國立暨南國際大學電機工程學系學士班必選修科目一覽表

Undergraduate Program Course Catalog of Department of Electrical Engineering ,National Chi Nan University

本表(**113**)學年度入學新生適用 Effective for students admitted in Fall,**2024**

最低畢業學分：**131**學分，全校共同課程**16**學分，通識領域課程**15**學分，系必修**58**學分，選修**42**學分，其中專業選修至少 **33** 學分(專業選修含資訊工程學系、應用材料與光電工程學系及本系所開授之專業選修課程，第二外語或英文聽講至少2學分。)。

Undergraduate requirements: a minimum of 131 required credits, including 16 credits in the school-wide curriculum, 15 credits of General Education courses, 58 credits of Departmental required courses and 42 credits of elective courses, including 33 credits from specialized elective courses, and at least 2 credits in a second foreign language or English listening and speaking.

壹、全校共同課程 1.School-Wide Curriculum

一、共同課程(必修**16**學分) A. School-Wide Required Courses (**16** credits)

課程代號 Course Code	課程名稱(中文及英文) Course Name (Chinese and English)	學分數 Credits	備註 Notes
	跨域專業學術英文(一)：文本解析與書寫 Cross-disciplinary ESAP: Textual Interpretation and Composition	2	自110學年度起，英文能力分班改為依照本校自辦英檢(OOPT)作依據，分為三級上課：前10%的同學將分配至「跨域專業學術英文(一)：文本解析與書寫(進階)/跨域專業學術英文(二)：思辨與表達(進階)/跨域專業學術英文(三)：跨文化溝通與表達(進階)」上課；中間80%的同學將分配至原班英文上課；後10%的同學將分配至「跨域專業學術英文(一)：文本解析與書寫(基礎)/跨域專業學術英文(二)：思辨與表達(基礎)/跨域專業學術英文(三)：跨文化溝通與表達(基礎)」上課。
	跨域專業學術英文(二)：思辨與表達 Cross-disciplinary ESAP: Critical Thinking and Expression	2	
	跨域專業學術英文(三)：跨文化溝通與表達 Cross-disciplinary ESAP: Cross-Cultural Communicative Skills	2	Since the first semester of 110 Academic Year (September 2021), the competence-based class grouping policy of Freshmen English (Course Title: Cross-disciplinary ESAP: Textual Interpretation and Composition) will be based on registered student's OOPT scores; Students will be accordingly divided into three different levels: advanced (top 10%), general (middle 80%) and basic (bottom 10%).
	中文思辨與表達一：閱讀書寫 Critical Thinking And Expression In Chinese （Ⅰ）：Reading And Writing	2	僑外生修習「僑外生華語文」可抵通識人文領域課程，不得以「僑外生華語文」抵免中文思辨與表達課程。（Overseas students who take

	中文思辨與表達二：多元應用 Critical Thinking And Expression In Chinese（Ⅱ）：Multiple Applications	2	Chinese for Overseas Students can be credited in field of Humanities, but cannot be certified as Critical Thinking And Expression In Chinese.）
	社會服務學習 Service Learning	1	依所屬學系分班上課，無特殊原因不得跨班選課。（Students are divided into groups by their own department, without any proper reasons they cannot change the decision.）
	資訊科技 Information Technology	1	每學年於上學期開課，不分學系上課。(Freshmen take courses in the first semester of each academic year, regardless of department.)
	大一體育(上) Physical Education (1)	1	上學期依所屬學系分班上課，無特殊原因不得跨班選課，惟未達40人之學系、院學士班班級，則採合併班開課；下學期則依運動項目分班，自由選課。（In the first semester of freshman, students are arranged to take Physical Education (1) by their original department. Without any proper reasons, change will be prohibited. If a class of the department or the interdisciplinary program that is less than 40 students, the combined class will be adopted. In the second semester of freshman, studetns are able to take Physical Education (2) by their interesting.）
	大一體育(下) Physical Education (2)	1	
	特色運動 Featured Sports	2	大二開始，每學期限修一項，畢業前須完成至少2項特色運動（Students are limited to take 1 featured sports course each semester since sophomore. At least 2 featured sports courses are required before graduation.）
通識講座 General Education Seminar		0	畢業前至少應出席6場。（Students are required to attend at least 6 lectures before graduation.）

二、共同選修課程（各系依共同選修加列課程）B. School-Wide Elective Courses

	第二外語 (Second Foreign Language）		含日文、韓文、法文、德文及西班牙文等。(Including Japanese, Korean, French, German and Spanish, etc.)

	東南亞語言 (Southeast Asia Languages)		含泰語、越南語、緬甸語、印尼語及馬來語，可抵特色通識領域。(Including Thai, Vietnamese, Burmese, Indonesian and Malay. These courses can be credited course credits in Topical General Education)
	進階語文(Advanced English)		
	其他選修(Other Elective Course)		

貳、通識領域課程(至少**15**學分) 2.General Education Courses

領域 Field (須修習資訊科技與自主學習課程) (Information Technology and Self-directed Learning courses are required)		學分數 Credits	備　　　　　　　註　　Notes
人文領域 Humanities	文學與藝術(Literature and Art)	3	至少修習3學分。(Students should attend a total of at least 3 credits.)
	歷史哲學與文化(History, Philosophy and Culture)		
	AI文創協作(AI Collaboration in Cultural Creativity)		
社會領域 Society	法政與教育(Law, Politics and Education)	3	至少修習3學分。(Students should attend a total of at least 3 credits.)
	社經與管理(Society, Economy and Management)		
	資料科學分析(Data Science Analysis)		
自然領域 Nature	工程與科技(Engineering and Technology)	3	至少修習3學分。(Students should attend a total of at least 3 credits.)
	生命與科學(Life and Science)		
	程式設計(Programming)		
特色通識領域 Topical General Education	國際連結(International Connection)	3	至少修習3學分。(Students should attend a total of at least 3 credits.)
	淨零永續(Net-Zero Sustainability)		
	社會創新(Social Innovation)		

通識各主領域課程(人文、社會、自然及特色通識)得單一領域跨域認抵，至多4學分 (需經通識教育中心認定之)
General education courses from various fields (humanities, social, natural, and topical general education) can be cross-credited within a single field, up to a maximum of 4 credits (subject to approval by the General Education Center).
領域課程15學分中，學生須至少修習二門資訊科技課程，且須包括自主學習類型課程1學分。
Students are required to take at least two Information Technology courses and get 1 credit of Self-directed Learning courses out of the 15 credits of General Education Courses.

參、學系專業課程 3.Departmental Courses

課程代號 Course Code	課程名稱(中文及英文)　　Course Name (Chinese and English)	學分數 Credits	修別 Course type (required/elective)	開課年級 Course availability (freshman/sophomore/junior/senior)	備註 Notes

230001	普通物理（上） Physics (I)	3	必 required	一上 Freshman 1st Semester	
230002	微積分（上） Calculus (I)	3	必 required	一上 Freshman 1st Semester	
230003	基礎化學 Fundamental Chemistry	3	選 elective	一 Freshman	
230004	普通物理實驗 Physics Laboratory	1	選 elective	一 Freshman	
230005	計算機概論 Introduction to Computer Science	3	選 elective	一 Freshman	
230009	微積分(下) Calculus (II)	3	必 required	一下 Freshman 2nd Semester	
230010	普通物理(下) Physics (II)	3	必 required	一下 Freshman 2nd Semester	
230012	數位邏輯設計 Digital Logic Design	3	必 required	一上 Freshman 1st Semester	
230013	電工實驗(一) Electrical Engineering Laboratory (I)	1	必 required	二上 Sophomore 1st Semester	
230020	電子學(一) Electronics (I)	3	必 required	二上 Sophomore 1st Semester	

230021	電路學(一) Circuitry(I)	3	必 required	二上 Sophomore 1st Semester	
230023	電工實驗(二) Electrical Engineering Laboratory (II)	1	必 required	二下 Sophomore 2nd Semester	
230026	電子學(二) Electronics (II)	3	必 required	二下 Sophomore 2nd Semester	
230027	電路學(二) Circuitry (II)	3	必 required	二下 Sophomore 2nd Semester	
230035	線性代數 Linear Algebra	3	必 required	一下 Freshman 2nd Semester	
230043	近代物理 Modern Physics	3	選 elective	三 Junior	
230050	隨機程序 Stochastic Processes	3	選 elective	三 Junior	
230052	專題(上) Senior Project (I)	2	必 required	三上 Junior 1st Semester	
230053	專題(下) Senior Project (II)	2	必 required	三下 Junior 2nd Semester	
230054	數位通訊 Digital Communications	3	選 elective	三 Junior	

230057	工程數學(下) Engineering Mathematics (II)	3	必 required	二下 Sophomore 2nd Semester	
230059	資料結構 Data Structure	3	選 elective	二 Sophomore	
230062	數位邏輯實驗 Digital Logic Laboratory	1	必 required	一下 Freshman 2nd Semester	
230063	電子學(三) Electronics (III)	3	選 elective	三 Junior	
230064	電磁學(上) Electromagnetics (I)	3	必 required	三上 Junior 1st Semester	
230068	通訊系統導論 Introduction to Communication Systems	3	選 elective	三 Junior	
230073	控制系統導論 Introduction to Control Systems	3	選 elective	三 Junior	
230074	電磁學(下) Electromagnetics (II)	3	必 required	三下 Junior 2nd Semester	
230084	工程數學(上) Engineering Mathematics (I)	3	必 required	二上 Sophomore 1st Semester	
230088	計算機程式 Computer Programming	3	必 required	一下 Freshman 2nd Semester	

230090	機率 Probability	3	選 elective	二 Sophomore	
230091	VLSI導論 Introduction to VLSI	3	選 elective	二 Sophomore	
230103	微波量測 Microwave Measurement	3	選 elective	三 Junior	
230104	系統最佳化 System Optimization	3	選 elective	三 Junior	
230106	數位訊號處理導論 Introduction to Digital Signal Processing	3	選 elective	三 Junior	
230108	訊號與系統 Signals and Systems	3	必 required	二下 Sophomore 2nd Semester	
230110	數位系統設計 Digital Systems Design	3	選 elective	三 Junior	
230113	微算機原理與實驗 Microprocessors Principles and Laboratory	3	必 required	二上 Sophomore 1st Semester	
230118	數位控制系統 Digital Control Systems	3	選 elective	三 Junior	
230120	通訊實驗 Communication Laboratory	3	選 elective	三 Junior	

	機率 Probability	3	選 elective	二 Sophomore	

230121	固態電子導論 Introduction to Solid-State Electronics	3	選 elective	三 Junior	
230122	專業實習 Specialized Internship	3	選 elective	四 Senior	
230123	企業實習 Enterprise Internship	6	選 elective	四 Senior	
230127	半導體製程技術導論 Introduction to Semiconductor Process Technology	3	選 elective	三 Junior	
230128	計算機組織與結構 Computer Organization and Architecture	3	選 elective	三 Junior	
230132	物聯網系統設計與實作 System Design and Development of Internet of Things	3	選 elective	三 Junior	
230133	智慧生活 Smart Life	3	選 elective	一 Freshman	
230134	嵌入式系統機器學習應用程式設計 Embedded System and Machine Learning Programming	3	選 elective	三 Junior	
230135	智慧無人載具之體驗與應用 Implementation and Application of Intelligent Unmanned Vehicles	3	選 elective	二 Sophomore	
230137	量測與自動化 Measurement and Automation	3	選 elective	二 Sophomore	

230138	電機與資訊入門設計與實作 Cornerstone Course Design for Engineering Education	3	選 elective	一 Freshman	
230139	Python程式設計 Python Programming	3	選 elective	一 Freshman	
230140	電磁學實驗 Electromagnetics Lab	3	選 elective	二 Sophomore	
230242	數位影像處理 Digital Image Processing	3	選 elective	三 Junior	
230243	半導體元件物理 Semiconductor Devices Physics	3	選 elective	三 Junior	
230244	半導體元件特性與量測 Semiconductor Devices Characterization and Measurement	3	選 elective	三 Junior	
230245	半導體元件模擬 Simulation of Semiconductor Devices	3	選 elective	三 Junior	
230246	半導體記憶體 Semiconductor Memories	3	選 elective	三 Junior	
230247	半導體感測器 Semiconductor Sensors	3	選 elective	三 Junior	
230248	固態物理 Solid-State Physics	3	選 elective	三 Junior	

電機與資訊入門設計與實作
Cornerstone Course Design for
Engineering Education

230249	固態電子實驗-半導體製程與量測 Solid-State Electronics Laboratory-Semiconductor Processing and Measurement	3	選 elective	三 Junior	
230250	固態電子學 Physics for Solid-State Electronics	3	選 elective	三 Junior	
230251	奈米金氧半元件 Nano CMOS Devices	3	選 elective	三 Junior	
230252	前瞻類比積體電路設計 Advanced analog integrated circuit design	3	選 elective	三 Junior	
230253	硬體描述語言與FPGA雛型 Hardware Description Language and FPGA Prototyping	3	選 elective	三 Junior	
230254	積體電路元件 Semiconductor Devices for Integrated Circuits	3	選 elective	三 Junior	
230255	積體電路製程技術(一) Integrated Circuits Fabrication Technology(I)	3	選 elective	三 Junior	
230256	積體電路製程技術(二) Integrated Circuits Fabrication Technology(II)	3	選 elective	三 Junior	
230257	類比VLSI電路設計 Analog VLSI Circuits Design	3	選 elective	三 Junior	
230258	類比與數位訊號轉換器設計 Analog and Digital Signal Converter Design	3	選 elective	三 Junior	

230259	類比積體電路系統設計及應用 Analog VLSI System Design Applications	3	選 elective	三 Junior	
230260	射頻積體電路設計 RF Integrated Circuit Design	3	選 elective	三 Junior	
230261	非接觸式行動裝置充電導論 Introduction to Wireless Power Transfer (WPT) for Mobile Devices	3	選 elective	三 Junior	
230262	RFID晶片設計 RFID Chip Design	3	選 elective	三 Junior	
230263	太陽能電池 Solar Cells	3	選 elective	三 Junior	
230264	微波元件 Microwave Devices	3	選 elective	三 Junior	
230265	微波電路 Microwave Circuits	3	選 elective	三 Junior	
230266	微波工程 Microwave Engineering	3	選 elective	三 Junior	
230267	微波被動電路 Microwave Passive Circuits	3	選 elective	三 Junior	
230268	平面天線設計 Planar Antenna Design	3	選 elective	三 Junior	

230269	天線陣列設計 Antenna Array Design	3	選 elective	三 Junior	
230270	數值電磁方法 Numerical Methods in Electromagnetics	3	選 elective	三 Junior	
230271	電磁相容 Electromagnetic Compatibility	3	選 elective	三 Junior	
230272	醫學電子學 Biomedical Electronics	3	選 elective	三 Junior	
230273	線性系統 Linear System Theory	3	選 elective	三 Junior	
230274	數位訊號處理 Digital Signal Processing	3	選 elective	三 Junior	
230275	數位視訊技術 Digital Video Technology	3	選 elective	三 Junior	
230276	數位通訊應用 Digital Communication Theory and Technology	3	選 elective	三 Junior	
230277	軟硬體協同設計 Hardware/Software Codesign	3	選 elective	三 Junior	
230278	圖型識別 Pattern Recognition	3	選 elective	三 Junior	

天線陣列設計
Antenna Array Design

230279	偵測與估計 Detection and Estimation	3	選 elective	三 Junior	
230280	行動網路系統 Mobile Network Systems	3	選 elective	三 Junior	
230281	計算機網路 Computer Network	3	選 elective	三 Junior	
230282	無線通訊 Wireless Communication	3	選 elective	三 Junior	
230283	第五代無線通訊系統簡介 Introduction to 5G Wireless Communication Systems	3	選 elective	三 Junior	
230284	軟體無線電 Software Radio	3	選 elective	三 Junior	
230285	新世代無線通訊技術 New-Generation Wireless Communication Techniques	3	選 elective	三 Junior	
230286	無線通訊系統 Wireless Communication Systems	3	選 elective	三 Junior	
230287	無線接收器模擬與製作 Wireless Receiver Simulation and Implementation	3	選 elective	三 Junior	
230288	MATLAB程式語言於電機工程之應用 Application of MATLAB in Electrical Engineering	3	選 elective	三 Junior	

230289	MATLAB機器學習應用程式設計 MATLAB Programming in Machine Learning	3	選 elective	三 Junior	
230290	人工智慧與模糊類神經網路 Artificial intelligence and fuzzy neural network	3	選 elective	三 Junior	
230291	人工智慧與類神經網路 Artificial Intelligence and Neural Network	3	選 elective	三 Junior	
230292	深度學習與圖型識別之TensorFlow程式設計與實作 Programming and Implementations of Deep Learning and Pattern Recognition with Tensorflow	3	選 elective	三 Junior	
230293	深度學習與語音識別 Deep Learning and Speech Recognition	3	選 elective	三 Junior	
230294	深度機器學習 Special Topics on Deep Machine Learning	3	選 elective	三 Junior	
230295	智慧型與適應性控制 Intelligent and Adaptive Control	3	選 elective	三 Junior	
230296	智慧機器人原理與控制 Intelligent Robotics-Principles and Control	3	選 elective	三 Junior	
230297	機器人程式設計 Advanced Programming in Robotic Navigation	3	選 elective	三 Junior	
230298	科技簡報 Technical Presentation	3	選 elective	三 Junior	

230299	鎖相環迴路設計 Phase Lock Loop Design	3	選 elective	三 Junior Semester	

填表人：　　　　　系(所)主管：　　　　院長：　　　　　填表日期：