**元智大學　化學工程與材料科學學系博士班 必修科目表**

**（111學年度入學新生適用）**

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

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

**(Applicable to Students Admitted in Academic Year of 2022）**

111.04.20 一一○學年度第六次教務會議通過

Passed by the 6th Academic Affairs Meeting, Academic Year 2021, on April 20, 2022

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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3rdYear | | 第四學年4thYear | |
| 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  修  科  目  (12)  Required Course  (12) |  |  |  |  |  |  |  | 論文  (Dissertation)  CH901  (12) |
| 學期學分小計  Semester Total Credits | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 備註  Remarks | 1. 學期學分小計指必修課程部份。The “semester total credits” indicates the sum of total credit hours of the required courses.  2. 最低畢業學分計 33 學分。除論文(12學分)外，至少應修21學分，其中本系課程不得少於15學分。A total of 33 credits are required for PhD degree. These include 12 credits from the dissertation and 21credits from courses, of which at least 15 credits should be taken from the courses offered in the department.  3.其他未盡事宜，請參閱本系「博士班修讀辦法」。Students should refer to the "Regulations for PhD's Students" in the department for additional information.  4.入學研究生須依本校學術研究倫理教育課程實施要點規定，於入學第一學期結束前完成學術研究倫理教育課程，最遲須於申請學位口試前補修完成，未完成本課程，不得申請學位口試。For those graduate students who shall complete Academic Research Ethics Education Course before the end of their first academic semester, they must follow the regulations of Yuan Ze University Academic Research Ethics Education Course Implementation Highlights. The latest deadline for them shall be their course completions and then their applications towards the degree’s oral exam. | | | | | | | |

[AA-CP-04-CF04](http://www.yzu.edu.tw/admin/so/files/%E5%85%A7%E6%8E%A7%E6%96%87%E4%BB%B6/AA/AA-CP-04/AA-CP-04-CF04.pdf) (1.2 版)／101.11.15修訂

**元智大學　化學工程與材料科學學系博士班 選修科目表**

**（111學年度入學新生適用）**

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

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

**(Applicable to Students Admitted in Academic Year of 2022)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 學年、學期  Year/ Semester  科目Course  選修領域  Options | 第一學年  1st Year | | 第二學年  2nd Year | | |
| 上學期  Fall Semester | 下學期  Spring Semester | 上學期  Fall Semester | 下學期  Spring Semester |
| 核心科目  Core course | 科技英文  Technical Writing  CH502 (3) |  |  |  | |
|  | 科技論文寫作  Methods of Research and Thesis Writing CH570 (3) | 統計實驗設計與應用  Statistical Experimental Design and Application EG501 (3) | 可靠度工程  Reliability Engineering  IE566 (3) | 智慧財產權  Copyright Protection  CH801 (3) | |
| 高等品質管制Advanced Quality Control IE531 (3) |
| 高分子材料領域  Polymer Materials | 高分子化學  Polymer Chemistry  CH509 (3) | 高等儀器分析(二)  Advanced Instrumental Analysis (Ⅱ)  CH526 (3) | 專題討論  Seminars in Science and Engineering  CH517 (3) | 生物高分子特論  Special Topics on Biomacromolecules  CH519 (3) | |
| 實驗設計  Design for Experimental  CH511 (3) | 高分子物理  Polymer Physics  CH527 (3) | 平面顯示器材料化學  Chemistry of Materials for Flat Visual Display  CH521 (3) | 表面分析特論  Special Topics on Surface Analysis  CH536 (3) |
| 高等儀器分析  Advanced Instrumental Analysis  CH525 (3) |  | 有機半導體材料特論  Special Topics on Organic Semiconductor Materials CH589 (3) | 材料特性分析Analysis of Materials [properties](http://tw.dictionary.yahoo.com/search?ei=UTF-8&p=property)  CH620 (3) |
| 高分子熱力學Polymer Thermodynamics  CH528 (3) |  | ***質子交換膜燃料電池特論***  ***Special Topics on Proton-exchange-membrane Fuel Cells CH566 (3)*** |  |
| 藥物制放特論  Special Topics on Controlled Drug Release  CH535 (3) |  |  |  |
| 生化工程領域  Biochemical Engineering | 實驗設計  Design for Experimental  CH511 (3) | 高等化工熱力學  Advanced Chemical Engineering Thermodynamics  CH514 (3) | 專題討論  Seminars in Science and Engineering  CH517 (3) | 生物高分子特論  Special Topics on Biomacromolecules  CH519 (3) | |
| 高等儀器分析  Advanced Instrumental Analysis  CH525 (3) | 高等儀器分析(二)  Advanced Instrumental Analysis (Ⅱ)  CH526 (3) | 薄膜分離技術  Membrane Separations  Technology  CH520 (3) | 製藥技術工程  Pharmaceutical Engineering  CH579 (3) |
| 藥物制放特論  Special Topics on Controlled Drug Release  CH535 (3) | 分離技術特論  Special Topics on Separations Technology CH534(3) | 環境生物技術  Environmental Biotechnology  CH586 (3) | 細胞訊息路徑  Cellular Signal Transduction  CH610 (3) |
| 生物物理化學  Biophysical Chemistry  CH548 (3) | 生物模擬材料  Biomimetic Materials  CH569 (3) | 再生醫學  Regenerative Medicine  CH609 (3) |  |
| 高等生化工程  Advanced Biochemical Engineering  CH584 (3) | 生物醫學工程Biomedical Engineering  CH599(3) | 計算生物學  Computational Biology  CB537 (3) |  |
| 分子生物學  Molecular Biology CB521(3) | 基因體學與蛋白體學  Genomics and Proteomics  CB530 (3) |  |  |
| 材料科學領域  Materials Science | 實驗設計  Design for Experimental  CH511 (3) | 高等儀器分析(二)  Advanced Instrumental Analysis (Ⅱ)  CH526 (3) | 專題討論  Seminars in Science and Engineering  CH517 (3) | 光電材料與應用  Optoelectronic Materials and its Applications  ER505 (3) | |
| 高等儀器分析  Advanced Instrumental Analysis  CH525 (3) | 質子交換膜燃料電池特論  Special Topics on Proton-exchange-membrane Fuel Cells CH566 (3) | 電化學特論  Special Topics on Electrochemical Engineering  CH539(3) | 表面分析特論  Special Topics on Surface Analysis  CH536 (3) |
| 精密陶瓷概論  Introduction to Fine Ceramics  CH530 (3) | 無機奈米材料  Inorganic Nanomaterials  CH568 (3) | 太陽能技術  Solar Energy Technology  CH588 (3) | 光電材料特論  Special Topics on Optoelectronic Materials  CH537 (3) |
| 藥物制放特論  Special Topics on Controlled Drug Release  CH535 (3) | 化學蒸鍍技術  Chemical Vapor Deposition  C H577 (3) | 有機半導體材料特論  Special Topics on Organic Semiconductor Materials CH589 (3) | 觸媒原理與應用  Catalyst Principles and Applications  CH578 (3) |
| 材料物理化學  Physical Chemistry of Materials  CH600 (3) | 物理冶金  Physical Metallurgy  CH617 (3) | 奈米材料製備與觸媒應用  Nanomaterial Preparations and Catalytic Applications  CH607 (3) | 材料特性分析Analysis of Materials [properties](http://tw.dictionary.yahoo.com/search?ei=UTF-8&p=property)  CH620 (3) |
|  | 相變態  Phase Transformations  CH604 (3) | 晶體結構與缺陷  Crystal Structure and Defects CH618 (3) | 結晶學與繞射概論  Elements of Crystallography and Principles of X-Ray Diffraction CH619 (3) | 鋰電池材料與製程技術  Materials and Processing of Lithium Battery  CH701 (3) |
| 光電材料與元件Optoelectronic Materials and Devices CH622 (3) |  | 計算材料學  Calculation in Materials Science CH621 (3) |  |
|  | 磁性材料概論  Introduction to Magnetic Materials  CH625 |  |  |  |
| 程序工程領域  Process Engineering | 高等輸送現象  Advanced Transport Phenomena  CH501 (3) | 應用數值分析  Applied Numerical Analysis  CH507 (3) | 專題討論  Seminars in Science and Engineering  CH517 (3) | 懸浮微粒制技術  Particulate Control Technique  CH564 (3) | |
| 高等化工動力學  Advanced Chemical Engineering Kinetics  CH503 (3) | 高等化工熱力學  Advanced Chemical Engineering Thermodynamics  CH514 (3) | 薄膜分離技術  Membrane Separations Technology  CH520 (3) | 氣膠學  Aerosol Science  CH574 (3) |
| 實驗設計  Design for Experimental  CH511 (3) | 高等儀器分析(二)  Advanced Instrumental Analysis (Ⅱ)  CH526 (3) | 分離技術特論  Special Topics on Separations Technology CH534(3) |  |
| 高等儀器分析  Advanced Instrumental Analysis  CH525 (3) | 反應器設計  Reactor Design  CH561 (3) |  |  |
|  | 薄膜程序設計與應用  Design and Applications of Membrane Processes  CH585 (3) |  |  |
| 永續發展領域  Sustainable Development | 高等輸送現象  Advanced Transport Phenomena  CH501 (3) | 應用數值分析  Applied Numerical Analysis  CH507 (3) | 專題討論  Seminars in Science and Engineering  CH517 (3) | 光電材料與應用  Optoelectronic Materials and its Applications  ER505 (3) | |
| 實驗設計  Design for Experimental  CH511 (3) | 綠色工程創意設計  Innovative Design for Green Energy  ER509 (3) | 分離技術特論  Special Topics on Separations Technology CH534(3) | 懸浮微粒制技術  Particulate Control Technique  CH564 (3) |
| 環境系統工程  Environmental Systems Engineering  CH518 (3) | 高等儀器分析(二)  Advanced Instrumental Analysis (Ⅱ)  CH526 (3) | 電化學特論  Special Topics on Electrochemical Engineering  CH539 (3) | 氣膠學  Aerosol Science  CH574 (3) |
| 高等儀器分析  Advanced Instrumental Analysis  CH525 (3) | 環工程序化學  Environmental Process Chemistry  CH573 (3) | 太陽能技術  Solar Energy Technology  CH588 (3) | 觸媒原理與應用  Catalyst Principles and Applications  CH578 (3) |
| 環境生物技術  Environmental Biotechnology  CH586 (3) | 燃料電池  Fuel Cells  CH575 (3) | 有機半導體材料特論  Special Topics on Organic Semiconductor Materials CH589 (3) | 鋰電池材料與製程技術  Materials and Processing of Lithium Battery  CH701 (3) |
| 材料物理化學  Physical Chemistry of Materials  CH600 (3) | 光電材料與元件Optoelectronic Materials and Devices CH622 (3) | ***質子交換膜燃料電池特論***  ***Special Topics on Proton-exchange-membrane Fuel Cells CH566 (3)*** |  |
| 備註  Remarks | 博士生在學期間至少須完成一個選修領域，該領域學程內至少須選修2門課，且此2門課均要求及格(70分以上)。  All graduate students are required to take one of the five options and pass (above 70) at least two courses in the selected option before graduation. | | | | |

[AA-CP-04-CF04](http://www.yzu.edu.tw/admin/so/files/%E5%85%A7%E6%8E%A7%E6%96%87%E4%BB%B6/AA/AA-CP-04/AA-CP-04-CF04.pdf) (1.2 版)／101.11.15修訂