113 學年度第 2 學期電機系第 1 次課程委員會(114.03.26)修訂
113 年度第 2 學期電機學院第 1 次課程委員會(114.04.14)通過
113 學年度國立陽明交通大學第 3 次課程委員會(114.05.12)通過

Revised by the Joint Curricular Committee, Department of Electronics and Electrical Engineering, on March 26, 2025
Approved by the Curricular Committee, College of Electrical and Computer Engineering, on April 14, 2025
Approved by the Curriculum Committee, National Yang Ming Chiao Tung University, on May 12, 2025

國立陽明交通大學電機工程學系大學部必修課程暨專業必修實驗課程表

NYCU Department of Electronics and Electrical Engineering
Table of Required Courses

110 學年度 (Academic Year 2021)

科目名稱 Course Name	規定學分 Credit	第一學年 Freshmen		第二學年 Sophomore		第三學年 Junior		第四學年 Senior		備註 Remarks	
		上 1st	下 2st	上 1st	下 2st	上 1st	下 2st	上 1st	下 2st		
微積分(一)(二) Calculus(I)(II)	8	4	4							基礎類(25 學分) Fundamental (Mathematics) Courses (25 credits)	基礎必修課程(50 學分) Fundamental Courses (50 credits)
物理(一)(二) General Physics(I)(II)	8	4	4								
線性代數※ Linear Algebra	3		3								
微分方程※ Differential Equation	3			3							
機率 Probability	3				3						
生涯規劃與導師時間 Career Planning and Mentor's Hours	0	0	0								
服務學習(一)(二) Student Service Education(I)(II)	0		0	0							
電子學(一)(二) Electronics(I)(II)	6			3	3					電機類(19 學分) Electrical Engineering (19 credits)	
電子實驗(一)(二) Electronics Lab(I)(II)	4			2	2						
電路學 Circuit Theory	3			3							
電磁學 Electromagnetics	3				3						
訊號與系統 Signals and Systems	3				3						
計算機概論與程式設計 Intro. to Computers and Programming	3	3								計算機類(6 學分) Computer Science (6 credits)	
邏輯設計 Logic Design	3	3									
數位實驗 Digital Lab.	3		3							專業必修實驗課程，至少選 2 科 Major compulsory Labs (at least 2 labs)	
微算機原理與實驗 Principle of Microcomputer	3			3	(3)						
通訊網路實驗 Communication Networks Lab.	3					3	(3)				
通訊系統實驗 Communication System Lab.	3					3	(3)				
通訊系統電腦模擬 Computer Simulation of Communication Systems	3					3	(3)				
射頻電路原理與實驗 Principles and Lab. of RF Circuits	3						3				
數位訊號處理晶片實驗 Digital Signal Processing Chips Lab.	3							3	(3)		
控制實驗	3						3				

Control Lab.										
電力電子實驗 Power Electronics Lab.	3				(3)	3				
生醫工程實驗 Biomedical Engineering Lab.	3					3	(3)			
人本計算實驗 Human-Centric Computing Lab.	3						3	(3)		
智慧機器人實驗 Intelligent Robotics Lab.	3						3	(3)		
VLSI 實驗 VLSI Lab.	3					3	(3)			
(二擇一)半導體實驗 或 碳化矽製程技術+碳化矽製程實驗 Semiconductor Lab. **or** SiC Process Technology + SiC Process Laboratory	3					3	(3)			
類比積體電路實驗 Integrated Circuit Lab	3						3			
嵌入式系統技術實驗 Embedded System Lab.	3					3	(3)			
(二擇一)元件電路計測實驗 或 高功率元件電性測量技術與實驗 Device and Circuit Characterization Lab. **or** Electrical Characterization Technology and Laboratory of Power Devices	3							3	(3)	
電子設計自動化演算法與實作 Electronic Design Automation Algorithms and Implementation	3					3	(3)			
數位訊號處理應用實驗 Digital Signal Processing Laboratory	3					3	(3)			
AI 無線通訊系統實驗 AI Lab for Wireless Communication	3						3			
專業選修領域 Major Elective Courses	33	專業選修 33 學分，應從本系開授之專業課程至少修得 24 學分(不含基礎必修、專業必修實驗課程 6 學分與專題)，課程需涵蓋至少 18 學分的本系核心課程。 Require 33 credits of Elective Courses. Among these, at least 24 credits must be obtained from our department (not including the Fundamental Courses, 6 credits of the Major Compulsory Labs, and Project Courses), and at least 18 credits must be obtained from Core Curricular.								
合計	89									
		校訂共同科目依照本校相關規定。 Common required courses should follow the university regulations.								
本系最低畢業學分為 128 學分 Graduation requirement 128 credits										

※大學程式設計先修檢測(APCS)成績總級分九級(含)以上，可申請抵修大一[計算機概論與程式設計]，核予三學分。

※Students, who receive grade nine or above in the Advanced Placement Computer Science (APCS) exam, can be recognized as having gotten the credits of the fundamental course “Introduction to Computers and Programming”.

※專業必修實驗課程，至少選 2 科，適用所有在學學生。

※The Major Compulsory Laboratory Courses, at least two of which must be taken, shall be applied to all undergraduate students.

107 學年度第三次兩系聯席課程委員會通過 (107.12.12)
109 學年度第一次兩系聯席課程委員會通過 (109.10.28)
110 學年度第 2 學期第 2 次課程委員會(111.3.15)
111 學年度第 2 學期第 2 次課程委員會(112.3.30)
111 學年度第 2 學期電機系第 2 次課程委員會(112.3.30)修訂
111 學年度第 2 學期電機學院第 1 次課程委員會(112.04.13)通過
111 學年度國立陽明交通大學第 3 次課程委員會(112.05.16)通過
Approved by the Joint Curricular Committee, College of Electronics and Electrical Engineering, on October 3, 2018
Approved by the Joint Curricular Committee, College of Electronics and Electrical Engineering, on October 28, 2020
Approved by the Joint Curricular Committee, College of Electronics and Electrical Engineering, on March 15, 2022
Approved by the Joint Curricular Committee, College of Electronics and Electrical Engineering, on May 3, 2022
Revised by the Joint Curricular Committee, Department of Electronics and Electrical Engineering, on March 30, 2023
Approved by the Curricular Committee, College of Electrical and Computer Engineering, on April 13, 2023
Approved by the Curriculum Committee, National Yang Ming Chiao Tung University, on May 16, 2023

電機工程學系專業選修核心課程暨相關專業選修課程表
Elective Curricula of the Department of Electronics and Electrical Engineering: Table of Core Courses and Related Elective Courses

領域名稱 Program	核心課程 Core Courses	大學部領域相關專業選修課程 Related Undergraduate Elective Courses	研究所相關課程 Related Graduate Courses
智慧與感測元件 Intelligent and Sensor Device	材料科學導論 Introduction to Material Science 電磁波 Electromagnetic Wave 感測與光電導論 Introduction to Sensor and Optoelectronics	量子力學導論 Introduction to Quantum Mechanics 固態物理(一)(二) Solid State Physics(I)(II) 相關實驗課程 Related Laboratory Courses: 半導體實驗 Semiconductor Laboratory 元件電路計測實驗 Device and Circuit Characterization Laboratory	固態物理 Solid State Physics 半導體物理及元件(一)(二) Semiconductor Physics and Devices(I)(II) 光電子學 Optical Electronics 高等電磁學(一) Advanced Electromagnetics(I) 積體電路技術(一)(二) Integrated Circuit Technology(I)(II) 記憶體元件與製程 Semiconductor Memories and Their Fabrication Technologies 太陽能電池物理與技術 Solar Cell Physics and Technology CMOS 元件、可靠度及應用之特論 Special Topics of CMOS Devices, Reliability, and Applications 量子力學 Quantum Mechanics 材料分析 Materials Analysis 微機電元件技術 Component Technology of MEMS 元件電路計測實驗 Device and Circuit Characterization Laboratory 電子材料 Electronic Materials 薄膜技術及分析 Thin Film Technology and

			Analysis 單光子元件與系統 Single-Photon Devices and Systems 半導體雷射 Semiconductor Laser 光電半導體物理及元件 Semiconductor Optoelectronic Devices and Physics
半導體元件及工程 Semiconductor Device and Engineering	材料科學導論 Introduction to Material Science 近代物理導論 Introduction to Modern Physics 半導體元件物理 Semiconductor Device Physics 量子力學導論 Introduction to Quantum Mechanics	半導體基礎理論 Basic Semiconductor Physics 數值分析 Numerical Analysis 固態物理(一)(二) Solid State Physics(I)(II) 半導體工程 Semiconductor Engineering 相關實驗課程 Related Laboratory Courses: 半導體實驗 Semiconductor Laboratory	半導體物理及元件(一)(二) Semiconductor Physics and Devices(I)(II) 積體電路技術(一)(二) Integrated Circuit Technology(I)(II) 三維積體電路 3D Integrated Circuits 記憶體元件與製程 Semiconductor Memories and Their Fabrication Technologies 太陽能電池物理與技術 Solar Cell Physics and Technology 元件製程技術及可靠度 Reliability on Semiconductor Device and Process Technology 矽奈米元件及物理 Silicon Nanometer Devices and Physics 低功率 CMOS 元件技術 Low Power Si CMOS Electronics and Device Technology 高功率半導體元件物理與技術 High Power Semiconductor Device Physics and Technology 固態物理 Solid State Physics 量子力學 Quantum Mechanics 光電子學 Optical Electronics 高等電磁學(一) Advanced Electromagnetics(I) 材料分析 Materials Analysis 電子材料 Electronic Materials 薄膜技術及分析 Thin Film Technology and Analysis 微機電元件技術 Component Technology of MEMS 元件電路計測實驗

			Device and Circuit Characterization Laboratory
固態與量子物理 Solid State and Quantum Physics	近代物理導論 Introduction to Modern Physics 量子力學導論 Introduction to Quantum Mechanics 固態物理(一) Solid State Physics(I) 固態物理(二) Solid State Physics(II)	半導體基礎理論 Basic Semiconductor Physics 半導體元件物理 Semiconductor Device Physics 電磁波 Electromagnetic Wave 相關實驗課程 Related Laboratory Course: 物理實驗(一) Physics Laboratory(I) 物理實驗(二) Physics Laboratory(II)	固態物理 Solid State Physics 固態理論 Solid State Theory 量子力學 Quantum Mechanics 光電子學 Optical Electronics 高等電磁學(一) Advanced Electromagnetics(I) 半導體物理及元件(一) (二) Semiconductor Physics and Devices(I)(II)
類比電路與系統 Analog Circuit and Systems	類比積體電路導論 Introduction to Analog Integrated Circuits	電磁波 Electromagnetic Wave 控制系統導論 Introduction to Control Systems 數位訊號處理導論 Introduction to Digital Signal Processing 半導體元件物理 Semiconductor Device Physics 電力電子導論 Introduction to Power Electronics 醫學工程導論 Introduction to Biomedical Engineering Research 感測與光電導論 Introduction to Sensor and Optoelectronics 混合信號積體電路導論 Introduction to Mixed-Signal Integrated Circuits 相關實驗課程 Related Laboratory Course: 類比積體電路實驗 Integrated Circuit Lab	類比積體電路設計 Design and Applications of Analog Integrated Circuits 射頻積體電路設計 Radio Frequency Integrated Circuits Design 資料轉換積體電路 Data Conversion Integrated Circuits 功率積體電路 Power Integrated Circuit Design 毫米波電路與系統 Millimeter-wave Circuits and Systems 微波電路 Microwave Circuits 類比濾波器設計 Analog Filter Design 高頻電路設計與實驗 High-Frequency Circuits & Design Laboratory 生醫電子與系統 Bio-Medical Circuits and Systems 積體電路之靜電防護設計特論 Special Topic on ESD Protection Design in CMOS ICs
電子設計自動化 Electronic Design Automation	資料結構 Data Structures 演算法導論 Introduction to Algorithms	離散數學 Discrete Mathematics 物件導向程式設計 Object-Oriented Programming 數位電路與系統 Digital Circuits and Systems 計算機組織 Computer Organization 超大型積體電路設計導論 Introduction to VLSI Design 相關實驗課程 Related Laboratory Courses: 電子設計自動化演算法與實作	實體設計自動化 Physical Design Automation 計算機輔助設計特論 Special Topics in Computer Aided Design VLSI 測試與可測試性設計 VLSI Testing and Design for Testability 高等演算法 Advanced Algorithms 計算機結構 Computer Architecture 數位積體電路

		Electronic Design Automation Algorithms and Implementation	Digital Integrated Circuits 積體電路設計實驗 Integrated Circuit Design Laboratory 機器學習 Machine Learning 平行程式設計 Parallel Programming 電腦輔助電路設計與分析 Computer-Aided Circuit Design and Analysis VLSI 導線效應之模型與最佳化 Modeling and Optimization of VLSI Interconnects 矩陣運算 Matrix Computation 數值半導體元件模式 Numerical Semiconductor Device Modeling 元件設計與模擬實驗 Device Design and Simulation Lab
系統控制 System Control	自動控制系統 Automatic Control Systems 控制系統設計 Design and Simulation of Control System	微算機系統與實驗 Microcomputer Systems and Lab 動態系統分析與模擬 Analysis and Simulation of Dynamic Systems 數位訊號處理導論 Introduction to Digital Signal Processing 數位控制系統 Digital Control System 相關實驗課程 Related Laboratory Courses: 控制實驗 Control Lab 微算機原理與實驗 Principle of Microcomputer 控制系統整合應用實驗 Laboratory of Control Systems Integration and Applications	數位訊號處理 Digital Signal Processing 嵌入式作業系統 Embedded Operating Systems 隨機過程 Stochastic Processes 線性系統理論 Linear System Theory 智慧型控制 Intelligent Control 電腦控制系統 Computer Control System
多媒體訊號處理 Multimedia Signal Processing	數位訊號處理導論 Introduction to Digital Signal Processing 語音處理導論 Introduction to Speech Processing 機器學習導論 Introduction to Machine	人工智慧導論 Introduction to Artificial Intelligence 互動式音訊處理導論 Introduction to Interactive Audio Processing	數位訊號處理 Digital Signal Processing 機器學習 Machine Learning 雲端運算與巨量資料分析 Cloud Computing and Big Data Analytics 適應性訊號處理

	Learning 影像處理導論 Introduction to Image Processing	相關實驗課程 Related Laboratory Courses: 數位訊號處理晶片實驗 Digital Signal Processing Chips Labs 嵌入式系統技術實驗 Embedded System Laboratory 數位訊號處理應用實驗 Digital Signal Processing Laboratory	Adaptive Signal Processing 語音處理 Digital Speech Processing 聽語資訊處理 Auditory and Acoustic Information Process 資料壓縮 Data Compression 應用電腦視覺 Applied Computer Vision 最佳化理論與應用 Optimization Theory and Applications
系統晶片設計 System-on-chip	超大型積體電路設計導論 Introduction to VLSI Design 計算機組織 Computer Organization	數位訊號處理導論 Introduction to Digital Signal Processing 數位電路與系統 Digital Circuits and Systems 相關實驗課程 Related Laboratory Courses: VLSI 實驗 VLSI Lab 數位實驗 Digital Laboratory	超大型積體電路系統設計 VLSI System Design and Application (高等)數位訊號處理 (Advanced) Digital Signal Processing 數位積體電路 Digital Integrated Circuits 計算機結構 Computer Architecture 記憶體系統 Memory System 積體電路設計實驗 Integrated Circuit Design Lab
通訊科學與系統 Communication Science and Systems	通訊原理(一) Principle of Communication Engineering (I) 通訊原理(二) Principle of Communication Engineering (II)	演算法導論 Introduction to Algorithms 數據通訊 Data Communication 數位訊號處理導論 Introduction to Digital Communications 相關實驗課程 Related Laboratory Courses: 通訊系統實驗 Communication System Lab 通訊系統電腦模擬 Computer Simulation of Communication Systems AI 無線通訊系統實驗 AI Lab for Wireless Communication	數位通訊 Digital Communication 檢測與估計(理論) Detection and Estimation (Theory) 隨機過程 Random Process 編碼理論 Coding Theory 消息理論 Information Theory 適應性訊號處理 Adaptive Signal Processing 無線通訊訊號處理 Wireless Communication Signal Processing MIMO 通訊系統 MIMO Communication Systems 量子訊息與計算 Quantum Information and Computation 最佳化理論與應用 Optimization Theory and Applications 智慧霧運算系統和設計 Intelligent Fog Computing Systems and Designs 訊號處理之數學方法及演算法(一) Mathematical Methods and Algorithms for Signal Processing (I)

			5G 技術規格與實驗 5G Specification and experiment
AI 機器人 AI Robots	進階物件導向程式設計 Advanced Object-Oriented Programming 人工智慧導論：機器人 Introduction to Artificial Intelligence 機器學習導論 Introduction to Machine Learning	JAVA 程式設計 JAVA Programming 資料結構 Data Structure 自動控制系統 Automatic Control Systems 相關實驗課程 Related Laboratory Courses: 智慧機器人實驗 Intelligent Robotics Laboratory 數位訊號處理晶片實驗 Digital Signal Processing Chips Lab	嵌入式作業系統 Embedded Operating Systems 自走式機器人 Mobile Robots 數位訊號處理 Digital Communications 線性系統理論 Linear System Theory 機器人學 Robotics 模糊系統 Fuzzy Systems 感測與智慧系統 Sensing and Intelligent Systems 自主駕駛車技術 Self-Driving Cars 機器學習 Machine Learning 深度學習 Deep Learning 智慧型控制 Intelligent control
電力電子 Power Electronics	電力電子導論 Introduction to Power Electronics 電力工程導論 Introduction to Electrical Power Engineering	自動控制系統 Automatic Control Systems 類比積體電路導論 Introduction to Analog Integrated Circuits 電動機械(機械系) Electromechanical Device (Mechanical Engineering Department) 相關實驗課程 Related Laboratory Courses: 電力電子實驗 Power Electronics Lab 微算機原理與實驗 Principle of Microcomputer	電力電子 Power Electronics 高等電力電子 Advanced Power Electronics 數位電源控制 Digital Power Control 交流式電源供應器設計 Switching Power Supply Design 電動機控制 Motor Control 電力系統 Power System 類比積體電路設計 Design and Applications of Analog Integrated Circuits 功率積體電路設計 Power Integrated Circuit Design
無線科技 Wireless and Microwave Techniques	天線導論 Introduction to Antennas 微波工程導論 Foundations for Microwave Engineering 數位訊號處理導論 Introduction to Digital Signal Processing 通訊原理(一) Principle of Communication Engineering (I)	複變函數 Complex Variables 數值分析 Numerical Analysis 無線通訊之電波傳播與天線 Radio Propagation and Antennas for Wireless Communications 固態電子學 Solid State Electronics 通訊電子學 Communication Electronics 人工智慧導論：機器人 Introduction to Artificial Intelligence 類比積體電路導論 Introduction to Analog Integrated Circuits 半導體元件物理 Semiconductor Device Physics 電磁波 Electromagnetic Wave	類比積體電路設計 Integrated Circuit Design 天線理論 Antenna Theory 物理數學 Mathematical Methods of Physics 微波工程(一)(二) Microwave Engineering(I)(II) 高等電磁學(一)(二) Advanced Electromagnetics(I)(II) 手機行動通訊系統 Mobile Phone Communication System 射頻積體電路設計 Radio Frequency Integrated Circuits Design 電磁共容 Electromagnetic Compatibility 射頻積體電路實驗 Radio Frequency Integrated Circuits Lab

		超大型積體電路導論 Introduction to VLSI Circuits 相關實驗課程 Related Laboratory Courses: 射頻電路原理與實驗 Principle and Lab of RF Circuit	微波電路設計與製造 Microwave Circuit Design Laboratory 微波量測原理 Theory of Microwave Measurement 微波主動元件 Active Microwave Circuit 電波傳播與散射 Wave Propagation and Scattering 電腦輔助電路設計與分析 Computer–Aided Circuit Design and Analysis 數值半導體元件模式 Numerical Semiconductor Device Modeling 最佳化理論與應用 Optimization Theory and Application VLSI 導線效應之模型與最佳化 Modeling and Optimization of VLSI Interconnnects 元件設計與模擬實驗 Device Design and Simulation Lab
資訊通訊 Information and Communications	數據通訊 Data Communication 網路程式設計 Network Programming 資料結構 Data Structure	演算法導論 Introduction to Algorithms 物件導向程式設計 Object-Oriented Programming 作業系統 Operating Systems 電腦網路導論 Introduction to Computer Networks JAVA 程式設計 JAVA Programming 無線網路導論 Introduction to Wireless Networks 網路安全導論 Introduction to Network Security 嵌入式系統導論 Introduction to Embedded Systems 相關實驗課程 Related Laboratory Courses: 通訊網路實驗 Communication Networks Lab AI 無線通訊系統實驗 AI Lab for Wireless Communication	排隊理論 Queuing Theory 無線隨意網路 Wireless Ad Hoc Networks 演算法 Algorithms 計算機網路 Computer Networks 無線網路 Wireless Network 嵌入式系統設計 Embedded Systems Design 行動計算 Mobile Computing 網路安全 Network Security 無線感測網路 Wireless Sensor Networks and RFID Technologies 網路隨機過程 Network Random Process 最佳化理論與應用 Optimization Theory and Application
生醫工程 Biomedical Engineering	醫學工程導論 Introduction to Biomedical Engineering 數位訊號處理導論 Introduction to Digital Signal Processing	人工智慧導論 Introduction to Artificial Intelligence 人體結構、功能、臨床及醫療器材 Human Function Anatomy and Medical Instrument Application VLSI 導論 Introduction to VLSI Circuits 類比積體電路導論 Introduction to Analog Integrated Circuits	數位訊號處理 Digital Signal Processing 影像處理 Digital Image Processing 生醫統計學 Biomedical Statistics 神經彌補裝置 Neural Prosthesis 超音波導論與應用 Introduction to Ultrasound and its Applications

		相關實驗課程 Related Laboratory Courses: 生醫工程實驗 Biomedical Engineering Laboratory 數位訊號處理應用實驗 Digital Signal Processing Laboratory	近代生醫電學 Modern Bioelectricity 醫學工程 Biomedical Engineering Research 仿生科技 Biomimicry 生醫信號分析和模擬 Biomedical Signal Analysis and Modeling 穿戴式裝置系統晶片設計 Wearable device system on a chip (SOC) design 臨床醫學工程概論 Introductiion of Medical Engineering 醫療電子臨床導入 Clinical Application of Medical Electronic Devices
人工智慧與計算機工程 Artificial Intelligence and Computer Engineering	離散數學 Discrete Mathematics 資料結構 Data Structure 人工智慧導論 Introduction to Artificial Intelligence 機器學習導論 Introduction to Machine Learning	物件導向程式設計 Object-Oriented Programming 電腦網路導論 Introduction to Computer Networks 計算機組織 Computer Organization 作業系統 Operating Systems 相關實驗課程 Related Laboratory Courses: 人本計算實驗 Human-Centric Computing Laboratory 嵌入式系統技術實驗 Embedded System Laboratory	機器學習 Machine Learning 平行程式(設計) Parallel Programming (Design) 演算法 Algorithms 計算機結構 Computer Architecture 資料科學 Data Science 計算機網路 Computer Network 嵌入式系統設計 Embedded System Design 雲端運算與巨量資料分析 Cloud Computing and Big Data Analytics 深度學習 Deep Learning 人工智慧無線通訊 Artificial Intelligence Wireless 最佳化理論與應用 Optimization Theory and Application 應用電腦視覺 Applied Computer Vision

※各領域課程適用所有在學學生

※The courses listed in the these programs shall be applied to all undergraduate students.

電機工程學系輔系科目表

Minor Course of EEE

110 學年度

(Academic Year 2021)

科目名稱 Course Name	學分數 Credit	科目名稱 Course Name	學分數 Credit
電子學(一)(二) Electronics (I) (Ⅱ)	6	電路學 Circuit Theory	3
電磁學 Electromagnetics	3	訊號與系統 Signals and Systems	3
邏輯設計 Logic Design	3	電子實驗(一)(二) Electronics Lab. (I) (Ⅱ)	4
輔系最低應修學分為 22 學分 At least 22credits.			