**元智大學電機工程學系(丙組) 必修科目表**

**（113學年度入學新生適用）**

Department of Electrical Engineering (Program C), Yuan Ze University

List of Required Courses for the Undergraduate Program

（Applicable to newly-admitted students in 2024）

113.05.01 一一二學年度第八次教務會議通過

113.06.05 一一二學年度第九次教務會議修訂通過

113.11.20 一一三學年度第二次教務會議修訂通過

Passed by the 8th Academic Affairs Meeting, Academic Year 2023, on May 01, 2024

Amended by the 9th Academic Affairs Meeting, Academic Year 2023, on June 05, 2024

Amended by the 2nd Academic Affairs Meeting, Academic Year 2024, on November 20, 2024

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| 學年Year  學期Semester  科目Course | 第一學年  1st Academic Year | | 第二學年  2nd Academic Year | | 第三學年  3rd Academic Year | | 第四學年  4th Academic Year | |
| 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring |
| 共  同  必  修  科  目  Common Compulsory  （17） | 中文閱讀、思辨與表達（一） Chinese Reading, Critical Thinking, and Expression （I）（2） | 中文閱讀、思辨與表達（二）Chinese Reading, Critical Thinking, and Expression （II）（2） |  |  |  |  |  |  |
| 英語（一） English (I)  （2） | 英語（二） English (II)  （2） |  |  |  |  |  |  |
| 1. 外語課程應修習10學分。 2. 「英語（一）」及「英語（二）」為基礎課程，採能力分級上課，共計二學期四學分。 3. 除了「英語（一）」及「英語（二）」外，畢業前應修畢二個不同主題式英語課程，共計4學分。 4. 大一英語能力後測「TOEIC模擬測驗」成績未達350分者，應修習「應試加強班」(EL260)。修習「應試加強班」期間之期末TOEIC模擬測驗成績未達350分者，則該科成績將「不及格」，並應再次修習「應試加強班」，直到取得TOEIC模擬測驗分數達350分(含)始得修習其他主題式英語課程。 5. 另開設「英語檢定」(EL160)計一學期2學分，「英語檢定」之修課限制與注意事項，請參照「通識外語『英語檢定』修課規定」，並由通識教學部公佈後施行。 6. 外國學生改修華語須經國際語言文化中心審核通過始可改修華語課程10學分，其華語課程10學分應含「華語檢定」2學分，「華語檢定」修課限制與注意事項，請參照「通識外語『英語檢定』修課規定」及「元智大學外籍生華語學分抵免規定」。 7. 凡本校大學部外國學生修習「華語(一)」或「華語(二)」任一課程成績未達60分，不得修習「華語(三)」、「華語(四)」。若修習「華語(三)」、「華語(四)」任一課程成績未達60分，不得修習「華語檢定」(EL375)。 8. The undergraduate students must complete 10 required credits of foreign language courses. 9. English （I） & （II） for the total 4 credits: English （I） and （II） are 4 credits elementary courses for the freshmen who are grouped on English competence; to complete within two semesters. 10. English thematic course for the total 4 credits: English thematic courses are 4-credit English courses; students are required to obtain 4 credits through 2 different thematic courses for graduation. 11. Students who do not reach the 350-point threshold of TOEIC Mock Exam in the end of the freshman year must take English Testing （EL260） course. Students will fail the course if they do not score higher than 350 points of TOEIC Mock Exam by the end of the course, and must repeatedly take the course until they can score higher than 350 points. 12. “English Testing” （EL160） is a 2-credit course: For the requirements of registering “English Testing”, please refer to The Regulation for Registering English Test announced and implemented by the College of General Education. 13. Foreign students need approval by ILCC for taking 10 credits of Mandarin Chinese courses as alternative courses of English. The 10 credits in Mandarin Chinese courses must include 2 credits for “Chinese Proficiency Test”. For the specific restrictions and considerations for taking the “Chinese Proficiency Test”, please refer to the 'General Education Foreign Language “English Proficiency Exam” Course Requirements' and 'Yuan Ze University Regulations for Exempting the Mandarin Chinese as a Foreign Language Credit ' for more details. 14. The undergraduate foreign students must pass Mandarin Chinese （I） and （II） before taking Mandarin Chinese （III） and （IV）. Students must pass Mandarin Chinese （III） and （IV） before taking 'Chinese Proficiency Test' （EL375）.   **英語檢定**English Testing （2）、**經典選讀**A Guide to Classics （2）、**服務學習**Service Learning （1） | | | | | | | |
| 體育 Physical Education （0） | 體育 Physical Education （0） | 興趣選項體育optional physical education（0） | 興趣選項體育optional physical education （0） |  |  |  |  |
| 大學部必須修習4學期體育課程；其中2學期為大一體育課程原班級上課，另2學期為興趣選項體育課程。  The undergraduate students must attend the physical education course for 4 semesters; 2 semesters for the freshman physical education courses, the other two semesters for the optional physical education courses. | | | | | | | |
| 通識教育科目  General Education  Courses  （10） | 通識課程分為人文藝術、自然科學、社會科學及生命科學四大類。學生須於四大領域中各選修2學分課程，共計8學分。General Education program comprises four categories：Humanities, Natural Science, Social Science and Life Science. Students are required to take a 2-credit course from each category to get 8 credits before graduation.  通識跨域課程General Education Interdisciplinary Course：此2學分學生可自由於通識講座課程、微課自主學習或在地多元文化課群中選課。惟外籍生與工程學院英語學士班、資訊學院英語學士班、人文社會學院英語學士班、電機通訊學院英語學士班學生仍須於四大領域中選課，依各院修課規定辦理。Students can select the 2 credits from a General Education Lecture course, Micro Credit courses, Self-Study courses, or Local-Multicultural courses. Only foreign students and undergraduates of International Programs in the Colleges of Engineering, Informatics, Humanities and Social Sciences, as well as Electrical and Communication Engineering are required to take a 2-credit course from the four categories according to each college’s policy before graduation. | | | | | | | |
| 院必修科目  College  Compulsory  （4） | 程式語言共4學分，依各院修課規則辦理。(開課名稱：基礎程式設計-Python（一）EN001**、**基礎程式設計-Python（二）EN002)  The Fundamental Computer Programming has 4 credits in total, which is subject to the rules of each college. (Course Name: Fundamental Computer Programming) | | | | | | | |
| 學年Year  學期Semester  科目Course | 第一學年  1st Academic Year | | 第二學年  2nd Academic Year | | 第三學年  3rd Academic Year | | 第四學年  4th Academic Year | |
| 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring |
| 電  機  專  業  基  礎  共  同  必  修  科  目  Professional Basic Compulsory Courses  ( 11) | 微積分(一) Calculus(I)  (3)  EEC105 | 微積分(二) Calculus(II)  (3)  EEC106 |  |  |  | 畢業專題 Graduation Project (3)  EEC327 |  |  |
| 程式語言實驗(一)  Programming Language Labs(I) (1)  EEC113 | 程式語言實驗(二)  Programming Language Labs(II) (1)  EEC114 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| 學期學分小計  Credits each semester | 4 | 4 | 0 | 0 |  | 3 |  |  |
| 電  機  (丙  組)  必  修  科  目  （31） | 普通物理(一) General Physics(I)  (3)  EEC101 | 普通物理(二) General Physics(II)  (3)  EEC102 | 工程數學(一) Engineering Mathematics(I)  (3)  EEC202 | 工程數學(二) Engineering Mathematics(II)  (3)  EEC203 |  |  |  |  |
|  | 普通物理  實驗(一) General Physics Lab. (1)  EEC103 | 電子學(一) Electronics(I)  (3)  EEC204 | 電子學(二) Electronics(II)  (3)  EEC205 |  |  |  |  |
|  |  | 電子電路實驗(一) Electronic Circuits Experiments(I) (1)  EEC206 | 電子電路實驗(二) Electronic Circuits Experiments(II) (1)  EEC207 |  |  |  |  |
|  |  | 電路學 Circuit Theory  (3)  EEC201 | 半導體光學 Semiconductor Optics  (3)  EEC214 |  |  |  |  |
|  |  |  | 電磁學(一) Electromagnetics (I)  (3)  EEC208 | 半導體光學 實驗 Semiconductor Optics Laboratory (1)  EEC215 |  |  |  |  |
| 學期學分小計  Credits each semester | 3 | 4 | 13 | 11 |  |  |  |  |
| 備  註  Remarks | 1. 括弧內數字為學分數.   The numbers in parentheses are referred as credit.   1. 必修科目計：73學分. (包含共同必修17學分、通識教育科目10學分、院必修程式語言課程共4學分、電機專業基礎共同科目11學分、電機(丙組)必修科目：31學分)   The course requirement is 73 credits, including 17 co-requisite course credits, 10 general education course credits, College Compulsory Courses Fundamental Computer Programming 4 credits, 11 prerequisite course credits, and 31 group prerequisite course credits).   1. 電機系丙組專業選修科目至少選修38學分，其餘選修17學分不限於本組、系、院修課，可跨至其他學院修課   The minimum request for electrical engineering program C major is 38 credits. Outside the Department of elective up to recognize the (17) credits.   1. 畢業學分：共128學分.(通識教育科目學分只採計至多10學分，超修之學分將不列入畢業學分)   The minimum credits requirement for graduation is 128 credit. (The maximum credits for general education courses is 10, the exceeding credits will not be counted.)   1. 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，共同必修超修學分不得列入畢業學分數。   Please refer to Yuan Ze University Common Required Course List for General Education courses information and regulations.   1. 本組學生修習電通學院各系專業課程，皆予承認；但必修課程初次修課須在本組修讀始予承認。   Students are permitted to take courses offered in College of Electrical and Communication Engineering, however the first compulsory courses has to be taken in department of electrical engineering program C.   1. 終端學習課程：畢業專題   The experiential learning courses: Graduation project.   1. 至少須修畢一項本組制訂之學程，始得畢業，不包含微學程。   Students need to take at least one course package offered by the department program C to fulfill the graduation requirement.   1. 修習普通物理實驗(一)、電子電路實驗(一)／(二)等3 門課程者，必須通過該課程所規定之儀器檢定項目。   Those who take courses of General Physics Lab.(I), Electronic Circuits Experiments(I), or Electronic Circuits Experiments(II) are required to pass the corresponding certification exams.   1. 議題導向實作專題課程：畢業專題   Graduation Project (EEC327) is a compulsory three-credit course of "Topic and Implementation-oriented courses".  十一、本組「數位應用相關課程」如下列，畢業前須通過至少2門「數位應用相關課程」(可至本系或外系修習)。傅立葉變換及其應用(EEC312) 、光電程式設計(EEC321) 、嵌入式系統之光電應用(EEC323)、感測器與其應用(EEC329)、無人商店感測技術(EEC424) 、色彩與影像處理(EEC322)、人工智慧與其應用(EEC563)或人工智慧與影像辨識(EEC425)、影像檢測技術(EEC523)、機器學習與其應用(EEC561)。  Students require passing at least two 'digital application courses'. (Student may take 'digital application courses' from another department.) Fourier Transform Theory and Applications(EEC312) , Electro-Optics Programming(EEC321) , Photonics Applications of Embedded Systems (EEC323),Sensors and their applications(EEC329), Sensor technologies of checkout-free store(EEC424), Color and Image Processing (EEC322), Artificial Intelligence and Its Applications (EEC563) or Artificial Intelligence and pattern recognition (EEC425), Image Inspection and Detection Technique (EEC523), Machine Learning and Its Applications(EEC561), are courses of 'digital application courses'.  十二、因特殊狀況需求，得微調課程開課時間。  Adjustments to course scheduling may be made, if special circumstances or needs rise  十三、為增進學生英文能力，鼓勵選修英語授課課程(含英專班)，其修習之課程科目及學分數之認抵需依學系規定辦理  To improve students’ English, we encourage students to take the courses in English (including English Bachelor), which courses and credits waiver and transference should be standardized by each department.  十四、自106學年度起軍訓課程由必修改為選修，該學分納入當學期修課學分數計算，但不納入畢業總學分計算。  The military education courses are no longer compulsory starting the 106 academic year. The military education courses will not be accumulated to the graduation requirements, but they can be counted as taken credits for each semester.  十五、須通過大學程式能力檢定 (Collegiate Programming Examination, 簡稱CPE) 累計二題始得畢業。或取得Amazon (AWS)、Google、Microsoft三雲證照者，「基礎級」證照（無論張數）僅能折抵一題，其餘進階證照一張折抵一題。  There are two avenues to meet the graduation requirements on programming skill.  1. The students could take the Collegiate Programming Examination (CPE) and pass at least two CPE questions in a cumulative manner during their undergraduate study.  2. The students could earn Amazon (AWS), Google, or Microsoft cloud certifications. The foundational certifications (regardless of the number of certifications the student owns) can be applied in equivalence to only a single CPE question while other advanced certifications can be applied in a one-to-one equivalence to the CPE questions.  十六、修習碩士班課程以大三以上學生為限，且不得修習碩士在職專班課程。  Master's degree courses are limited to students in their third year or above, and students are not allowed to take courses from the Master's part-time program. | | | | | | | |

AA-CP-04-CF02 (1.3版)／102.04.19修訂

**元智大學電機工程學系(丙組) 選修科目表**

**（113學年度入學新生適用）**

Department of Electrical Engineering (Program C), Yuan Ze University

List of Elective Courses for the Undergraduate Program

（Applicable to newly-admitted students in 2023）

113.05.01 一一二學年度第八次教務會議通過

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| 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring | 上Fall | 下Spring |
| 電  機  (丙  組)  選  修  科  目  Department Elective | 基礎數學實作Fundamental Mathematics Practice  EEC112 | 普通化學  General Chemistry  EEC108 | 光電程式設計  Electro-Optics Programming  EEC321 | 電磁學(二)  Electromagnetics(II)  EEC308  **必選修** | 光子學導論 Introductory Photonics  EEC301 | 電磁學（三）  Electromagnetics(III)  EEC315 | 雷射導論  Introduction to Lasers  EEC404 | 光電量測系統導論  Introduction of the optical metroiogy EEC418 |
| 光電概論  Introduction to Electro-Optics  (1學分)  EEC111 | 線性代數  Linear Algebra  EEC110 |  | 電機專題  (2學分)  Electrical Topics  EEC216  **必選修** | 進階工程數學  Advanced Engineering Mathematics  EEC421 | 近代物理（二）  Modern Physics(II)  EEC306 | 光電元件 製程  Manufacturing Technology of Optoelectronic Devices  EEC407 | 新興平面顯示器原理與技術導論  Introduction to novel flat panel display technology  EEC411 |
| 光電與產業  Photonics Industry  EEC313 | 色度學  Colorimetry  EEC414 |  | 嵌入式系統之光電應用  Photonics Applications of Embedded Systems  EEC323 | 近代物理(一)  Modern Physics(I)  EEC305 | 色彩與影像處理  Color and Image Processing  EEC322 | 固態物理 導論  Introduction to Solid-state Physics  EEC408 | 量子力學導論  Introduction to Quantum Mechanics  EEC413 |
| 計算機概論  Introduction to Computer Science  EEC107 | 半導體產業簡介  Introduction to Semiconductor Industry  (1學分)  EEC116 |  |  | 工程光學實驗  Experiments in Photonic Engineering  (1學分)  EEC328 | 光學設計導論  Introductory Optical Design  EEC213 | 節能照明  Green Lighting  EEC419 | 生醫光電原理與運用  Principles and Applications of Biophotonics  EEC412 |
| 電子電機概論  Introduction of Electronic Engineering  (1學分)  EEC115 | 量子電腦與量子計算  Quantum Computers and Quantum  EEC117 |  |  | 傅立葉變換及其應用  Fourier Transform Theory and Applications  EEC312 | 半導體元件物理  Semiconductor Device Physics  EEC307 | 非成像系統與實作  Introduction of the Simulation and Fabrication of Opto-Mechanical System EEC422 | 專題與實習(一)  Project Study and Practical Training(I)  EEC309 |
|  | 半導體 光電概論  Introduction to Semiconductor Electro-Optics  (1學分)  EEC118 |  |  | 感測器與其 應用  Sensors and Their Applications  EEC329 | 光纖導論  Introductory Fiber Optics  EEC303 | 有機光電半導體導論  Introduction of organic semiconductor for optoelectronics  EEC417 | 專題與實習(二)  Project Study and Practical Training(II)  EEC409 |
|  |  |  |  | 半導體物理 導論  Introduction to Semiconductor Physics  EEC331 | 光電工程 實作  Optoelectronics Engineering Practices (2學分)  EEC330 | 太陽能光電導論  Principles of Solar Cells  EEC416 |  |
|  |  |  |  | 液晶顯示器之基礎原理  Fundamentals of Liquid Crystal Display  EEC311 | 有機發光元件與投影機導論  Introduction to Organic Light-Emitting Diodes and Projectors  EEC332 | 人工智慧與影像辨識  Artificial Intelligence and Image Identification  EEC425 |  |
|  |  |  |  |  |  | 色度光度理論與量測Colorimetry: Fundamentals and Measurements EEC401 |  |
| 備  註  Remarks | 1. 必選修課程：電磁學(二) (EEC308)、電機專題(EEC216) (2學分)   Required elective courses: Course requirement: Electromagnetics (II) (EEC308)、Electrical Topics (EEC216) (2 credit hours).   1. 未特別註明學分數之科目皆為3學分   Those courses without specific marking are worth 3 credit hours.   1. 本組規劃有兩個學程，其必選修科目如下： Program C offers two academic programs, with the required and elective courses listed as follows:   ●「半導體暨綠能」學程： the program of semiconductor and green energy:  必修：近代物理（一）(EEC305)、半導體物理導論(EEC331)或半導體物理(EEC503)、光電元件製程(EEC407)或半導體製程技術導論(EEC542)、發光二極體原理與應用(EEC540)或太陽能光電元件(EEC541)或太陽能光電導論(EEC416)。需通過四門。  Required courses: Modern Physics (I) (EEC305), Introduction to Semiconductor Physics (EEC331) or Semiconductor Physics (EEC503), Optoelectronic devices manufacturing process (EEC407) or Introduction to Semiconductor Process Technology (EEC542), Principles and Applications of Light Emitting Diodes (EEC540) or Photovoltaic Devices (EEC541) or Principles of Solar Cells (EEC416). Four courses in the list need taking and passing.  選修：液晶顯示器之基礎原理(EEC311)、新興平面顯示器原理與技術導論(EEC411)、色度學(EEC414)、節能照明(EEC419)、固態物理(EEC509)或固態物理導論(EEC408)、液晶顯示光學(EEC519)、半導體元件(EEC531)或半導體元件物理(EEC307)、有機發光元件及物理(EEC543)或有機光電半導體導論(EEC417)或有機發光元件與投影機導論(EEC566)或(EEC332)、色度光度理論與量測(EEC567)或(EEC401)、前瞻光電元件導論(EEC549)、薄膜工程(EEC551)，其中選修科目需任選二門以上。  Elective courses: Fundamentals of Liquid Crystal Display (EEC311), Introduction to novel flat panel display technology (EEC411), Colorimetry (EEC414), Green Lighting (EEC419), Solid-State Physics (EEC509) or Introduction to Solid-state Physics (EEC408), Optics of Liquid Crystal Displays (EEC519), Semiconductor Devices (EEC531) or Semiconductor Device Physics (EEC307), Organic light-emitting devices and physics (EEC543) or Introduction of organic semiconductor for optoelectronics (EEC417) or Introduction to Organic Light-Emitting Diodes and Projectors (EEC566) or (EEC332), Colorimetry: Fundamentals and Measurements (EEC567) or (EEC401), Introduction of the advanced optoelectronic devices (EEC549), Thin-film Technology (EEC551). Two or more courses in the list need taking.  ●「光機電系統與光資訊」學程：  the program of opto-electromechanical systems and optical information  必修：光子學導論(EEC301)、光電與產業(EEC313)、光學設計(EEC511)或光學設計導論(EEC213)、雷射原理及應用(EEC534)或雷射導論(EEC404)。需通過四門。  Required courses : Introductory Photonics (EEC301), Photonics Industry (EEC313), Optical Design (EEC511) or Introductory Optical Design (EEC213), Laser Principle and Application (EEC534) or Introduction to Lasers (EEC404). Four courses in the list need taking and passing.  選修：電磁學（二）(EEC308)、傅立葉變換及其應用(EEC312)、光電程式設計(EEC321)、色彩與影像處理(EEC322)、嵌入式系統之光電應用(EEC323)、光電工程實作(EEC330)或工程光學實驗(EEC328)、感測器與其應用(EEC329)、色度學(EEC414)、光電量測系統導論(EEC418)、非成像系統設計與實作(EEC422)、人工智慧與其應用(EEC563)或人工智慧與影像辨識(EEC425)、傅立葉光學(EEC514)、液晶顯示光學(EEC519)、影像檢測技術(EEC523)、機器學習與其應用(EEC561)、有機發光元件與投影機導論(EEC566)或(EEC332)、色度光度理論與量測(EEC567)或(EEC401)，其中選修科目需任選二門以上。  Elective courses: Electromagnetics (II) (EEC308), Fourier Transform Theory and Applications (EEC312), Electro-Optics Programming (EEC321), Color and Image Processing (EEC322), Photonics Applications of Embedded Systems (EEC323), Optoelectronics Engineering Practices (EEC330) or Experiments in Photonic Engineering (EEC328), Sensors and Their Applications (EEC329), Colorimetry (EEC414), Introduction to the optical metrology (EEC418), Introduction to the Simulation and Fabrication of Opto-Mechanical System (EEC422), Artificial Intelligence and Its Applications (EEC563) or Artificial Intelligence and Image Identification (EEC425), Fourier Optics (EEC514), Optics of Liquid Crystal Displays (EEC519), Image Inspection and Detection Technique (EEC523), Machine Learning and Its Applications (EEC561), Introduction to Organic Light-Emitting Diodes and Projectors (EEC566) or (EEC332), Colorimetry: Fundamentals and Measurements (EEC567) or (EEC401). Two or more courses in the list need taking.   1. 大學部同學上修電機系(丙組)碩士班一般生課程，承認為大學部專業選修，同學可依興趣選課。修課規定於選課系統說明標註須具備的知識與教學計劃書註明先修科目，依此辦理。另碩士在職專班課程不開放大學部同學選修。   Undergraduate students may take courses from the Master's program in Electrical Engineering (Program C), which will be recognized as major courses for undergraduate students. Students may choose courses according to their interests. Course requirements, prerequisites, and the teaching plans can be looked up in the course selection system. Students must adhere to these requirements. Additionally, Master's part-time program courses are not open for selection by undergraduate students. | | | | | | | |

AA-CP-04-CF05 (1.2版)／101.11.15修訂