiation | | Yu Wang |
| **4** | Optical Acquisition Systems | | Yu Wang/C & W Chap 3&4 |
| **5** | Optical Image Classification and Applications | | Yu Wang/C & W Chap 12&18 |
| **6** | **Lab 2:** Land cover classification | | Yu Wang |
| **7** | SAR Principals | | Nina Lin/Maitre Chap 2 |
| **8** | SAR Images | | Nina Lin/Maitre Chap 4 |
| **9** | **Lab 3:** Introduction to SNAP | | Nina Lin |
| **10** | SAR reflectivity model and filtering | | Nina Lin/Maitre Chap 5&6 |
| **11** | SAR amplitude-based applications | | Nina Lin/Maitre Chap 5&6 |
| **12** | **Lab 4:** Flood detection | | Nina Lin |
| **13** | SAR polarimetry | | Nina Lin/Maitre Chap 4, 5, 6 |
| **14** | SAR polarimetry-based applications | | Nina Lin/Maitre Chap 7 |
| **15** | **Lab 5:** Land cover classification | | Nina Lin |
| **16** | SAR interferometry | | Nina Lin/Maitre Chap 12 |
| **17** | SAR interferometry-based applications | | Nina Lin/Maitre Chap 12 |
| **18** | **Lab 6:** Surface deformation | | Nina Lin |
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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)  □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  □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)  V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)  V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)  V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)  V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)  V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)  V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)  V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) | | | | |