國立陽明交通大學電機工程學系「跨域學程」實施要點

National Yang Ming Chiao Tung University Department of Electronics and Electrical Engineering Implementation Guidelines for Cross-Disciplinary Program

111年3月15日電機系課程委員會通過
111年3月24日電機學院課程委員會通過
111年5月13日校課程委員會通過
111年6月16日教務會議核備通過
112年3月30日電機系課程委員會通過
112年4月13日電機學院課程委員會通過
112年5月16日校課程委員會議通過
112年5月30日教務會議核備通過
113年3月28日電機系課程委員會通過
113年4月11日電機學院課程委員會通過
113年5月20日校課程委員會議通過
114年3月26日電機系課程委員會通過
114年4月14日電機學院課程委員會通過
114年5月12日校課程委員會議通過
114年10月3日電機系課程委員會通過
114年10月17日電機學院課程委員會通過
114年11月12日校課程委員會議通過
115年3月26日電機系課程委員會通過
115年4月22日電機學院課程委員會通過
115年5月14日114學年度第4次課程委員會通過

一、依據國立陽明交通大學跨域學程實施辦法，國立陽明交通大學電機工程學系(以下簡稱本系)為鼓勵學生進行跨領域學習，建立跨域學習深度，協助學生拓展第二專長，提供學生可以在畢業學分不增加(或僅少量增加)情況下，修畢跨域學程，特訂定本要點。

Article One These Implementation Guidelines are prescribed by National Yang Ming Chiao Tung University Department of Electronics and Electrical Engineering (hereinafter referred to as Our Department) based on NYCU Cross-Disciplinary Program Implementation Regulations to provide the opportunity for students to proceed cross-disciplinary learning without increasing graduate credits (or only a few extra credits) in order to encourage students to conduct cross- disciplinary study, build the depth of cross-disciplinary study, and assist students expanding second specialty.

二、跨域學程係指由陽明交通大學的學系、研究所、或學院提出模組課程，模組課程應包含該領域基礎核心知識，且總學分數以 30 學分為原則(最低可為 28 學分，最高不可超過 32 學分)，學生修習跨域學程，其課程將包含所屬學系的跨域學程模組課程以及第二專長系所或學院的跨域學程模組課程，並可於畢業證書上加註第二專長模組課程為「跨域專長」。

Article Two The cross-disciplinary program here means the cross-disciplinary module curriculum proposed by the departments, institutes, or colleges in National Yang Ming Chiao Tung University. Module curriculum should include the core knowledge curriculum of the field and the total credits will be based on 30 credits (the minimum 28 credits and no more than 32 credits).The cross-disciplinary program that students take will include the cross-disciplinary program module curriculum of the department they belong to as well as the cross-disciplinary program module curriculum from the second specialty department or college. The module curriculum of the second specialty could be remarked as “Cross-Disciplinary Specialty” on the diploma.

三、本要點修業規定

Article Three Policies of these Guidelines

1.本系學生欲修習跨域學程者

1.For the students of our department who would like to take cross-disciplinary program

⑴得於每學年度公告申請期限內向本系提出申請，申請時註明欲申請的第二專長系所或學院，申請期限將由本系課程委員會提前一個月進行公告，公告中說明需準備的審查資料以及當年度本系開放給本系學生修讀跨域學程的名額，申請案經本系課程委員會審查通過後，需送到第二專長系所或學院審查，通過雙邊審查後，方可進入跨域學程。

(1). The application can be submitted to our department by the deadline announced by faculty every year. The name of department or college of the second specialty that the student would like to apply for must be remarked on the application form, and the application deadline would be announced one month in advance by the Curricular Committee at our department. The evaluation documents needed preparing as well as the quota available for the students in our department to apply for this program in the given year will be released on the announcement. The application shouldbe sent to the department or college of the second specialty for evaluation after it is approved by the Curricular Committee at our department. Students could take the cross-disciplinary program after evaluation by both sides.

⑵ 本系學生修習跨域學程的課程，列示於「電機工程學系跨域學程本系學生必修科目表」，其課程包含：校必修(含共同必修)、本系基礎必修課程、本系跨域模組課程、以及第二專長系所或學院的跨域模組課程(以下簡稱他系跨域模組課程)，畢業學分以 128 學分為原則。他系跨域模組課程認定為跨域專長，於畢業證書本系名稱後加註此跨域專長。

(2). The courses of cross-disciplinary program for students in our department will be listed on “The Required Course List for the students at our department study cross-disciplinary program in Department of Electronics and Electrical Engineering.” The courses include required courses of the university (including general education subjects), core curriculum at our department, cross-disciplinary module curriculum at our department, and the cross-disciplinary module curriculum of the second specialty department or college (hereinafter referred to as cross-disciplinary module curriculum atother department) with at least 128 graduate credits. The credits of cross-disciplinary module curriculum in other departments would be recognized as those of cross-disciplinary specialty, and the name of the cross-disciplinary specialty will be remarked after the title of our department on the diploma.

⑶ 本系學生修習跨域學程，若無法修畢跨域學程課程，得選擇放棄跨域學程，改修習原電機工程學系的學士學位課程。

(3). Students who study for cross-disciplinary program at our department are not able to complete the program, they shall give up the cross-disciplinary program and take credits of bachelor degree program at their original department, Electronics and Electrical Engineering.

2.外系學生欲修習跨域學程且選擇本系做為其跨域專長者

2.For students in other departments who would like to study for cross-disciplinary program and choose our department as their cross-disciplinary specialty

⑴ 得於每學年度公告申請期限內向其所屬學系（以下簡稱原系），通過原系以及本系的雙邊審查後，方可進入跨域學程。

⑴ They could submit the application to the department that they belong to within the dates of annual announcements by faculty, they could take the cross-disciplinary program after approved by both their original department and our department.

(2) 外系學生修讀跨域學程且選擇本系做為其跨域專長者，其課程包含：**原系要求**之校必修(含共同必修)、原系基礎必修課程及跨域模組課程，以及列示於「電機工程學系跨域模組課程必修科目表」的模組課程，畢業學分**達到原系要求**，並於畢業證書原系名稱後加註電機工程為其跨域專長。

(2) The courses for the students of other departments who would like to study for cross-disciplinary program and choose our department as their cross-disciplinary specialty include original department required courses of the university (including general education subjects), core curriculum at their original department, cross-disciplinary module curriculum at their original department, and the module curriculum listed on "The Required Course List for the students study cross-disciplinary module curriculum in Department of Electronics and Electrical Engineering" with reaching the graduate credits of original department requirements . The Department of Electronics and Electrical Engineering will be remarked as their cross-disciplinary specialty after the title of their original department on the diploma.

(3) 若外系與本系另訂定兩系雙向鎖定之跨域學程實施要點，則相關學生應依實施要點提出修習跨域學程。

(3) If external departments and the department have separately set out the two-way locked cross-domain course implementation points, the students should take a cross-domain courses based on the implementation points.

四、本系指定一名專任教師擔任跨域學程導師，與外系所或學院的跨域學程導師組成導師群，專責輔導跨域學程的學生。

Article Four Our department assigned one full-time teacher to be the mentor of the cross-disciplinary program and formed mentor group with teachers of cross-disciplinary program at other department or college to give guidance to cross-disciplinary program students.

五、為鼓勵不同系所或學院合作提出跨域共授課程，由兩位以上教師開授跨領域之創新整合式課程，得依本校教師授課時數核計原則規定辦理。

Article Five In order to encourage different departments or colleges working together for the proposal of cross-disciplinary curriculum, the number of teaching hours for the innovating integrated curriculum offered by more than two teachers could be calculated according to National Yang Ming Chiao Tung University Principles for Verifying and Calculating Teachers' Teaching Hours.

六、本要點如有未盡事宜，悉依本校學則及其他相關規定辦理。

Article Six If there is any unaccomplished matter of these guidelines, it shall be handled in accordance with the school constitution of our university as well as other relevant regulations.

七、本要點經校級課程委員會通過後實施，修訂時亦同。

Article Seven These guidelines were approved by Curricular Committee at the university level before putting them it into practice; the same shall be done upon any amendment thereto.

電機工程學系「跨域學程」本系學生必修科目表(A)
The Required Courses List for the students at our department study Cross-disciplinary Program in EEE Department

類別 Category	科目名稱 Courses	學分 Credits 上學期 Fall Semester	學分 Credits 下學期 Spring Semester	開課系所 Dept.	備註 Remarks
本系基礎必修（52 學分）Core curriculum at our department (52 credits)	微積分(一) (二) Calculus (I) (II)	4	4	電機系 EEE	
	物理(一) (二) General Physics (I) (II)	4	4	電機系 EEE	
	線性代數 Linear Algebra	3		電機系 EEE	
	微分方程 Differential Equation	3		電機系 EEE	
	生涯規劃與導師時間 Career Planning and Mentor's Hours	0	0	電機系 EEE	得以生涯規劃免修 Can be waived by "Career Planning"
	電路學 Circuit Theory	3		電機系 EEE	
	電磁學 Electromagnetics		3	電機系 EEE	
	電子學(一) (二) Electronics (I) (II)	3	3	電機系 EEE	
	電子實驗(一) (二) Electronics Labs (I) (II)	2	2	電機系 EEE	
	訊號與系統 Signals and Systems	3		電機系 EEE	
	計算機概論與程式設計 Intro. to Computers and Programming	3		電機系 EEE	
	機率 Probability		3	電機系 EEE	
	邏輯設計 Logic Design	3		電機系 EEE	
	電機工程專題(一) Special Project on Electrical Engineering (I)	2		電機系 EEE	113 學年起列為必修
專業選修領域 Elective Courses in Professional	應從本系開授之專業課程至少修得 21 學分(不含基礎必修與專題)，課程需涵蓋至少 12 學分之本系專業選修核心課程與 3 學分之本系專業必修實驗課程。 At least 21 credits (excluding basic compulsory and special subjects) from the professional courses offered in Our department. The courses must include at least 12 credits from core optional courses and 3 credits from compulsory lab courses.				
他系跨域模組 (依他系學分數規定)	本校各系所或學院所提供之跨域模組學程，擇一修畢	28			

Cross-disciplinary modules at other departments (28-32 credits)	Choose one of the cross-disciplinary modules offered by departments or colleges at our university to complete.			
共同必修 General Courses			校訂共同科目依照本校相關規定。 General courses should follow the university regulations.	
最低畢業學分 Minimum Credits Required for Graduation		128		

電機工程學系「跨域模組課程」必修科目表(B)
The Required Courses List for the students study Cross-disciplinary modulecurriculum in EEE Department

類別 Category	選別 Classification	科目名稱 Courses	學分 Credits	開課系所 Dept.	備註 Remarks
本系跨域模組（31 學分） Cross-disciplinary courses at our department (31 credits)	必修(16 學分) Compulsory Courses (16 credits)	邏輯設計 Logic Design	3	電機系 EEE	左列必修課如有免修或抵修，應以本系基礎必修或專業選修補足學分
		跨領域專題(一) Projects of Cross-disciplinary(I)	1	電機系 EEE	
		電子學(一) Electronics (I)	3	電機系 EEE	
		電路學 Circuit Theory	3	電機系 EEE	
		訊號與系統 Signals and Systems	3	電機系 EEE	
		微分方程 Differential Equation 機率 Probability 線性代數 Linear Algebra 三選一	3	電機系 EEE	不得以其他課程免修或抵修
	專業選修領域 Elective Courses in Professional Programs	應從本系開授之專業選修課程至少修得 15 學分，課程需涵蓋至少 9 學分之本系專業選修核心課程與 3 學分之本系專業必修實驗課程。 專業選修課程不得以其他課程免修或抵修。 At least 15 credits must be taken from the professional courses offered in Our department. The courses must include at least 9 credits from core elective courses and 3 credits from compulsory lab courses. Elective courses cannot be waived or substituted with other courses.			
總學分 Total Credits			31		

國立陽明交通大學電機工程學系大學部專業必修實驗課程表
NYCU Department of Electronics and Electrical Engineering
Table of Required Courses

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 2nd	上 1st	下 2nd	上 1st	下 2nd	上 1st	下 2nd	
數位實驗 Digital Lab.	3		3							專業必修實驗課程，至少選1科 Major compulsory Labs (at least 1 lab)
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 Control Lab.	3						3			
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			

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

領域名稱 Program	核心課程 Core 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
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
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)
類比電路與系統 Analog Circuit and Systems	類比積體電路導論 Introduction to Analog Integrated Circuits
電子設計自動化 Electronic Design Automation	資料結構 Data Structures 演算法導論 Introduction to Algorithms
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
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 Learning 影像處理導論 Introduction to Image Processing
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

領域名稱 Program	核心課程 Core Courses
通訊科學與系統 Communication Science and Systems	(二擇一)通訊原理(一) 或 通訊系統導論 Principle of Communication Engineering (I) or Introduction to Communication Systems (二擇一)通訊原理(二) 或數位通訊導論 Principle of Communication Engineering (II) or Introduction to Digital Communications
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
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
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 (二擇一)通訊原理(一) 或 通訊系統導論 Principle of Communication Engineering (I) or Introduction to Communication Systems
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
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