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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 | 週三678Wednesday 678 |
| 授課地點Location | 地球所414IES 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.twninalin@earth.sinica.edu.tw  |
| 辦公時間Office Hours | 週三 13:00-14:00Wednesday 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 EditionMaitre, 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 capacityV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 |
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| 強度指數Overall ratingof 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)  |

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