

# 生物科技學系(甲組)

## Department of Biological Science and Technology

112 學年度 Year2023

| 科目名稱<br>Courses  | 學分<br>Credit | 第一學年<br>Grade 1 |     | 第二學年<br>Grade 2 |     | 第三學年<br>Grade 3 |     | 第四學年<br>Grade 4 |     | 備註<br>Notes                     |
|--|--------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|---------------------------------|
|  |              | 1st             | 2nd | 1st             | 2nd | 1st             | 2nd | 1st             | 2nd |                                 |
| 化學<br>Chemistry  | 3            | 3               |     |                 |     |                 |     |                 |     | <b>核心課程</b><br>Core courses     |
| 化學實驗<br>Chemistry Labs.                                | 1            | 1               |     |                 |     |                 |     |                 |     |                                 |
| 物理 (一)(二)<br>Physics (I)(II)                           | 6            | 3               | 3   |                 |     |                 |     |                 |     |                                 |
| 物理實驗 (一)<br>Physics Labs. (I)                          | 1            | 1               |     |                 |     |                 |     |                 |     |                                 |
| 普通生物學 (一)(二)<br>General Biology (I)(II)                | 6            | 3               | 3   |                 |     |                 |     |                 |     |                                 |
| 普通生物學實驗<br>General Biology Lab.                        | 1            |                 | 1   |                 |     |                 |     |                 |     |                                 |
| 微積分 (一)(二)<br>Calculus (I)(II)                         | 8            | 4               | 4   |                 |     |                 |     |                 |     |                                 |
| 計算生物概論<br>Introduction to Computational Biology        | 2            |                 |     | 2               |     |                 |     |                 |     |                                 |
| 有機化學 (一)<br>Organic Chemistry (I)                      | 4            |                 | 4   |                 |     |                 |     |                 |     |                                 |
| 生物化學 (一)<br>Biochemistry (I)                           | 3            |                 |     | 3               |     |                 |     |                 |     |                                 |
| 生物化學實驗<br>Biochemistry Lab.                            | 1            |                 |     | 1               |     |                 |     |                 |     |                                 |
| 分子生物學 (一)<br>Molecular Biology (I)                     | 3            |                 |     |                 | 3   |                 |     |                 |     |                                 |
| 分子生物學實驗<br>Molecular Biology Lab.                      | 1            |                 |     |                 | 1   |                 |     |                 |     |                                 |
| 書報討論<br>Seminar  | 1            |                 |     |                 |     |                 | 1   |                 |     |                                 |
| 服務學習 (一)(二)<br>Service Learning (I)(II)                | 2            |                 | 1   | 1               |     |                 |     |                 |     |                                 |
| 生涯規劃及導師時間<br>Career Planning and Mentor's Hours        | 0            | 0               | 0   |                 |     |                 |     |                 |     |                                 |
| 生物科技概論 (一)(二)<br>Introduction to Biotechnology (I)(II) | 2            |                 |     | 1               | 1   |                 |     |                 |     |                                 |
| 小計<br>Total  | 45           | 15              | 16  | 8               | 5   | 0               | 1   | 0               | 0   |                                 |
| 物理化學 (一)(二)(三)<br>Physical Chemistry (I)(II)(III)      | 9            |                 |     | 3               | 3   |                 | 3   |                 |     | <b>進階課程</b><br>Advanced courses |
| 程式語言及演習<br>Programming Language and Exercise           |              |                 | 3   |                 |     |                 |     |                 |     |                                 |

|   |    |   |   |    |   |    |    |    |   |   |
|---|----|---|---|----|---|----|----|----|---|---|
| 有機化學 (二)<br>Organic Chemistry (II)                                      | 4  |   |   | 4  |   |    |    |    |   | 至少選 16 學分<br>At least 16 credits            |
| 生物化學 (二)<br>Biochemistry (II)   | 3  |   |   |    | 3 |    |    |    |   |   |
| 分析化學<br>Analytical Chemistry  | 3  |   | 3 |    |   |    |    |    |   |   |
| 儀器分析<br>Instrumental Analysis   | 3  |   |   |    |   | 3  |    |    |   |   |
| 細胞生物學 (一)(二)<br>Cell Biology (I)(II)                                    | 4  |   |   |    |   | 2  | 2  |    |   |   |
| 分子生物學 (二)<br>Molecular Biology (II)                                     | 3  |   |   |    |   | 3  |    |    |   |   |
| 微生物學<br>Microbiology  | 3  |   |   |    |   | 3  |    |    |   |   |
| 神經生物學 (一)(二)<br>Neurobiology (I)(II)                                    | 4  |   |   |    |   |    |    | 2  | 2 |   |
| 生理學 (一)(二)<br>Physiology (I)(II)  | 4  |   |   |    |   | 2  | 2  |    |   |   |
| 遺傳學<br>Genetics   | 3  |   |   | 3  |   |    |    |    |   |   |
| 演化生物學<br>Evolutionary Biology   | 3  |   |   |    |   | 3  |    |    |   |   |
| 免疫學<br>Immunology   | 3  |   |   |    |   |    |    |    | 3 |   |
| 腫瘤生物學<br>Oncology   | 3  |   |   |    |   |    |    | 3  |   |   |
| 結構生物學<br>Structural Biology   | 3  |   |   |    |   |    | 3  |    |   |   |
| 生物統計<br>Biostatistics   | 3  |   |   |    |   |    |    | 3  |   |   |
| 生科應用數學<br>Applied Math for Biological Science and Technology            | 3  |   |   |    |   |    | 3  |    |   |   |
| 生物序列分析與高通量技術<br>Sequencing Technology and High-throughput Data Analysis | 3  |   |   |    |   | 3  |    |    |   |   |
| 結構生物資訊<br>Structural Bioinformatics                                     | 3  |   |   |    |   |    |    | 3  |   |   |
| 生物機器學習<br>Machine Learning in Computational Biology                     | 3  |   |   |    |   |    |    | 3  |   |   |
| 小計<br>Total   | 73 | 0 | 6 | 10 | 6 | 19 | 13 | 14 | 5 |   |
| 有機化學實驗 (一)<br>Organic Chemistry Lab. (I)                                | 2  |   |   | 2  |   |    |    |    |   | 實驗課程<br>Experiment courses<br><br>至少修習 3 學分 |
| 有機化學實驗 (二)<br>Organic Chemistry Lab. (II)                               | 2  |   |   |    | 2 |    |    |    |   |   |
| 細胞生物學實驗<br>Cell Biology Lab.  | 1  |   |   |    |   |    | 1  |    |   |   |

|   |   |  |   |   |   |   |   |   |   |                   |
|---|---|--|---|---|---|---|---|---|---|-------------------|
| 微生物學實驗<br>Microbiology Lab.   | 1 |  |   |   |   | 1 |   |   |   | At least 3 credit |
| 計算生物實驗<br>Computational Biology Lab.  | 1 |  |   |   | 1 |   |   |   |   |                   |
| 寒暑期專題實習<br>Summer/Winter Internship   | 1 |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 |                   |
| 專題研究 (一)<br>Research (I)  | 1 |  |   |   | 1 | 1 | 1 | 1 | 1 |                   |
| <p>本系最低畢業學分為 128 學分<br/> 須滿足院內總學分 <b>70</b>，核心課程 <b>45</b> 學分，進階課程至少 <b>16</b> 學分，實驗課程至少 <b>3</b> 學分<br/> Student shall complete at least 128 credit hours of courses to graduate. These must include <b>70</b> credits within the College of Biological Science and Technology, <b>45</b> core courses credits, <b>16</b> advanced courses credits, and <b>3</b> credits for experiment courses.</p> |   |  |   |   |   |   |   |   |   |                   |

依 1100105 國立陽明交通大學生物科技學系、生物資訊及系統生物研究所、分子醫學與生物工程研究所系所務聯席會議決議 110 學年度甲、乙兩組學生須申請並經系課程委員會同意後轉組。

## 生物科技學系(乙組)

### Department of Biological Science and Technology

112 學年度 Year2023

| 科目名稱<br>Courses                                   | 學分<br>Credit | 第一學年<br>Grade 1 |     | 第二學年<br>Grade 2 |     | 第三學年<br>Grade 3 |     | 第四學年<br>Grade 4 |     | 備註<br>Notes          |
|---|--------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|----------------------|
|   |              | 1st             | 2nd | 1st             | 2nd | 1st             | 2nd | 1st             | 2nd |                      |
| 化學<br>Chemistry                                   | 3            | 3               |     |                 |     |                 |     |                 |     | 核心課程<br>Core courses |
| 物理 (一)(二)<br>Physics (I)(II)                      | 6            | 3               | 3   |                 |     |                 |     |                 |     |                      |
| 普通生物學 (一)(二)<br>General Biology (I)(II)           | 6            | 3               | 3   |                 |     |                 |     |                 |     |                      |
| 微積分 (一)(二)<br>Calculus (I)(II)                    | 8            | 4               | 4   |                 |     |                 |     |                 |     |                      |
| 計算機概論與程式設計 Intro. to<br>Computers and Programming | 3            | 3               |     |                 |     |                 |     |                 |     |                      |
| 普通生物學實驗<br>General Biology Lab.                   | 1            |                 | 1   |                 |     |                 |     |                 |     |                      |
| 有機化學 (一)<br>Organic Chemistry (I)                 | 4            |                 | 4   |                 |     |                 |     |                 |     |                      |
| 生涯規劃及導師時間<br>Career Planning and Mentor's Hours   | 0            | 0               | 0   |                 |     |                 |     |                 |     |                      |
| 服務學習 (一)(二)<br>Service Learning (I)(II)           | 2            |                 | 1   | 1               |     |                 |     |                 |     |                      |
| 線性代數<br>Linear Algebra                            | 3            |                 |     | 3               |     |                 |     |                 |     |                      |
| 計算生物概論<br>Introduction to Computational Biology   | 2            |                 |     | 2               |     |                 |     |                 |     |                      |
| 計算生物實驗<br>Computational Biology Lab.              | 1            |                 |     | 1               |     |                 |     |                 |     |                      |

|   |    |    |    |    |   |   |   |   |   |  |                             |
|---|----|----|----|----|---|---|---|---|---|--|-----------------------------|
| 物理化學 (一)<br>Physical Chemistry (I)  | 3  |    |    | 3  |   |   |   |   |   |  |                             |
| 生物化學 (一)<br>Biochemistry (I)  | 3  |    |    | 3  |   |   |   |   |   |  |                             |
| 生物化學實驗<br>Biochemistry Lab.   | 1  |    |    | 1  |   |   |   |   |   |  | 二<br>擇<br>一                 |
| 分子生物學實驗<br>Molecular Biology Lab.   | 1  |    |    |    | 1 |   |   |   |   |  |                             |
| 分子生物學 (一)<br>Molecular Biology (I)  | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 書報討論<br>Seminar   | 1  |    |    |    |   |   | 1 |   |   |  |                             |
| 專題研究(一)<br>Research   | 1  |    |    |    | 1 | 1 | 1 | 1 | 1 |  |                             |
| 小計<br>Total   | 51 | 16 | 16 | 14 | 5 | 1 | 2 | 1 | 1 |  |                             |
| 有機化學 (二)<br>Organic Chemistry (II)  | 4  |    |    | 4  |   |   |   |   |   |  |                             |
| 生理學(一)<br>Physiology (I)  | 2  |    |    | 2  |   |   |   |   |   |  |                             |
| 遺傳學<br>Genetics   | 3  |    |    | 3  |   |   |   |   |   |  |                             |
| 物理化學 (二)<br>Physical Chemistry (II)   | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 生物化學 (二)<br>Biochemistry (II)   | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 生物光譜學<br>Biospectroscopy  | 2  |    |    |    | 2 |   |   |   |   |  |                             |
| 生科應用數學<br>Applied Math for Biological Science<br>and Technology             | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 資料結構與物件導向程式設計<br>Data Structures and Object-oriented<br>Programming         | 3  |    |    |    | 3 |   |   |   |   |  | 進階課程<br>Advanced<br>courses |
| 離散數學<br>Discrete Mathematics  | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 科學計算<br>Scientific Computing  | 3  |    |    |    | 3 |   |   |   |   |  |                             |
| 光電生物物理技術 Optical and<br>Electrical Techniques in Biophysics                 | 2  |    |    |    |   | 2 |   |   |   |  |                             |
| 細胞生物學 (一)(二)<br>Cell Biology (I)(II)  | 4  |    |    |    |   | 2 | 2 |   |   |  |                             |
| 分子生物學 (二)<br>Molecular Biology (II)   | 3  |    |    |    |   | 3 |   |   |   |  |                             |
| 演化生物學<br>Evolutionary Biology   | 3  |    |    |    |   | 3 |   |   |   |  |                             |
| 生物序列分析與高通量技術<br>Sequencing Technology and High-<br>throughput Data Analysis | 3  |    |    |    |   | 3 |   |   |   |  |                             |
| 分子模擬<br>Molecular Simulation  | 3  |    |    |    |   | 3 |   |   |   |  |                             |

|  |   |  |  |  |  |   |   |   |  |
|--|---|--|--|--|--|---|---|---|--|
| 計算系統生物學 Computational Systems Biology  | 3 |  |  |  |  | 3 |   |   |  |
| 演算法概論 Introduction to Algorithms   | 3 |  |  |  |  | 3 |   |   |  |
| 分子演化 Molecular Evolution   | 3 |  |  |  |  |   | 3 |   |  |
| 結構生物學 Structural Biology   | 3 |  |  |  |  |   | 3 |   |  |
| 生物統計 Biostatistics   | 3 |  |  |  |  |   |   | 3 |  |
| 結構生物資訊 Structural Bioinformatics   | 3 |  |  |  |  |   |   | 3 |  |
| 統計熱力學 Statistical Thermodynamics   | 3 |  |  |  |  |   |   | 3 |  |
| 儀器分析 Instrumental Analysis   | 3 |  |  |  |  |   |   | 3 |  |
| 本系最低畢業學分為 128 學分<br>核心課程 51 學分，進階課程至少 32 學分<br>Student shall complete at least 128 credit hours of courses to graduate. These must include 52 core courses credits, and 32 advanced courses credits. |   |  |  |  |  |   |   |   |  |

依 1100105 國立陽明交通大學生物科技學系、生物資訊及系統生物研究所、分子醫學與生物工程研究所系所務聯席會議決議 111 學年度甲、乙兩組學生須申請並經系課程委員會同意後轉組。

## 生物科技學系輔系科目表

### Department of Biological Science and Technology Minor Program

112學年度/ Year2023

| 選別 | 科目名稱  | 學分數 | 科目名稱  | 學分數 |
|----|---|-----|---|-----|
| 必修 | 普通生物學 (一)<br>General Biology (I)                          | 3   | 生物化學(一)<br>Biochemistry (I)   | 3   |
|    | 普通生物學 (二)<br>General Biology(II)                          | 3   |   |     |
| 選修 | 普通生物學實驗<br>General Biology Lab.                           | 1   | 生物化學實驗<br>Biochemistry Lab.   | 1   |
|    | 微生物學<br>Microbiology                                      | 3   | 分子生物學 (一)<br>Molecular Biology (I)                                      | 3   |
|    | 微生物學實驗<br>Microbiology Lab.                               | 1   | 分子生物學 (二)<br>Molecular Biology (II)                                     | 3   |
|    | 細胞生物學 (一)<br>Cell Biology(I)                              | 2   | 分子生物學實驗<br>Molecular Biology Lab.                                       | 1   |
|    | 細胞生物學(二)<br>Cell Biology (II)                             | 2   | 生物序列分析與高通量技術<br>Sequencing technology and high-throughput data analysis | 3   |
|    | 生物科技概論 (一) 或 (二)<br>Introduction to Biotechnology I or II | 1   | 計算生物概論<br>Introduction to Computational Biology                         | 2   |
|    | 細胞生物學實驗<br>Cell Biology Lab.                              | 1   | 計算生物實驗<br>Computational Biology Lab                                     | 1   |
|    | 神經生物學 (一)<br>Neurobiology (I)                             | 2   | 結構生物資訊<br>Structural Bioinformatics                                     | 3   |

|   |   |                            |   |
|---|---|----------------------------|---|
| 神經生物學 (二)<br>Neurobiology (II)  | 2 | 生理學 (一)<br>Physiology (I)  | 2 |
| 遺傳學<br>Genetics   | 3 | 生理學 (二)<br>Physiology (II) | 2 |
| 結構生物學<br>Structural Biology   | 3 | 免疫學<br>Immunology          | 3 |
| <p>1. 生物科技概論 (一) 及 (二) , 兩門課僅採計1學分, 擇一選修即可。<br/>Students can take either Introduction to Biotechnology I or II to fulfill their credits, but not both.</p> <p>2. 輔系最低應修學分為 20 學分 A minor in Department of Biological Science and Technology requires a minimal of 20 credits.</p> |   |                            |   |