**元智大學 化學工程與材料科學學系大學部 必修科目表**

**（105學年度入學新生適用）**

**List of Required Courses for the Undergraduate Program**

**Department of Chemical Engineering and Materials Science, Yuan Ze University**

**(Applicable to Students Admitted in Academic Year of 2016)**

106.06.21 一○五學年度第六次教務會議修訂通過

Amended by the 6th Academic Affairs Meeting, Academic Year 2016, on June 21, 2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 學年(Year)學期(Semester)科目(Course) | 第一學年 (1st Year) | 第二學年 (2nd Year) | 第三學年 (3rd Year) | 第四學年 (4th Year) |
| 上(Fall Semester) | 下(Spring Semester) | 上(Fall Semester) | 下(Spring Semester) | 上(Fall Semester) | 下(Spring Semester) | 上(Fall Semester) | 下(Spring Semester) |
| 共同必修科目（23） | 國文（一）Chinese I(2) | 國文（二）Chinese II(2) |  |  |  |  |  |  |
| 英語（一）（2） | 英語（二）（2） |  |  |  |  |  |  |
| 歷史（2） |  | 民主倫理與法治（2） |  |  |  |  |  |
| 「英語（一）」及「英語（二）」為基礎課程，共計二學期四學分。除了「英語（一）」及「英語（二）」外，應修習主題式英語課程三學期六學分，畢業前需修畢三個不同英語課程，始取得畢業資格。英語檢定（2）、經典五十（2）、服務學習（1） |
| 全民國防教育軍事訓練課程-國際情勢(0) | 全民國防教育軍事訓練課程-全民國防(0) |  |  |  |  |  |  |
| 體育Physical Education (0) | 體育Physical Education (0) | 體育Physical Education (0) | 體育Physical Education (0) |  |  |  |  |
| 體育除修習大一至大二4個學期外，另需通過「游泳能力檢定」及「心肺適能檢定」等二項檢測，列為畢業門檻。 |
| 通識教育科目（10） | 通識課程可以分為四大類：人文藝術﹑自然科學、社會科學及生命科學。學生須在畢業前至少修滿十學分，包括一門兩學分工程倫理相關課程為必選修；由通識講座課程、微課自主學習或通識四大領域課程中，各選修一門兩學分課程，共計八學分，其餘二學分須於社會(GS), 生命(LS), 人文藝術(LE)三領域中選擇一門課。General education courses can be divided into four categories: Humanities (LE), Natural Science (GN), Social Science (GS), and Life Science (LS). Students are required to take at least 10 credits with one Ethics course (selective), and at least one 2-credit course from each of the four categories to get a total of 8 credits. The remaining 2 credits must be selected from one of the three categories: GS, LS or LE. |
| 系必修科目（80）Required Courses (80) | 普通化學General ChemistryCH103 (3) | 無機化學Inorganic ChemistryCH345 (3) | 有機化學(一)Organic Chemistry (Ⅰ)CH230 (3) | 有機化學(二)Organic Chemistry (Ⅱ)CH231 (3) | 應用生物化學Applied BiochemistryCH344 (3) |  |  |
| 儀器分析Instrumental AnalysisCH348 (3) |
| 微積分(一)Calculus (Ⅰ)CH130 (3) | 微積分(二)Calculus (Ⅱ)CH131 (3) | 工程數學(一)Engineering Mathematics (Ⅰ)CH232 (3) | 工程數學(二)Engineering Mathematics (Ⅱ)CH233 (3) | 化工熱力學Chemical Engineering Thermodynamics CH304 (3) | 化學反應工程Chemical Reaction Engineering CH403 (3) |  |  |
| 普通物理(一)General Physics (Ⅰ)CH128 (3) | 普通物理(二)General Physics (Ⅱ)CH129 (3) | 物理化學(一)Physical Chemistry (Ⅰ)CH234 (3) | 物理化學(二)Physical Chemistry (Ⅱ)CH235 (3) | 儀器分析實驗Instrumental Analysis LaboratoryCH211 (1) |  |  |
| 化工與材科概論Introduction to Chemical Engineering & Materials ScienceCH125 (3) |  | 質能均衡Material & Energy BalanceCH213(3) | 輸送現象與單元操作(一)Transport Phenomena and Unit Operations (I) CH218 (3) | 輸送現象與單元操作(二)Transport Phenomena and Unit Operations (II)CH301 (3) | 固態物理Solid State PhysicsCH355(3) |  |  |
| 普通化學暨分析實驗General Chemistry & Analysis LaboratoryCH105 (1) | 有機與材料化學實驗Organic Chemistry & Materials LaboratoryCH226 (1) | 化工與材料實驗(一)Chemical Engineering & Materials Laboratory(I)CH353 (1) | 化工與材料實驗(二)Chemical Engineering & Materials Laboratory(II)CH354 (1) |  |  |
| 計算機程式(一)Computer Programming (I)CH115 (3) | 計算機程式(二)Computer Programming (II)CH117 (3) | 物理化學與材料實驗Physical Chemistry & Materials LaboratoryCH227 (1) |
|  |  |  | 材料科學Materials ScienceCH220 (3) |  | 科技與管理講座Seminar on Technology and Management CH312(2) |  |  |
| 學期學分小計 | 15 | 13 | 13 | 16 | 11 | 12 |  |  |
| 備註Remarks全文完 | 1.括弧內數字為學分數。The numbers in parentheses are referred as credit hours.2.「學期學分小計」指系必修科目學分數之合計。The “semester total credits” indicates the sum of total credit hours of the required courses.3.本系同學應修基礎及通識課程共33學分、系必修科目80學分、系認定選修科目15學分(含)以上，總共必須修滿128學分方可畢業。Students must complete at least 128 credit hours including 80 credit hours of the required course and 15 credit hours of the elective course from the department, and 33 credit hours from the general education.4.本系必修、選修科目必須在系上修習方予承認，如有特殊原因需至外系修習者，須於選課時經系主任核准，其學分始得承認。Students should not take undergraduate courses from other departments or institutes to be counted as the required courses from the department unless being approved by the department chair.5.除了補修低年級必修科目之外，本系實驗課以隨班上課為主。Students must take the experimental courses at the time arranged by the department unless taking the required courses, which were failed previously, in the lower-level classes.6.有關共同必修及通識教育科目之詳細規定，另依據「元智大學共同必修科目表」之規定辦理。Students should refer to “元智大學共同必修科目表” for the regulation of credit hours of general education. |

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**元智大學 化學工程與材料科學學系大學部 選修科目表**

**（105學年度入學新生適用）**

**List of Elective Courses for the Undergraduate Program**

**Department of Chemical Engineering and Materials Science, Yuan Ze University**

**(Applicable to Students Admitted in Academic Year of 2016)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 學年Year學期Semester科目Course | 第一學年(1st Year) | 第二學年 (2nd Year) | 第三學年 (3rd Year) | 第四學年 (4th Year) |
| 上學期(Fall Semester) | 下學期(Spring Semester) | 上學期(Fall Semester) | 下學期(Spring Semester) | 上學期(Fall Semester) | 下學期(Spring Semester) | 上學期(Fall Semester) | 下學期(Spring Semester) |
| 必選修科目Required Elective course | 必選科目一(3選1）Required Elective course (I) ( (3 for1) | 創新工程系統與元件設計Innovative Engineering System and Component DesignCH404(3) |  |
| 程序控制Process ControlCH305 (3) | 產品與程序設計Product & Process DesignCH402 (3) |
| 必選科目二(3選1）Required Elective course (Ⅱ) ( (3 for1) | 專題研究(一)Research Project (I)CH335 (1) | 專業實習Field StudyCH445 (3) |  |
| 工廠實習Plant Practice CH446 (1) |  |
| 綠色科技學程Green Science and Technology |  |  | 化學安全工程Damage Prevention for Chemical EngineeringCH443 (3) | ***智慧生產概論Introduction to Intelligent Production EG201(3)*** | 尖端能源技術Sustainable Energy TechnologiesCH465 (3) | 輸送現象與單元操作（三）Transport Phenomena and Unit Operations(III) CH302(3) | 工程管理Engineering ManagementCH440 (3) | 應用電化學Applied ElectrochemistryCH456 (3) |
|  |  |  |  | 綠色化學Green ChemistryME494 (3) | 工程統計與數據處理Engineering Statistics and Data AnalysisCH357 (3) | 奈米科技NanotechnologiesCH460 (3) | 統計實驗設計與應用Statistical Experimental Design and ApplicationEG501 (3) |
|  |  |  |  |  | 化學工業特論Special Topics on Chemical IndustryCH435 (3) | 燃料電池概論Introduction to Fuel Cell TechnologyME483 (3) |  |
|  |  |  |  |  | 太陽能電池Solar CellME486 (3) | 印刷電路板製程Printed Circuit Board Processing CH340 (3) |  |
|  |  |  |  |  |  | 薄膜分離技術Membrane Separations TechnologyCH520 (3) |  |
|  |  |  |  |  |  | 專題研究(二)Research Project (Ⅱ)CH342(1) |
| 功能性材料學程Functional Materials |  |  | 電子學(一)EE205CN201EO204 (3) | 電子材料概論Introduction to Electronic MaterialCH222 (3) | 半導體製程Semiconductor ProcessingCH334 (3) | 工程統計與數據處理Engineering Statistics and Data AnalysisCH357 (3) | 印刷電路板製程Printed Circuit Board Processing CH340 (3) | 材料分析技術與應用Technique and Applications of Material AnalysisCH451 (3) |
|  |  |  | 高分子聚合PolymerizationCH339 (3) | 高分子物性Polymer PhysicsCH336 (3) | 複合材料Composite MaterialsCH421 (3) | 高分子加工Polymer ProcessingCH420 (3) | 應用電化學Applied ElectrochemistryCH456 (3) |
|  |  |  | ***智慧生產概論Introduction to Intelligent Production EG201(3)*** | 光電概論Introduction to Opto-ElectronicsCH346 (3) | 生物材料BiomaterialsCH461 (3) | 工程管理Engineering ManagementCH440 (3) |  |
|  |  |  |  | 尖端能源技術Sustainable Energy TechnologiesCH465 (3) | 太陽能電池Solar CellME486 (3) | 無機材料Inorganic MaterialsCH448 (3) |  |
|  |  |  |  | 綠色化學Green ChemistryME494 (3) |  | 奈米科技NanotechnologiesCH460 (3) |  |
|  |  |  |  |  |  | 燃料電池概論Introduction to Fuel Cell TechnologyME483 (3) |  |
|  |  |  |  |  |  | 專題研究(二)Research Project (Ⅱ)CH342(1) |
| 生物技術學程Biotechnology |  |  | 細胞生物學(一)Cell Biology (I)CH228 (2) | 細胞生物學(二)Cell Biology (II)CH229 (2) | 生化工程Biochemical EngineeringCH333 (3) | 基礎生物技術Basic BiotechnologyCH347 (3) | 工程管理Engineering ManagementCH440 (3) | 製藥技術工程Pharmaceutical EngineeringCH579 (3) |
|  |  |  | 工業微生物Industrial MicrobiologyCH349 (3) | ***藥物化學與藥理概論******Introduction of medicinal chemistry and pharmacology******CH358(3)*** | 生化分離Bio-separationsCH356 (3)  | 奈米科技NanotechnologiesCH460 (3) |  |
|  |  |  | ***智慧生產概論Introduction to Intelligent Production EG201(3)*** |  | 工程統計與數據處理Engineering Statistics and Data AnalysisCH357 (3) | 環境生物技術Environmental BiotechnologyCH586 (3) |  |
|  |  |  |  |  | 生物材料BiomaterialsCH461 (3) | 藥物制放特論Special Topics on Controlled Drug ReleaseCH535 (3) |  |
|  |  |  |  |  |  | 專題研究(二)Research Project (Ⅱ)CH342(1) |
| 備註 | 1. 專題研究（一）、工廠實習、專業實習***、***創新工程系統與元件設計及產品與程序設計為終端學習課程，須於畢業前至少通過1門課程。Research Project (I), Plant Practice, Field Study, Innovative Engineering System and Component Design and Product & Process Design are the terminal courses from the department, and students must complete (pass) at least one of them.
2. 專題研究（一）不及格不得選修專題研究（二）；專題研究（二）僅得認列一學程，由專題指導教授簽核認可。Research Project (I) is no pass, cannot Elective Research Project (Ⅱ). Research Project (Ⅱ) cannot be doubly counted in both programs.
3. 系認定選修分為四種方式，由同學自由擇一方式完成： There are four options for students to take the elective courses. Students are free to choose one of them to complete the requirement by the department.

(1) 完成一個系選修學程：該學程內至少須選修15學分(含)以上，且此15學分均要求及格，其中並包含該學程之核心課程：Complete one program: Complete (Pass) a minimum of 15 credit hours including the core courses of the program. 【綠色科技學程】 ⮞尖端能源技術、輸送現象與單元操作（三）、化學工業特論（三選二）Green Science and Technology Program: Sustainable Energy Technologies, Transport Phenomena and Unit Operations(III), and Special Topics on Chemical Industry (3 for 2) 【功能性材料學程】⮞ (a)高分子聚合、高分子物性、高分子加工（三選二） (b)電子材料概論、光電概論、無機材料（三選二）[(a)或(b)擇一]Functional Materials Program: (a) Polymerization, Polymer Physics, and Polymer Processing. (3 for 2) (b) Introduction to Electronic Material, Introduction to Opto-Electronics, and Inorganic Materials. (3 for 2) [Option (a) or (b)]【生物技術學程】 ⮞細胞生物學（一）、生化工程、基礎生物技術（三選二）Biotechnology Program: Cell Biology (I), Biochemical Engineering, and Basic Biotechnology. (3 for 2)一個學程內，若所要求之課程均及格，得在畢業成績單上特別註明完成該學程。Students pass all courses in the emphasis program and it would be honorably remarked/indicated in the official transcript.(2) 完成二個選修學程：選擇二個學程，在每一學程內必須各選修12學分(含)以上，但選修課程至少須12學分及格。若一門課跨二個學程以上，則只能擇一學程計算。Complete two programs: Take a minimum of 12 credit hours from each program, and complete (pass) at least 12 credits of them. The course credits cannot be doubly counted in both programs.(3) 完成一個跨領域學程，該學程內至少須選修15學分(含)以上，且獲得學程證書者。（請參考教務處網頁）Complete one of the interdisciplinary programs from **University**: Complete (Pass) a minimum of 15 credit hours from the program. (See the website of Office of Academic Affairs: <https://www.yzu.edu.tw/admin/aa/index.php/tw/2016-01-14-06-58-46/2016-03-13-13-02-53/interdisciplinary-course-program> )(4) 為增加同學多元學習之機會，提升就業能力及開闊生涯規劃，經導師同意後可跨至其他學系、學院修課，最多承認15學分(此15學分不得為通識教育科目學分)。In order to improve the multidiscipline learning, enhance the employability, and broaden the career planning, a maximum of 15 credits taken from other departments and colleges would be accepted after consented by the tutor (\*The general education courses are excluded).1. 課號非CH開頭之課程為非本系所開課課程。The courses from the department are recognized with the course number beginning with CH.
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