# 化學工程與材料工程系 四技 112學年度入學課程結構規劃表

## 2023 Curricula for the Day School (4-year College Program) in Department of Chemical and Materials Engineering

| 課程類別 Course Category | | | 一年級 1st Academic Year | | | | | | 二年級 2nd Academic Year | | | | | | 三年級 3rd Academic Year | | | | | | 四年級 4th Academic Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 第一學期 Semester 1 | | | 第二學期 Semester 2 | | | 第一學期 Semester 1 | | | 第二學期 Semester 2 | | | 第一學期 Semester 1 | | | 第二學期 Semester 2 | | | 第一學期 Semester 1 | | | 第二學期 Semester 2 | | |
| | | | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours | 課程名稱 Course Name | 學分數 Credits | 時數 Hours |
| 校共同必修課程 University-wide Common Core Requirements | | 應修學分數 12學分 (12 credits) | 中文閱讀與表達(一) Chinese Reading and Expression (I) | 2 | 2 | 中文閱讀與表達(二) Chinese Reading and Expression (II) | 2 | 2 | | | | | | | | | | | | | | | | | | |
| | | | 實用英文(一) Practical English (1) | 2 | 2 | 實用英文(二) Practical English (2) | 2 | 2 | 實用英文(三) Practical English (3) | 2 | 2 | 實用英文(四) Practical English (4) | 2 | 2 | | | | | | | | | | | | |
| | | | 體育(一) Physical Education (1) | 0 | 2 | 體育(二) Physical Education (2) | 0 | 2 | 體育(三) Physical Education (3) | 0 | 2 | 體育(四) Physical Education (4) | 0 | 2 | | | | | | | | | | | | |
| | | | 服務教育(一) Community Service (1) | 0 | 1 | 服務教育(二) Community Service (2) | 0 | 1 | | | | | | | | | | | | | | | | | | |
| 通識課程 General Education Courses | 校訂通識 University General Education Domains | 基礎探索入門 Introduction to Basic Exploration | 應修學分數 至少2學分 (min. required: 2 credits) | 校訂通識/2/2 University General Education /2/2<br>校訂(一)藝術美感探索Exploration in Arts and Beauty、校訂(二)運算與程式設計Computing and Programming、校訂(三)生命與倫理Life and Ethics、<br>校訂(四)走讀高雄Field Study of Kaohsiung、校訂(五)海洋科技與永續Sustainable Marine Science and Technology、校訂(六)創意與創新Creativity and Innovation | | | | | | | | | | | | | | | | | | | | |
| | 博雅通識 Liberal Curriculum Domains | 人文與創意美感 Humanities and Creative Aesthetics | 應修學分數14學分 （至少任選3課群） (min. required: 14 credits across at least 3 different course groups) | 博雅通識/學分數/時數 Course Name/Credits/Hours | | | | | | | | | | | | | | | | | | | | | | |
| | | 科技與數位知能 Technology and Digital Literacy | | 博雅通識/學分數/時數 Course Name/Credits/Hours | | | | | | | | | | | | | | | | | | | | | | |
| | | 社會與身心關懷 Society and Physical and Mental Well-being | | 博雅通識/學分數/時數 Course Name/Credits/Hours | | | | | | | | | | | | | | | | | | | | | | |
| | | 歷史與多元思維 History and Diversity of | | 博雅通識/學分數/時數 Course Name/Credits/Hours | | | | | | | | | | | | | | | | | | | | | | |
| | | 全球與永續議題 Global and Sustainable Issues | | 博雅通識/學分數/時數 Course Name/Credits/Hours | | | | | | | | | | | | | | | | | | | | | | |
| | | 通識微學分 General Education Micro-credits | | 通識微學分(一)/1 General education micro-credits course 1/1、通識微學分(二)/1 General education micro-credits course 2/1、通識微學分(三)/1 General education micro-credits course 3/1、通識微學分(四)/1 General education micro-credits course 4/1、通識微學分(五)/1 General education micro-credits course 5/1、、通識微學分(六)/1 General education micro-credits course 6/1、、通識微學分(七)/1 General education micro-credits course 7/1、通識微學分(八)/1 General education micro-credits course 8/1、通識微學分(九)/1 General education micro-credits course 9/1、通識微學分(十)/1 General education micro-credits course 10/1 | | | | | | | | | | | | | | | | | | | | |
| 系專業課程 Departmental Professional Courses | 必修 Required | 學院共同課程 College Common Courses | 應修學分數 6學分 6 credits | 微積分(一) Calculus (1) | 3 | 3 | | | | | | | | | | | | | | | | | | | | |
| | | | | 物理(一) Fundamental physics(1) | 3 | 3 | | | | | | | | | | | | | | | | | | | | |
| | | 系專業課程 Departmental Professional Courses | 應修學分數 76學分 76 credits | 普通化學(一) Fundamental Chemistry(1) | 3 | 3 | 普通化學(二) Fundamental Chemistry(2) | 3 | 3 | 工程數學(一) Engineering mathematics (1) | 3 | 3 | 工程數學(二) Engineering mathematics (2) | 3 | 3 | 輸送現象與單元操作(一) Transport Phenomena and Unit Operation (1) | 3 | 3 | 輸送現象與單元操作(二) Transport Phenomena and Unit Operation (2) | 3 | 3 | 輸送現象與單元操作(三) Transport Phenomena and Unit Operation (3) | 3 | 3 | 化學工程實習 Chemical engineering lab. | 1 | 3 |
| | | | | 化學工程概論 Introduction to Chemical Engineering | 2 | 2 | 微積分(二) Calculus (2) | 3 | 3 | 物理化學(一) Physical chemistry(1) | 3 | 3 | 物理化學(二) Physical chemistry(2) | 3 | 3 | 儀器分析實驗 Experiments in instrumental analysis | 1 | 3 | 化工材料實驗 Chemical material experiments | 1 | 3 | 程序設計 Chemical process design | 3 | 3 | 專業倫理 Professional Ethics | 1 | 1 |
| | | | | 材料科學導論 Introduction to Materials Science | 3 | 3 | 物理(二) Fundamental physics(2) | 3 | 3 | 有機化學實驗 Organic chemistry experiments | 1 | 3 | 物理化學實驗 Physical chemistry lab. | 1 | 3 | 化工熱力學 Chemical engineering thermodynamics | 3 | 3 | 材料熱力學 Thermodynamics of materials | 3 | 3 | 書報討論(一) Seminar(1) | 2 | 2 | 書報討論(二) Seminar(2) | 2 | 2 |
| | | | | | | | 普通化學實驗 Fundamental chemistry experiment | 1 | 3 | 有機化學(一) Organic Chemistry (1) | 3 | 3 | 有機化學(二) Organic Chemistry (2) | 3 | 3 | 程序控制 Process control | 3 | 3 | 反應工程 Kinetics of chemical reaction engineering | 3 | 3 | | | | | | |
| | | | | | | | 化工計算 Calculations of Chemical Engineering | 3 | 3 | | | | 儀器分析 Instrumental analysis | 3 | 3 | | | | | | | | | | | | | |
| | 選修 Elective | 高分子材料學程（需修4門） Polymer Materials Program (required 4 | 應修學分數 24學分 24 credits | | | | | | | | | | | | 高分子加工與應用 Processing and Applications of Polymeric Materials | 3 | 3 | 光電高分子材料 Optoelectrical Polymeric Materials | 2 | 2 | 學期實習(一) Semester Practicum(1) | 9 | 720 | 學期實習(二) Semester Practicum(2) | 9 | 720 |
| | | | | | | | | | | | | | | | 高分子化學 Polymer Chemistry | 3 | 3 | 高分子物性 Polymer Physics | 3 | 3 | 高分子奈米材料 Polymer Nanocomposite | 2 | 2 | | | |
| | | 光電材料與太陽能電池學程(需修5門) Optical-Electrical Materials and solar cell devices Program (required 5 | | | | | | | 光電材料 Materials for Photo-electric Applications | 3 | 3 | 無機化學 Inorganic Chemistry | 3 | 3 | | | | 薄膜材料與鍍膜技術 Thin Film Material and Coating | 2 | 2 | 學期實習(一) Semester Practicum(1) | 9 | 720 | 學期實習(二) Semester Practicum(2) | 9 | 720 |
| | | | | | | | | | | | | 光電工程概論 Introduction To Photo-electric Engineering | 2 | 2 | | | | | | | | | | 太陽能電池 Introduction To Solar Cell Devices | 2 | 2 |
| | | 半導體製程與材料科技學程(需修5門) Manufacturing Process of Semiconductor Material Program (required 5 | | | | | | | 電化學 Electrochemistry | 3 | 3 | | | | 電路板基礎工程 General Printed Circuit Board Technology | 2 | 2 | 材料表面處理 Surface Treatment of Materials | 2 | 2 | 學期實習(一) Semester Practicum(1) | 9 | 720 | 學期實習(二) Semester Practicum(2) | 9 | 720 |
| | | | | | | | | | 無機化學 Inorganic Chemistry | 3 | 3 | | | | | | | 薄膜材料與鍍膜技術 Thin Film Material and Coating | 2 | 2 | 電漿原理 Principles of Plasma | 2 | 2 | 電鍍原理與技術 Fundamental and Technology of Electrochemical Deposition | 2 | 2 |
| | | | | | | | | | | | | | | | | | | 半導體材料 Semiconductor Materials | 2 | 2 | | | | | | |
| | | | | | | | | | | | | | | | | | | 半導體構裝材料與製程概論 Introduction To Assembly and Fabrication of Semiconductor | 3 | 3 | | | | | | |
| | | | | | | | | | | | | | | | | | | 半導體與印刷電路板微影製程 The lithography process of semiconductor and printed circuit board | 2 | 2 | | | | | | |

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| | | 綠色科技與燃料電池學程(需修5門) | | 分析化學<br>Analytical Chemistry | 2 | 2 | 綠色能源科技概論<br>Introduction To Greenergy Technology | 2 | 2 | 電化學<br>Electrochemistry | 3 | 3 | 環境工程概論<br>Introduction of Environmental Engineering | 3 | 3 | | | | 奈米環境工程技術<br>Nanotechnology for Enviromental Engineering | 3 | 3 | 學期實習(一)<br>Semester Practicum(1) | 9 | 720 | 學期實習(二)<br>Semester Practicum(2) | 9 | 720 |
| | | Green technology and Fuel Cells Program (required 5 | | | | | | | | 生物化學<br>Biochemistry | 2 | 2 | | | | | | | 燃料電池<br>Fuel Cells | 2 | 2 | 界面科學<br>Interface Sciences | 2 | 2 | 碳管理及技術<br>Carbon management and technology | 2 | 2 |
| | | 其他<br><br>others | | 環境科學概論<br>Introduction To Environmental Science | 2 | 2 | 環境化學<br>Environmental Chemistry | 2 | 2 | 空氣污染防治<br>Air Pollution Control | 2 | 2 | 分子生物學<br>Molecular Biology | 2 | 2 | 實務專題(一)<br>Special Topics (1) | 1 | 1 | 實務專題(二)<br>Special Topics (2) | 1 | 1 | 原子能與環境<br>Atomic Energy and the Environment | 2 | 2 | 固體廢棄物處理<br>Solid Waste Treatment | 2 | 2 |
| | | | | 計算機概論<br>Foundation of Computer Science | 2 | 2 | 計算機概論<br>Foundation of Computer Science | 2 | 2 | 石油煉製技術<br>Petroleum Refining Technology | 3 | 3 | 有機化學特論<br>Special Topics of Organic Chemistry | 3 | 3 | 製程自動化儀器<br>Process Automatic Instruments | 2 | 2 | 暑期實習<br>Summer Session Intern Practice | 2 | 360 | 廢水處理<br>Wastewater Treatment | 2 | 2 | 工廠經營與管理<br>Plant Management | 2 | 2 |
| | | | | | | | 電工學<br>Electrical Engineering | 2 | 2 | | | | | | | 核工概論與能源科技<br>Introduction To Nuclear Engineering and Energy Technology | 2 | 2 | 固態物理<br>Solid State Physics | 2 | 2 | 工業安全與衛生<br>Industrial Safety and Hygiene | 2 | 2 | 觸媒化學概論<br>Introduction of Catalysis | 2 | 2 |
| | | | | | | | 生活中的化學科技<br>Chemical Technology in Our Lives | 2 | 2 | | | | | | | 生物技術概論<br>Introduction To Biotechnology | 2 | 2 | 順序控制<br>Sequential Control | 2 | 2 | 計算機輔助設計與實習<br>Computer Aided Design and Practice | 2 | 2 | 化粧品化學<br>Cosmetic Chemistry | 3 | 3 |
| | | | | | | | 化材英文<br>Chemical Material English | 2 | 2 | | | | | | | 有機分析<br>Analysis of Organic Chemistry | 2 | | 計算材料科學<br>Computational Materials Science | 3 | 3 | | | | 食品化學<br>Food Chemistry | 2 | 2 |
| | | | | | | | | | | | | | | | | 有機合成<br>Synthesis of Organic Chemistry | 3 | 3 | 計算機程式與應用<br>Computer Programming and Application | 3 | 3 | | | | | | |
| | | | | | | | | | | | | | | | | 生醫材料<br>Biomaterial | 3 | 3 | | | | | | | | | |

**備註：**

一、畢業總學分數為134學分。

二、必修82學分，選修24學分。（不含校共同必修課程及通識課程的學分數）

三、校共同必修課程及通識課程28學分；相關規定依據本校「共同教育課程實施辦法」、「共同教育課程結構規劃表」及「語言教學實施要點」。

四、須修滿英(外)語8學分，本國籍學生英語畢業門檻為等同CEFR B1以上程度之各類英檢成績；各系自訂英語畢業門檻高於校訂者，另依該系規定。在學期間參加2次各類英檢考試，未通過者，須提出考試成績證明始得以下列其中一種方式通過：

1.通過校內英語畢業門檻檢定考試。

2.參加一期外語教育中心開設之短期英文加強課程，並符合課程簡章規定。

3.修讀並通過就讀院系開設2學分以上全英授課專業課程1門。

多益成績達550分(或等同 CEFR B1等級)以上者得免修大一英語(4學分)；多益成績達785分(或等同CEFR B2等級)以上者得免修大一、大二英語(8學分)，但須選修主題式英語或其他外語課程補足語言畢業學分數。

其他外語課程請參閱外語教育中心課程結構規劃表。

五、學生修讀所屬學院之「學院共同課程」應認列為本系專業課程學分；修讀所屬學院之「學院跨領域課程」或其他學院開課之課程，則認列為外系課程學分。

六、系所訂定條件（學程、檢定、證照、承認外系學分、擋修規定、各教學分組之畢業應修學分數及其他）

**Notes:**

1.Minimum credits required to graduate:134.

2.Required courses: 82 credits; elective courses: 24 credits (excluding credits earned from university-wide common core requirements and general education courses)

3.University-wide common core requirements and general education courses total 28 credits. The relevant regulations are based on the school's "Implementation Regulations of Courses in the College of General Education", "Course Schedule of College of the General Education," and "Implementation Regulations of Language Education".

4. 8 credits in English and/or a second foreign language are required to graduate.

A.The English proficiency graduation requirement for domestic students is CEFR B1 level or higher with related grade report or transcript. For departments with higher English proficiency requirements, the requirements will be in effect.

B.Students who fail to meet the graduation requirement after two attempts at English proficiency tests during their academic years may fulfill it by passing any of the following:

a) School's English proficiency graduation test,

b) Participation in a short-term English improvement course offered by the Foreign Language Education Center and compliance with the course regulations,

c) Taking and passing at least one professional course that adopts English as a Medium of Instruction (EMI) offered by the college or the department which is worth two or more credits.

C.Students with a TOEIC score of 550 or above (equivalent to CEFR B1 level) are exempt from Practical English (1) and (2) (4 credits); those achieving a TOEIC score of 785 or above (equivalent to CEFR B2 level) are exempt from Practical English (1), (2), (3) and (4) (8 credits), but must take elective courses like English for Specific Purposes (ESP) courses or other foreign languages to meet the English and/or second foreign language graduation credit requirements. For courses of other foreign languages, please refer to the course schedule of the Foreign Language Education Center.

5. Credits earned by students from the common courses offered by their respective colleges shall be accepted as their affiliated departments' professional courses. However, credits earned from interdisciplinary courses offered either by their colleges or by other colleges will be accepted as credits earned from departments outside their own.

6. Departmental requirements (programs, certifications, licenses, recognition of external department credits, prerequisite requirements, credits needed for each teaching division, and other requirements):

A.Our department offers specialized programs: "**Polymer Materials Program**" (required 4 courses), "**Optical-Electrical Materials and solar cell devices Program**" (required 5 courses), "**Manufacturing Process of Semiconductor Material Program**" (required 5 courses), and "**Green technology and Fuel Cells Program**" (required 5 courses) for student reference. These specialized programs include both required and elective courses. Required courses include: General Chemistry I or General Chemistry. Elective courses are listed in the course schedule under "Professional Electives."

B.The students who completes any of these programs with passing grades will receive a completion certificate from our department upon review.

C.Out of the elective credits for the department, 12 credits may be taken from non-departmental and non-general education courses.

D.The listed electives are planned courses and will be offered according to the actual needs of each semester.