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| **113(2)/2025 Spring Semester TIGP-ESS課程資料表**  **113(2)/2025 Spring Semester TIGP-ESS course information form** | |
| 科目名稱(中文) | 大氣科學 |
| Course Title (English) | Atmospheric Sciences |
| 授課時間  Time | Mon 02.-05 P.M. |
| 授課地點  Location | Room\_4032 RCEC |
| 學分數  Course Credits | 3 |
| 主要授課老師 Main Instructors | 李威良、張偉裕、廖宇慶、鍾高陞、林傳堯、周崇光、劉千義、梁茂昌 |
| 聯絡郵件  E-mail | TIGP office |
| 辦公時間 Office Hours | e.g. Mon 3-5p.m. in RCEC or by appointment |
| 課程目標 Course Objectives | This course focuses on the quantitative and analytical aspects of atmospheric physics, dynamics, and chemistry, integrating both basic and applied research. Students in the program gain a comprehensive understanding of atmospheric sciences, along with interdisciplinary research skills in related fields such as environmental sciences, hydrology, and sustainability sciences particularly in the context of a changing climate. |
| 授課內容 Course Description | Climate and climate change, Mesoscale Meteorology, Extreme Weather, Planet boundary layer and air pollution, Remote sensing, Stratosphere |
| 教科書/參考書 Textbooks/References | Meteorology Today，An Introduction to Dynamic Meteorology, Middle Atmosphere Dynamics |
| 自編教材比例  Self-compiled Textbook/References Proportion(if any) | 30% |
| 授課方式 Course Requirements | ■講授(Lecture)；  □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 | Midterm examination 40%; Final examination 40%; Attendance rate/Class performance 20%. |
| 對應之永續發展目標(SDGs)(請選擇至多3項與教學內容相關的項目)  Corresponding Sustainable Development Goals (SDGs) (Please choose up to 3 items related to the teaching content) | □SDG1消除貧窮No Poverty  □SDG2消除飢餓Zero Hunger  □SDG3健康與福祉Good Health and Well-being  □SDG4優質教育Quality Education  □SDG5性別平等Gender Equality  □SDG6潔淨飲水與衛生Clean Water and Sanitation  ■SDG7永續能源Affordable and Clean Energy  □SDG8就業與經濟成長Decent Work and Economic Growth  □ SDG9產業永續創新Industry, Innovation, and Infrastructure  □SDG10減少不平等Reduced Inequality  ■ SDG11永續城市與社區Sustainable Cities and Communities  □SDG12永續消費及生產Responsible Consumption and Production  ■SDG13氣候行動Climate Action  □SDG14水生生態Life Below Water  □SDG15陸地生態Life on Land  □SDG16和平與正義制度Peace, Justice, and Strong Institutions  □SDG17全球夥伴Partnerships for the Goals |
| 課程類別Course Category | □ STEAM  □人文關懷Humanities and Social Sciences  ■跨域課程Interdisciplinary Courses  ■問題導向Problem-Based Learning  □總整課程Integrated Curriculum  □媒體識讀Media Literacy  □創新課程Innovative Curriculum  □自主學習課程Self-Directed Learning  □無None |
| 課程領域Areas | □基礎學科(共同)(Basic subjects (common))  □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 | □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)  □地質科技(Geosciences and technology) |

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| 課程進度與內容  Lecture outline and content | | | |
| 週次  week | 日期 Date | 主題  Topic | 授課教師/指定閱讀或作業  Instructor/Readings or assignments |
| **1** | 2/17 | Introduction, Global system | 李威良 |
| **2** | 2/24 | The Earth’s Changing Climate | 李威良 |
| **3** | 3/3 | Middle-Latitude Cyclones | 張偉裕 |
| **4** | 3/10 | Air masses and fronts | 張偉裕 |
| **5** | 3/17 | Weather forecasting | 廖宇慶 |
| **6** | 3/24 | Thunderstorms and Tornadoes | 廖宇慶 |
| **7** | 3/31 | Hurricanes | 鍾高陞 |
| **8** | 4/7 | Hurricanes | 鍾高陞 |
| **9** | 4/14 | PBL, Wind: Small scale and local systems | 林傳堯 |
| **10** | 4/21 | PBL, air pollution & modeling | 林傳堯 |
| **11** | 4/28 | Air pollution | 周崇光 |
| **12** | 5/5 | Air pollution | 周崇光 |
| **13** | 5/12 | Remote sensing | 劉千義 |
| **14** | 5/19 | Remote sensing | 劉千義 |
| **15** | 5/26 | Stratosphere: Middle atmospheric Dynamics | 梁茂昌 |
| **16** | 6/2 | Final exam. | 林傳堯 |
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| 課程所屬學制(Educational System): 博士班(Doctoral Program) | | | |

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| 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 |
| ■獨立思考與研究能力Independent thinking and research capacity  ■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 | □ | □ | □ | ■ | □ | □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 | □ | □ | □ | ■ | □ | □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 | □ | □ | □ | ■ | □ | □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 | □ | ■ | □ | □ | □ | □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 | □ | □ | □ | ■ | □ | □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 | □ | □ | ■ | □ | □ | □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) | |