

理學院科學學士學位學程（雙學位）

Undergraduate honors Program of Interdisciplinary Science
(Dual Degree)

109 學年度 (Academic Year 2020)

| 科目名稱 Course Name | 規定 學分 Credit | 第一學年 Grade 1 | | 第二學年 Grade 2 | | 第三學年 Grade 3 | | 第四學年 Grade 4 | | 備註 Note |
|--|--------------------|---|----------|-----------------|----------|-----------------|----------|-----------------|----------|--|
| | | 上 1st | 下 2nd | 上 1st | 下 2nd | 上 1st | 下 2nd | 上 1st | 下 2nd | |
| | | 基礎科學研究方法與實作 (一)(二)(三)(四) Introduction to Scientific Research and Implementation (I)(II)(III)(IV) | 12 | 3 | 3 | 3 | 3 | | | |
| 跨領域科學專題 (一)(二)(三)(四) Directed Studies in Interdisciplinary Science (I)(II) (III)(IV) | 6 | | | | | 3 | 3 | 3 | 3 | |
| 物理(一)(二) Physics(I)(II) | 8 | 4 | 4 | | | | | | | 跨領域科學基礎課程 Basic Courses of Interdisciplinary Science |
| 物理實驗(一)(二) Physics Labs. (I)(II) | 2 | 1 | 1 | | | | | | | |
| 電腦模擬與計算分析 Physics with computer simulation | 2 | | | | | | | | 2 | |
| 化學(一)(二) Chemistry(I)(II) | 6 | 3 | 3 | | | | | | | |
| 化學實驗(一)(二) Chemistry Labs. (I)(II) | 2 | 1 | 1 | | | | | | | |
| 微積分(一)(二) Calculus(I)(II) | 8 | 4 | 4 | | | | | | | |
| 微積分學而班(一)(二) Honor calculus problem solving session (I)(II) | 2 | 1 | 1 | | | | | | | |
| 普通生物學(一)(二)或近代生物 學(一)(二) General Biology(I)(II) or Modern Biology(I)(II) | 6 | 3 | 3 | | | | | | | |
| 跨領域科學專題 (一)(二)(三)(四) Directed Studies in Interdisciplinary Science (I)(II) (III)(IV) | 6 | | | | | 3 | 3 | 3 | 3 | 跨領域科學核心課程 Core Courses of Interdisciplinary Science. 1.必修以外之「跨領域科學 專題」學分，可列入採 計。Excluding 'Directed Studies in Interdisciplinary Science' compulsory courses could be taken into extra credits. 2.選修非本表規定之課 程，學分抵免最高以 6 學 分為限。Subject to the |
| 科學史文本選讀 Selected Readings in the History of Science | 3 | | | | 3 | | | | | |
| 數學發展史導論 Intro. to the History of Mathematics | 2 或 3 | | | | 2 或 3 | | | | | |
| 物理學發展史導論 Intro. to the History of Physics | 2 或 3 | | | | 2 或 3 | | | | | |
| 宇宙學發展史導論 Intro. to the History of Cosmology | 2 或 3 | | | | 2 或 3 | | | | | |

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|--|-------|---|---|---|---|-------|-------|---|---|--|
| 神經科學導論 Introduction to Neuroscience | 3 | | | | | | | | | approval of the curriculum committee, students may elect up to 6 credits of courses not in the list. |
| 線性代數(一)(二) (應數) Linear Algebra(I)(II) | 6 | 3 | 3 | | | | | | | |
| 分析導論(一)(二) (應數) Introduction to Analysis (I)(II) | 8 | | | 4 | 4 | | | | | |
| 代數(一) (應數) Algebra(I) | 3 | | | 3 | | | | | | |
| 計算數學(應數) Computational Mathematics | 3 | | | | 3 | | | | | |
| 偏微分方程(導論)(應數) Introduction to Partial Differential Equations | 3 | | | | 3 | | | | | |
| 微分方程(應數) Differential Equations | 3 | | | 3 | | | | | | |
| 狹義相對論(應數) Intermediate Special Relativity | 3 | | | | | 3 | | | | |
| 電磁學(一)(二) (電物) Electromagnetics(I)(II) | 6 | | | 3 | 3 | | | | | |
| 電子學(一)(二) (電物) Electronics(I)(II) | 6 | | | 3 | 3 | | | | | |
| 量子力學導論 (電物) Intro. to Quantum Mechanics | 3 | | | | | | 3 | | | |
| 光學概論(一)(二) (電物) Introduction to Optics (I) (II) | 6 | | | | | 3 | 3 | | | |
| 應用群論 Group Theory and its Applications in Physics and Chemistry | 3 | | | | | | | 3 | | |
| 物理化學(一)(二) (應化) Physical Chemistry(I)(II) | 8 | | | 4 | 4 | | | | | |
| 有機化學(一)(二) (應化) Organic Chemistry(I)(II) | 8 | | | 4 | 4 | | | | | |
| 分析化學(一)(二) (應化) Analytical Chemistry(I)(II) | 6 | | | 3 | | 3 | | | | |
| 無機化學(一)(二) (應化) Inorganic Chemistry(I)(II) | 6 | | | | | 3 | 3 | | | |
| 生物化學(一)(二) Biochemistry(I)(II) | 6 | | | 3 | 3 | | | | | |
| 細胞生物學(一)(二) Cell Biology(I)(II) | 4 或 6 | | | | | 2 或 3 | 2 或 3 | | | |
| 分子生物學 Molecular Biology | 3 | | | | 3 | | | | | |
| 生物統計 Biostatistics | 3 | | | | | | | 3 | | |
| 統計學或統計方法 Statistics or Statistical Methods | 3 | | | | | | 3 | | | |
| 機器學習(應數/資工) Machine Learning | 3 | | | | | | | | 3 | |
| 深度學習(應數/資工) Deep Learning | 3 | | | | | | | | 3 | |
| 資料結構(應數/資工) Data Structures | 3 | | | | | | | | 3 | |
| 資料探勘(應數/資工) Data Mining | 3 | | | | | | | | 3 | |
| 人工智慧概論(應數/資工) Intro. to Artificial Intelligence | | | | | | | | | 3 | |
| 機率與統計(交大/陽明) Probability and Statistics | 2 | | | | | 2 | | | | |
| 資料結構與演算法(陽明) Data Structures and Algorithms | 2 | | | 2 | | | | | | |
| 奈米科技概論(陽明) Intro. to Nanobiotechnology | 2 | | | | 2 | | | | | |

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| 奈米化學(陽明) Nano Chemistry | 3 | | | | | 3 | | | | Smart Biomedical courses. |
| 生物醫學訊號與影像處理特論 (陽明) Special Topics on Biomedical Signal and Image Processing | 3 | | | | | 3 | | | | |
| 基礎光電材料與技術(陽明) Basic Photonic Materials and Technology | 3 | | | | | | 3 | | | |
| 醫療科技實務(陽明) Medical Technology Practice | 1 | | | | | | 1 | | | |
| 訊號與系統(陽明) Signals and Systems | 3 | | | | | | 3 | | | |
| 應用雷射與非線性光學(陽明) Applied Laser and Nonlinear Optics | 3 | | | | | | 3 | | | |
| 生物物理化學(一)(二) Biophysical Chemistry (I)(II) | 4 | | | | | | 2 | 2 | | |
| 醫用生物物理 Medical Biophysics | 2 | | | | | | | 2 | | |
| 電漿子學與生醫感測(陽明) Plasmonics for Biosensors | 3 | | | | | | | 3 | | |
| 生醫感測與微奈米操控科技(陽 明) Biosensing and Micro- /Nanomanipulation Technology | 2 | | | | | | | 2 | | |
| 機器學習與生醫應用(陽明) Machine Learning & Biomedical Application | 3 | | | | | | | 3 | | |
| 生醫斷層影像原理與應用(陽明) Principle and Applications of Biomedical Tomography | 3 | | | | | | | 3 | | |
| LabVIEW 程式設計與生醫應用 LabVIEW Programming and Biomedical Applications | 3 | | | | | | | 3 | | |
| 跨領域科學實驗(陽明) Interdisciplinary Scientific Experiments | 2 | | | | | | | | 2 | |
| 深度學習與生醫應用(陽明) Deep Learning and Biomedical Applications | 3 | | | | | | | | 3 | |
| 合計 Total | 35 | | | | | | | | | |

「理學院科學學士學位學程」雙學位畢業學分：除主修學系或原學系之畢業規定外，須滿足本班規定至少 35 學分。必選課程至少取得 17 學分，必選課程包含「跨領域科學基礎課程」及「跨領域科學核心課程」。

[Undergraduate honors Program of Interdisciplinary Science] Dual Degree graduation credits requirement: Except for major or original department requirement regulation, the graduation requires at least 35 credits. The minimum number of mandatory courses is 17 credits, including Basic Courses of Interdisciplinary Science and Core Courses of Interdisciplinary Science.

理學院科學學士學位學程

Undergraduate honors Program of Interdisciplinary Science

109 學年度 (Academic Year 2020)

| 科目名稱 Course Name | 規定學分 Credit | 第一學年 Grade 1 | | 第二學年 Grade 2 | | 第三學年 Grade 3 | | 第四學年 Grade 4 | | 科目名稱 Course Name |
|--|----------------|--|----------|-----------------|----------|-----------------|----------|-----------------|----------|---|
| | | 上 1st | 下 2nd | 上 1st | 下 2nd | 上 1st | 下 2nd | 上 1st | 下 2nd | |
| 基礎科學研究方法與實作 (一)(二)(三)(四) Introduction to Scientific Research and Implementation (I)(II)(III)(IV) | 12 | 3 | 3 | 3 | 3 | | | | | 必修課程 34 學分，「跨領域科學專題」：任選 2 學期，每學期分別修習一門專題，大三或大四必修。 |
| 跨領域科學專題 (一)(二)(三)(四) Directed Studies in Interdisciplinary Science (I)(II)(III)(IV) | 6 | | | | | 3 | 3 | 3 | 3 | |
| 物理(一)(二) Physics(I)(II) | 8 | 4 | 4 | | | | | | | A minimum of 34 credits are required from mandatory courses. Choose between 2 academic periods, each semester for one 'Directed Studies in Interdisciplinary Science' is compulsory in the third year or the fourth year. |
| 微積分(一)(二) Calculus(I)(II) | 8 | 4 | 4 | | | | | | | |
| 物理實驗(一)(二) Physics Labs. (I)(II) | 2 | 1 | 1 | | | | | | | 跨領域科學基礎課程至少取得 12 學分 A minimum of 12 credits are required from Basic Courses of Interdisciplinary Science. |
| 電腦模擬與計算分析 Computer Simulation and Analysis | 2 | | | | | | | | 2 | |
| 化學(一)(二) Chemistry(I)(II) | 6 | 3 | 3 | | | | | | | |
| 化學實驗(一)(二) Chemistry Labs. (I)(II) | 2 | 1 | 1 | | | | | | | |
| 微積分學而班(一)(二) Honor calculus problem solving session (I)(II) | 2 | 1 | 1 | | | | | | | |
| 普通生物學(一)(二)或近代生 物學(一)(二) General Biology(I)(II) or Modern Biology(I)(II) | 6 | 3 | 3 | | | | | | | |
| 跨領域科學專業課程 Interdisciplinary Science Specialized Curriculum | 32 | 依本班修業規定，分成六個領域：電物、應數、應化、大數據及 AI、智慧生醫、跨領域。除跨領域外，在其他各個領域中至少選修兩個領域，每個領域至少 9 學分。 According to the regulation, the curriculums are divided to six sectors: Electrophysics, Applied Mathematics, Applied Chemistry, Big Data and Artificial Intelligence, Smart Biomedical and Interdisciplinary. Students should elect courses from at least 2 different sectors other than the interdisciplinary sector, and each sector requires at least 9 credits. | | | | | | | | 跨領域科學專業課程至少取得 32 學分 A minimum of 32 credits are required from Interdisciplinary Science Specialized Curriculum. |
| 合計 Total | 78 | | | | | | | | | |

本班最低畢業學分：128 學分 (含校訂共同必修課程 28 學分)

The requirement credits: 128 credits (Include 28 credits of Common Required Course for Undergraduate)

理學院科學學士學位學程選修課程規畫

Undergraduate honors Program of Interdisciplinary Science Elective Curriculum

跨領域科學專業選修(必選課程)：至少取得 32 學分

以下六個不同領域課程，除跨領域外，學生畢業前必須至少選修二個領域之必選課程，每個領域至少取得 9 學分。

Interdisciplinary Science Specialized Elective Curriculum: A minimum of 32 credits are required.

Following are 6 different specialized sectors. Except for Interdisciplinary, each student has to elect at least 2 sectors of the elective courses before graduation, and each sector requires at least 9 credits.

| | 科目 Course | 學分 Credits | 領域 Sector |
|----|---|---------------|-------------------------------|
| 1 | 應用數學 (一) (線性代數、向量分析) Applied Math.(I)(Linear Algebra, Vector Analysis) | 3 | 【電物領域】 Electrophysics |
| 2 | 應用數學 (二) (微分方程) Applied Math.(II)(Differential Equation) | 3 | |
| 3 | 應用數學 (三) (複變函數) Applied Math.(III) (Complex Variables) | 3 | |
| 4 | 電子學 (一)(二) Electronics (I)(II) | 6 | |
| 5 | 理論力學 (一) Theoretical Mechanics (I) | 3 | |
| 6 | 電路理論 (一) Circuit Theory (I) | 3 | |
| 7 | 材料科學導論 Introduction to Material Science | 3 | |
| 8 | 電磁學 (一)(二) Electromagnetics (I)(II) | 6 | |
| 9 | 近代物理 (一)(二) Modern Physics (I) (II) | 6 | |
| 10 | 量子力學導論 Intro. to Quantum Mechanics | 3 | |
| 11 | 光學概論 (一)(二) Introduction to Optics (I) (II) | 6 | |
| 12 | 熱物理 Thermal Physics | 3 | |
| 13 | 固態物理 (一) Solid State Physics (I) | 3 | |
| 14 | 應用群論 Group Theory and its Applications in Physics and Chemistry | 3 | |
| 1 | 分析導論 (一)(二) Introduction to Analysis (I)(II) | 8 | 【應數領域】 Applied Mathematics |
| 2 | 線性代數 (一)(二) Linear Algebra (I)(II) | 6 | |
| 3 | 機率論 Probability | 3 | |
| 4 | 微分方程 Differential Equations | 3 | |
| 5 | 統計學或統計方法 Statistics or Statistical Methods | 3 | |
| 6 | 數學軟體實作 Mathematical Software and Implementation | 3 | |
| 7 | 計算數學 Computational Mathematics | 3 | |
| 8 | 代數 (一) Algebra (I) | 3 | |
| 9 | 離散數學 Discrete Mathematics | 3 | |

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| 10 | 複變函數 Complex Analysis | 3 | |
| 11 | 偏微分方程(導論) Intro. to Partial Differential Equations | 3 | |
| 12 | 狹義相對論 Intermediate Special Relativity | 3 | |
| 【應化領域】 Applied Chemistry | | | |
| 1 | 有機化學(一)(二) Organic Chemistry (I)(II) | 8 | |
| 2 | 分析化學(一)(二) Analytical Chemistry (I)(II) | 6 | |
| 3 | 物理化學(一)(二) Physical Chemistry (I)(II) | 8 | |
| 4 | 無機化學(一)(二) Inorganic Chemistry (I)(II) | 6 | |
| 5 | 有機化學(三) Organic Chemistry (III) | 3 | |
| 6 | 物理化學(三) Physical Chemistry (III) | 3 | |
| 7 | 化學應用群論 Group Theory for Chemistry | 3 | |
| 8 | 物理化學特論 Special Topics in Physical Chemistry | 3 | |
| 9 | 神經科學導論 Introduction to Neuroscience | 3 | |
| 【大數據及 AI 領域】 Big Data and Artificial Intelligence | | | |
| 1 | 機器學習 Machine Learning | 3 | |
| 2 | 深度學習 Deep Learning | 3 | |
| 3 | 資料結構 Data Structures | 3 | |
| 4 | 資料探勘 Data Mining | 3 | |
| 5 | 人工智慧概論 Intro. to Artificial Intelligence | 3 | |
| 6 | 機率與統計 Probability and Statistics | 3 | |
| 7 | 機器學習與生醫應用 Machine Learning & Biomedical Application | 3 | |
| 8 | 深度學習與生醫應用 Deep Learning and Biomedical Applications | 3 | |
| 【智慧生醫領域】 Smart Biomedical | | | |
| 1. | 資料結構與演算法 Data Structures and Algorithms | 2 | |
| 2. | 奈米科技概論 Intro. to Nanobiotechnology | 2 | |
| 3. | 奈米化學 Nano Chemistry | 3 | |
| 4. | 生物醫學訊號與影像處理特論 Special Topics on Biomedical Signal and Image Processing | 3 | |
| 5. | 基礎光電材料與技術 Basic Photonic Materials and Technology | 3 | |
| 6. | 醫療科技實務 Medical Technology Practice | 1 | |
| 7. | 訊號與系統 Signals and Systems | 3 | |
| 8. | 應用雷射與非線性光學 Applied Laser and Nonlinear Optics | 3 | |
| 9. | 生物物理化學(一)(二) Biophysical Chemistry (I)(II) | 4 | |
| 10. | 醫用生物物理 Medical Biophysics | 2 | |

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| 11. | 電漿子學與生醫感測 Plasmonics for Biosensors | 3 | |
| 12. | 生醫感測與微奈米操控科技 Biosensing and Micro-/Nanomanipulation Technology | 2 | |
| 13. | 機器學習與生醫應用 Machine Learning & Biomedical Application | 3 | |
| 14. | 生醫斷層影像原理與應用 Principle and Applications of Biomedical Tomography | 3 | |
| 15. | LabVIEW 程式設計與生醫應用 LabVIEW Programming and Biomedical Applications | 3 | |
| 16. | 跨領域科學實驗 Interdisciplinary Scientific Experiments | 3 | |
| 17. | 深度學習與生醫應用 Deep Learning and Biomedical Applications | 3 | |
| 1 | 跨領域科學專題(一)(二)(三)(四) Directed Studies in Interdisciplinary Science (I)(II) (III)(IV) | 6 | <p style="text-align: center;">【跨領域】 Interdisciplinary (必修以外之「跨領域科學專題」 學分，可列入採計。Excluding 'Directed Studies in Interdisciplinary Science' compulsory courses could be taken into extra credits.)</p> |
| 2. | 科學史文本選讀 Selected Readings in the History of Science | 3 | |
| 3. | 數學發展史導論 Intro. to the History of Mathematics | 2 或 3 | |
| 4. | 物理學發展史導論 Intro. to the History of Physics | 2 或 3 | |
| 5. | 宇宙學發展史導論 Intro. to the History of Cosmology | 2 或 3 | |