

國立勤益科技大學日間部四年制 110 學年度 電子工程系(積體電路與系統應用組)學分計畫表

National Chin-Yi University of Technology

Curriculum Planning of 2021 Four-Year Degree in

Department of Electronic Engineering: Integrated Circuit and System Application

110.5.3 課程委員會及 110.05.11. 院課程委員會議審議通過
110.05.25. 校課程委員會議及 110.06.15. 教務會議審議通過
113.12.5. 校課程委員會議及 113.12.24. 臨時教務會議審議訂通過

科目	Courses	上學期 First Semester			下學期 Second Semester		
		學分 Credits	正課 Lecture	實習 Internship	學分 Credits	正課 Lecture	實習 Internship
共同必修科目(30 學分) General Required Courses (30 credits hours)							
第一學年 First Year							
國文(一)	Chinese (I)	3	3	0			
大一英文(一)	Freshman English (I)	2	2	0			
英文聽講(一)	Listening and Speaking (I)	1	1	0			
歷史與文化(一)	History and Culture (I)	2	2	0			
藝術鑑賞	Art Appreciation	1	1	0			
體育(一)	Physical Education (I)	0	2	0			
全民國防教育軍事訓練(一)	All-Out Defense Education Military Training (I)	0	2	0			
勞作與社會服務教育(一)	Labor and Social Services Education (I)	0	0	1			
國文(二)	Chinese (II)				3	3	0
大一英文(二)	Freshman English (II)				2	2	0
英文聽講(二)	Listening and Speaking (II)				1	1	0
歷史與文化(二)	History and Culture (II)				2	2	0
音樂鑑賞	Music Appreciation				1	1	0
體育(二)	Physical Education (II)				0	2	0
全民國防教育軍事訓練(二)	All-Out Defense Education Military Training (II)				0	2	0
勞作與社會服務教育(二)	Labor and Social Services Education (II)				0	0	1
第二學年 Second Year							
博雅通識課程	Liberal Education	2	2	0			
體育(三)	Physical Education (III)	0	2	0			
憲法與民主	Constitution and Democracy	2	2	0			
博雅通識課程	Liberal Education				2	2	0
體育(四)	Physical Education (IV)				0	2	0
第三學年 Third Year							
博雅通識課程	Liberal Education	2	2	0			
博雅通識課程	Liberal Education	2	2	0			
博雅通識課程	Liberal Education				2	2	0
第四學年 Fourth Year(無必修課程 No General Required Courses)							
專業必修科目(53 學分) Department Required Courses(53 credits hours)							
第一學年 First Year							
微積分(一)	Calculus (I)	3	3	0			
物理(一)	Physics (I)	3	3	0			
邏輯設計實務	Digital Logic Design	2	1	3			
微積分(二)	Calculus (II)				3	3	0
物理(二)	Physics (II)				3	3	0
△計算機程式實習	Computer Programming Practice				2	1	3
第二學年 Second Year							
工程數學(一)	Engineering Mathematics (I)	3	3	0			
電子學(一)	Electronics (I)	3	3	0			
電路學(一)	Electric Circuit Analysis (I)	3	3	0			
電子實習(一)	Electronic Experiment (I)	2	1	3			
△●微處理機實習	Microprocessor Practice	2	1	3			
工程數學(二)	Engineering Mathematics (II)				3	3	0
電子學(二)	Electronics (II)				3	3	0
電路學(二)	Electric Circuit Analysis (II)				3	3	0
電子實習(二)	Electronic Experiment (II)				2	1	3
信號與系統	Signals and Systems				3	3	0
第三學年 Third Year							
數位 IC 導論	Introduction to Digital IC	3	3	0			
實務專題(一)	Practical Project (I)	2	0	6			
電能轉換電路設計	Design of Power Conversion Circuits				3	3	0
實務專題(二)	Practical Project (II)				2	0	6
第四學年 Fourth Year(無必修課程 No General Required Courses)							

科目	Courses	上學期 First Semester			下學期 Second Semester		
		學分 Credits	正課 Lecture	實習 Internship	學分 Credits	正課 Lecture	實習 Internship

共同選修科目 General Elective Courses							
第一學年 First Year(無排定共同選修課程 No General Elective Courses)							
第二學年 Second Year							
全民國防教育軍事訓練(三)	All-Out Defense Education Military Training (III)	1	2	0			
全民國防教育軍事訓練(四)	All-Out Defense Education Military Training (IV)				1	2	0
第三學年 Third Year							
體育選修	Physical Elective Course	1	2	0	1	2	0
全民國防教育軍事訓練(五)	All-Out Defense Education Military Training (V)	1	2	0			
第四學年 Fourth Year							
體育選修	Physical Elective Course	1	2	0	1	2	0
專業選修科目 Department Elective Courses							
第一學年 First Year							
網路多媒體暨遊戲機 Network Multimedia and Game Machine							
機率與統計	Probability And Statics				3	3	0
智慧機器人 Intelligent Robotics							
智慧型機器人概論	Intelligent Robotics	3	3	0			
機率學	Probability				3	3	0
第二學年 Second Year							
積體電路與系統應用 Integrated Circuit and System Application							
※VLSI 概論	Introduction to VLSI	3	3	0			
※半導體物理導論	Introduction to Semiconductor Physics	3	3	0			
●3D 列印導論與實務	3D Printing Introduction and Practice	3	3	0			
△※FPGA 系統設計	FPGA System Design and Practice	3	3	0			
全客戶 IC 佈局	Full Custom IC Layout				3	3	0
半導體元件導論	Introduction to Semiconductor Devices				3	3	0
微控制器系統實務	Microcontroller Based Embedded System Practice				3	3	0
網路多媒體暨遊戲機 Network Multimedia and Game Machine							
△物件導向程式設計	Object-Oriented Programming	3	3	0			
△※工程軟體應用實作	Engineering Software Practice	2	1	3			
影像處理概論	Introduction to Image Processing	3	3	0			
※數位影像處理實作	Digital Image Processing				2	1	3
△※Python 程式設計	Programming in Python				3	1	2
※電腦圖學	Computer Graphics				3	3	0
智慧機器人 Intelligent Robotics							
工程圖學	Engineering Drawing	2	1	3			
機器人學	Robotics	3	3	0			
氣壓控制原理與應用	Principle and Application of Air Pressure Control	2	1	3			
※電腦機構繪圖	Computer Aided Machine Drawing				3	3	0
機構設計	Mechanism Design				3	3	0
△單晶片微電腦應用實務	Microcontroller Application and Practice				2	1	3
智慧電子應用設計概論	Fundamental of Innovative Electronic Design				3	3	3
第三學年 Third Year							
積體電路與系統應用 Integrated Circuit and System Application							
※類比積體電路設計	Introduction to Analog IC Design	3	3	0			
積體電路製程	Integrated Circuits Manufacturing Process	3	3	0			
※嵌入式系統應用	Embedded System Application	3	3	0			
●電磁相容原理	Introduction to Electromagnetic Compatibility	3	3	0			
電路板製造與產業概論	Introduction to Circuit Board Manufacturing and Industry	3	3	0			
[AI]人工智慧晶片導論	Introduction to AI on Chip	3	3	0			
半導體設備概論	Introduction to Semiconductor Equipment	3	3	0			
記憶體元件	Memory Devices				3	3	0
※低功率積體電路設計	Low Power IC Design				3	3	0
光電轉換導論	Optical-Electrical Transfer				3	3	0
高速 PCB 設計	High-Speed Printed Circuit Board Design				3	3	0
智慧電子科技	Intelligent Electronic Technology				3	3	0
網路多媒體暨遊戲機 Network Multimedia and Game Machine							
※網路概論	Introduction to Network	3	3	0			
△視窗程式設計	Windows Programming	3	3	0			
數位信號處理	Digital Signal Processing	3	3	0			
※工程光學應用	Applied Engineering Optics	3	3	0			
遊戲企劃	Game Design	3	3	0			
3D 物件建模技術	3D Modeling Software Practice	3	3	0			
3D 動畫技術	3D Animation Software Practice				3	3	0
[AI]人工智慧	Artificial Intelligence				3	3	0
遊戲製作	Game Development				3	3	0
深度學習應用	Applied Deep Learning				3	3	0
光學元件	Optical Elements and Design				3	3	0
※嵌入式微處理器系統與實習	Embedded Microprocessor System and Practice				2	1	3

智慧機器人 Intelligent Robotics

※智慧型機器人系統應用專題	Application Project of Intelligent Robotic System	3	3	0			
PLC 應用實作	Programmable Logic Controller Practice	2	1	3			
● 機器人控制	Robot Control	3	3	0			
嵌入式微處理器系統與實習	Embedded Microprocessor System and Practice	2	1	3			
機器視覺	Machine Vision	3	3	0			
感測器原理與應用	Sensors' Principles and Applications	3	3	0			
嵌入式系統概論	Embedded System Overview	3	3	0			
工業電子學	Industrial Electronics	3	3	0			
※模糊控制	Fuzzy Control				3	3	0
● 工業機器人原理與應用	Principle and Application of Industrial Robots				3	3	0
※智慧感測與監控實務	Smart Sensor and Supervisory Control Practice				2	1	3
電力電子學	Power Electronics				3	3	0
機電整合	Mechatronics				3	3	0
數位影像處理實作	Digital Image Processing				2	1	3
類神經網路概論	Introduction to Neural Network				3	3	0

第四學年 Fourth Year

積體電路與系統應用 Integrated Circuit and System Application

材料科學概論	Introduction to Material Science	3	3	0			
射頻積體電路導論	Introduction to RFIC Design	3	3	0			
※電力電子積體電路設計	Power Electronics IC Design	3	3	0			
太陽能系統與應用	Solar Cell System and Applications	3	3	0			
△※嵌入式軟體設計實務	Embedded Software Design	3	3	0			
● 電磁相容之標準與測試	Electromagnetic Compatibility of Standards and Test	3	3	0			
生醫感測器概論	Introduction to Biosensor Devices				3	3	0
IC 測試技術	IC Test Technologies				3	3	0
IC 封裝技術	IC Packaging Technologies				3	3	0
半導體元件模擬	Semiconductor Device Simulation				3	3	0
運算放大器設計實務	Practical Design of Operational Amplifiers				3	3	0
電磁相容實務	Engineering EMC				3	3	0

網路多媒體暨遊戲機 Network Multimedia and Game Machine

資料庫系統應用	Applied Database System	3	3	0			
作業系統	Operating System	3	3	0			
計算機結構	Computer Architecture	3	3	0			
遊戲物理導論	Introduction to Game Physics	3	3	0			
演算法	Algorithms				3	3	0
虛擬實境	Introduction to Virtual Reality				3	3	0
擴增實境導論	Introduction to Augmented Reality				3	1	2
物聯網概論	Introduction to Internet of Things				3	3	0
△雲端科技應用	Applied Cloud Computing				3	3	0
△※嵌入式系統開發實習	Embedded System Development and Practice				2	1	3

智慧機器人 Intelligent Robotics

定位導航概論	Introduction to Positioning and Navigation	3	3	0			
● ※智慧機電實務	Smart Mechatronics Practice	2	1	3			
人機介面	Design of Human-Machine Interface	3	3	0			
△工程軟體應用實作	Engineering Software Practice	2	1	3			
△行動裝置應用程式	Development of Mobile Applications	3	3	0			
數位控制	Digital Control System	3	3	0			
電機控制原理與應用	Electrical Control Principle and Application				3	3	0
可攜式電源設計	Portable Power Supply Design				3	3	0
[AI]人工智慧	Artificial Intelligence				3	3	0
機器人程式設計	Robotic Programming				3	3	0
電子導航	Electronic Navigation				3	3	0
工業通訊技術	Industrial Communication Techniques				3	3	0
語音識別	Speech Recognition				3	3	0

共同專業選修科目 Department General Elective Courses

第一學年 First Year

電子工程概論	Introduction to Electronic Engineering	3	3	0			
產業概論	Introduction to Industrial				3	3	0

第二學年 Second Year

校外實習(寒假)一	Internship Program (outside-campus) on Winter Vacation (I)	1	0	1			
校外實習(暑期)一	Internship Program (outside-campus) on Summer Vacation (I)	3	0	3			
通信電子學	Fundamentals of Electronic Communications				3	3	0
師徒實務專題(一)	Mentor-Apprentice Project study (I)				3	0	3

第三學年 Third Year

產業論壇	Industry Forum	3	3	0			
電磁學	Electromagnetics	3	3	0			
數位通信概論	Introduction to Digital Communication Systems	3	3	0			

校外實習(寒假)二	Internship Program (outside-campus) on Winter Vacation (II)	1	0	1			
校外實習(暑期)二	Internship Program (outside-campus) on Summer Vacation (II)	3	0	3			
高頻電路設計	Radio Frequency Circuit Design				3	3	0
電磁波	Electromagnetic Waves				3	3	0
職場倫理論壇	Workplace Ethics Forum				3	3	0
第四學年 Fourth Year							
通訊儀控程式設計	Communication Instruments Program	3	3	0			
天線設計	Antenna Design	3	3	0			
RFID 技術	RFID Technology	3	3	0			
射頻安全概論	Introduction to RF Security	3	3	0			
專業倫理與社會責任	Professional Ethics and Social Responsibility	3	3	0			
校外實習(寒假)三	Internship Program (outside-campus) on Winter Vacation (III)	1	0	1			
校外實習(暑期)三	Internship Program (outside-campus) on Summer Vacation (III)	3	0	3			
職場倫理實習(一)	Workplace Ethics (I)	3	0	3			
資訊技術實習(一)	Computer Applications Practice (I)	3	0	3			
電子技術實習(一)	Electronic Skill Practice (I)	3	0	3			
產業實務實習(一)	Industrial Skill Practice (I)	3	0	3			
信號完整性	Signal Integrity				3	3	0
通信系統儀測	Communication System Instrumentation				3	3	0
微波工程	Microwave Engineering				3	3	0
RFID 系統	RFID System				3	3	0
射頻收發模組設計	RF Transceiver Module Design				3	3	0
職場倫理實習(二)	Workplace Ethics (II)				3	0	3
資訊技術實習(二)	Computer Applications Practice (II)				3	0	3
電子技術實習(二)	Electronic Skill Practice (II)				3	0	3
產業實務實習(二)	Industrial Skill Practice (II)				3	0	3
師徒實務專題(二)	Mentor-Apprentice Project study (II)	3	0	3			

備註 Note:

一、畢業至少應修滿 128 學分【必修 83 學分，選修至少 45 學分(須含本系專業選修至少 30 學分)】

Students should complete at least 128 credits before graduation, includes 83 required credits, 45 elective credits (elective credits should have at least 30 credits from department elective courses).

二、本校訂有「國立勤益科技大學學生畢業門檻辦法」，請依規定辦理。

Our school has established the "National Chin-yi University of Science and Technology Student Graduation Threshold Measures", please follow the regulations.

三、博雅通識課程三大領域中，每一領域至少各修習一門課程，學分總計至少 10 學分。每門課程學分數(時)為 2 學分 2 學時或 3 學分 3 學時。

Among the 3 core areas of liberal education curriculum, students should take 10 or more credits in 3 different areas. The credit hours for each course are either 2 hours course with 2 credits or 3 hours course with 3 credits.

四、本系畢業門檻一：學生要修讀積體電路與系統應用學程「※必選課程」其中的三門，為其畢業之基本條件。

Three of the required courses(※) offered in the Integrated Circuit and System Application Program must be taken for satisfying the first graduation criteria.

五、本系畢業門檻二：學生要取得本系開設之下述「學程」至少一個，為其畢業之基本條件。學生至少要獲得 21 學分、或獲得 7 門課的學分，才能視為取得此學程證明。「※必選課程」，須至少選二門。

- (一)積體電路與系統應用學程
- (二)網路多媒體暨遊戲機學程
- (三)智慧機器人學程

At least one of the following programs must be fulfilled for satisfying the second graduation criteria. Students taking this program are requested to obtain a minimum of 21 credits, including at least 2 required courses to be taken for this program certificate.

- (1) Integrated Circuit and System Application Program
- (2) Network Multimedia and Game Machine Program
- (3) Intelligent Robotics Program

六、必選課程為選修，不及格者不必重修、或補修。

Every required course is elective. Failure of these courses is not necessary to re-take for graduation.

七、課程名稱前有標示「●」符號者，為「職能專業課程」。

Courses with a "●" refer to a professional competence course.

八、課程名稱前有標示「AI」符號者，為「人工智慧相關課程」。

Courses with an "AI" refer to an artificial intelligence related course.

九、課程名稱前有標示「△」符號者，為程式設計課程。

Courses with a "△" refers to an application design course.

十、為因應法規變更、評鑑建議或政府計畫規定等外在因素，本系保有調整學分計畫之權利。若有修訂，將於學期開始前公告，並明確說明修訂內容、影響範圍及相關配套措施，以保障學生權益。

The department reserves the right to adjust the curriculum in response to external factors such as changes in regulations, suggestions of evaluation and accreditation, or government program regulations. If there are any revisions, will be announced before the start of the semester, and the revised content, scope of impact, and related supporting measures will be clearly stated to protect the rights and interests of students.