



教學計劃表 Syllabus

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| 課程名稱(中文) Course Name in Chinese | Python 科學計算入門：以 AI 與量子計算為例 | | 學年/學期 Academic Year/Semester | 115/1 | |
| 課程名稱(英文) Course Name in English | Scientific Computing Fundamentals with Python: Illustrated by Examples of AI and Quantum Computing | | | | |
| 科目代碼 Course Code | GC_68130 | 系級 Department & Year | 校核心 | 開課單位 Course-Offering Department | 通識教育中心 |
| 修別 Type | 選修 Elective | 學分數/時間 Credit(s)/Hour(s) | 2.0/2.0 | | |
| 授課教師 Instructor | /陳企寧 | | | | |
| 先修課程 Prerequisite | | | | | |
| 課程描述 Course Description | | | | | |
| 教授 Python 程式語言基本語法，並透過實作方式，建立對於AI神經網絡模型與量子計算基本架構之初步認識。 | | | | | |
| 課程目標 Course Objectives | | | | | |
| 了解Python 程式語言之基本語法，能撰寫 Python 程式解決科學計算問題，並透過實作的方式，對於AI神經網絡模型與量子計算基本架構有初步的認識。 | | | | | |
| (校)核心能力 Learning Outcomes | | | | | 課程目標與校核心能力相關性 Correlation between Course Objectives and Basic Learning Outcomes |
| A | 自主學習與創新思考Autonomous Learning and Creative Thinking | | | | ● |
| B | 康健身心Physical Fitness and Mental Balance | | | | |
| C | 互動、溝通與解決問題Interactive Communication and Problem Solving | | | | ● |
| D | 情藝美感Artistic Feeling and Aesthetic Perception | | | | |
| E | 文化素養與尊重差異Cultural Literacy and Respect for Differences | | | | |
| F | 在地關懷與公民責任Local Commitment and Civic Responsibility | | | | |
| 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 to Modern Scientific Computing | | | | |
| 2 | Python Programming: Variables and Data Structures | | | | |
| 3 | Python Programming: Do Loop | | | | |
| 4 | Python Programming: Control Flow | | | | |
| 5 | Python Programming: Functions and Modules | | | | |
| 6 | Numpy and Matplotlib | | | | |

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| 7 | Numerical Calculus | |
| 8 | Matrix Computations | |
| 9 | Introduction to Machine Learning | |
| 10 | Artificial Neural Networks: MLP | |
| 11 | Artificial Neural Networks: CNN | |
| 12 | Artificial Neural Networks: RNN | |
| 13 | Artificial Neural Networks: Boltzmann Machine | |
| 14 | Introduction to Quantum Computing | |
| 15 | Quantum Logic Gates and Circuits | |
| 16 | Quantum Algorithms: Concepts and Simulation | |
| 17 | Final Examination | |

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| 彈性 教學 規劃 Flexible Teaching Plan | <p>請勾選(至少需勾選1 個項目): Please tick the box(es). (At least one item is required.):</p> <p><input checked="" type="checkbox"/> 問題討論 Problem-based Discussion</p> <p><input type="checkbox"/> 翻轉教學 Flipped Classroom</p> <p><input type="checkbox"/> 展演實作 Performance / Practical Presentation</p> <p><input type="checkbox"/> 校外參訪 Off-campus Visit</p> <p><input type="checkbox"/> 講座活動 Lecture / Seminar</p> <p><input type="checkbox"/> 線上作業 Online Assignments</p> <p><input type="checkbox"/> 自主學習 Self-directed Learning</p> <p><input type="checkbox"/> 課業輔導 Academic Support</p> <p><input type="checkbox"/> 實驗操作 Experiment Operation</p> <p><input type="checkbox"/> 遠距教學(同步) Distance Learning (Synchronous)</p> <p><input type="checkbox"/> 遠距教學(非同步) Distance Learning (Asynchronous)</p> <p><input type="checkbox"/> 其他(請填寫) Others (Please specify.):</p> <p>備註: 本校學期週數自115 學年度起調整為17 週, 為符合1學分18 小時之原則, 請教師規劃安排彈性教學。 Note: From the 115th academic year, the semester will be 17 weeks. Please include flexible teaching activities to meet the required 18 hours per credit.</p> |
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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:

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(含出缺席) General Performance (Attendance Record) | 0% | | | | | | | | |
| 期中考成績 Midterm Exam | 0% | | | | | | | | |
| 期末考成績 Final Exam | 25% | ✓ | | | | | | | |
| 作業成績 Homework and/or Assignments | 75% | | ✓ | | | | | | |
| 其他 Miscellaneous (project(加分)) | | | | ✓ | | | | | |
| 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.) | | | | | | | | | |
| 上課講義 | | | | | | | | | |
| 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.) | | | | | | | | | |
| 上課公布 | | | | | | | | | |
| 其他補充說明 (Supplemental instructions) | | | | | | | | | |