國立陽明交通大學電機工程學系「資訊工程跨域學程」實施要點

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

110 年 10 月 15 日電機系課程委員會通過
110 年 12 月 2 日 110 學年度第 3 次校級課程委員會通過
110 年 12 月 16 日 110 學年度第 2 次教務會議核備通過
112 年 3 月 30 日電機系課程委員會
112 年 05 月 16 日 111 學年度第 3 次課程委員會通過
112 年 05 月 30 日 111 學年度第 4 次教務會議核備通過
112 年 10 月 26 日電機系課程委員會
112 年 12 月 12 日 112 學年度第 2 次課程委員會通過
113 年 3 月 28 日電機系課程委員會通過
113 年 05 月 20 日 112 學年度第 3 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。

Based on NYCU Cross-Disciplinary Program Implementation Regulations, these implementation guidelines are set up for Department of Electrical and Computer Engineering (hereinafter referred to as Our Department) in NYCU 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 in expanding second specialty.

二、依據國立陽明交通大學跨域學程實施辦法，本系學生修習「資訊工程跨域學程」(以下簡稱本學程)，於修畢後可於畢業證書上加註「資訊工程」為跨域專長。

According to NYCU Cross-Disciplinary Program Implementation regulations, students in ECE department will be remarked as “Computer Science Cross-Disciplinary Specialty” on the diploma once they complete this cross-disciplinary program.

三、本要點實施細節及申請程序

1.本系學生欲修習本學程者得於每學年度公告申請期限內向本系提出申請，經本系及 資訊工程學系課程委員會審查通過後，方可修習本學程。
2.本學程的課程列示於「電機工程學系『資訊工程跨域學程』必修科目表」，其課程包含：校必修(含共同必修 24 學分)，本系基礎必修課程(51 學分)，專業必修實驗課程(6 學分)，專業選修領域(12 學分)，以及資訊工程學系的跨域模組課程(31 學分)，畢業學分至少 128 學分。
3.修習本學程之學生，若無法完成上述規定之課程，可回復修習原電機工程學系之學 士學位課程。
4.除必修科目表備註可以抵免之科目外，其餘抵免皆需遞送免修申請表。
5.經申請免修後之不足學分，得修習資工系或電機系之專業選修。

Guidelines in detail and Application procedure

1. The application can be submitted to our department during within the dates of annual announcements by faculty. Having approved by both Curricular Committees at our department and the CS department, students are qualified to take the cross-disciplinary program.
2. Courses included in this program are listed on “The Required Course List for the study in cross-disciplinary program in Computer Science department”. The courses include general

education courses (24 credits), core curriculum at ECE department (51 credits), professional experimental courses (6 credits), elective courses at ECE department 12 credits), and cross-disciplinary program courses at CS department (31credits). At least 128 credits are required for graduation.

3. If students who study for cross-disciplinary program are not able to complete the program, their graduation credits criterion should meet the qualification for the bachelor degree program at the original department, namely, Electrical and Computer Engineering.
4. Except for the subjects listed on the compulsory subject list that can be deducted, the other credits must be submitted with the exemption application form.
5. After the exemption, insufficient credits can be taken from the professional electives in the Department of Computer Science or in the Department of Electrical and Computer Engineering.

四、本系指定專任教師擔任本學程之導師，與資訊工程學系之跨域學程導師組成導師群， 專責輔導跨域學程之學生。

Our department will assign full-time professors to be the mentors of the cross-disciplinary program as well as the mentors in CS department to give guidance to cross-disciplinary program students.

五、本要點如遇修訂，須主動知會資訊工程學系。

ECE department should notify CS department if the guidelines need to be revised.

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。

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 Guidelines.

七、本要點經校級課程委員會通過後實施，修訂時亦同。

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

電機工程學系「資訊工程跨域學程」必修科目表

Courses for ECE Department Cross-disciplinary Program in CS Department

類別 Category	選別 Classification	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（57 學分）Core curriculum at our department (57 credits)	基礎必修課程（51 學分）Fundamental Compulsory Courses (51 credits)	微積分(一)(二) Calculus (I)(II)	4	4	電機系 ECE	
		物理(一)(二) General Physics (I)(II)	4	4	電機系 ECE	
		線性代數 Linear Algebra		3	電機系 ECE	
		微分方程 Differential Equation	3		電機系 ECE	
		生涯規劃與導師時間 Career Planning and Mentor's Hours	0	0	電機系 ECE	得以生涯規劃免修 Can be waived by "Career Planning"
		服務學習(一)(二) Student Service Education (I)(II)	0	0	電機系 ECE	
		電路學 Circuit Theory	3		電機系 ECE	
		電磁學 Electromagnetics		3	電機系 ECE	
		電子學(一)(二) Electronics (I)(II)	3	3	電機系 ECE	
		電子實驗(一)(二) Electronics Labs (I)(II)	2	2	電機系 ECE	
		訊號與系統 Signals and Systems		3	電機系 ECE	
		計算機概論與程式設計 Intro. to Computers and Programming	3		電機系 ECE	
		邏輯設計 Logic Design	3		電機系 ECE	
		機率 Probability		3	電機系 ECE	
		專題演講 Seminar	1		電機系 ECE	
	專業必修實驗課程-任選2 門課 (6 學分) Major Compulsory Labs (Pick at least 2 labs, 6 credits)	數位實驗 Digital Laboratory	3		電機系 ECE	
		通訊系統實驗 Communication System Lab	3		電機系 ECE	
		射頻電路原理與實驗 Principles and Lab of RF Circuits	3		電機系 ECE	

		數位訊號處理晶片實驗 Digital Signal Processing Chips Lab	3	電機系 ECE	
		電力電子實驗 Power Electronics Lab	3	電機系 ECE	
		VLSI 實驗 VLSI Lab	3	電機系 ECE	
		通訊網路實驗 Communication Networks Lab	3	電機系 ECE	
		控制實驗 Control Lab	3	電機系 ECE	
		通訊系統電腦模擬 Computer Simulation of Communication Systems	3	電機系 ECE	
		生醫工程實驗 Biomedical Engineering Lab	3	電機系 ECE	
		人本計算實驗 Human-Centric Computing Lab	3	電機系 ECE	
		智慧機器人實驗 Intelligent Robotics Lab	3	電機系 ECE	
		微算機原理與實驗 Principle of Microcomputer	3	電機系 ECE	
		(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	電機系 ECE	
		類比積體電路實驗 Analog Integrated Circuits Lab	3	電機系 ECE	
		嵌入式系統技術實驗 Embedded System Lab	3	電機系 ECE	
		(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	電機系 ECE	
		電子設計自動化演算法	3	電機系 ECE	

		與實作 Electronic Design Automation Algorithms and Implementation				
		數位訊號處理應用實驗 Digital Signal Processing Laboratory	3		電機系 ECE	
資工系跨域模組（31 學分） 修畢於畢業證書加註「跨域專長：資訊工程」 至少三門課程須至資工系選修 Cross-disciplinary courses at CS department (31 credits) Could be remarked as “Computer Science Cross-Disciplinary Specialty” on the diploma At least 3 courses should be taken in CS department	必修 Compulsory Courses	數位電路設計 Digital Circuit Design		3	資工系 CS	可以電機系課程「邏輯設計」抵免之 Can be deducted from the "Logic Design" course of the Electrical Engineering Department
		作業系統概論 Intro. to Operating Systems			資工系 CS	可以電機系課程「作業系統」抵免之 Can be waived by “Operating Systems” offered by ECE Dept.
		電機資訊跨領域專題(一)(二) Electrical and Computer Engineering-Computer Science Cross disciplinary Projects (I)(II)	2	2	電機系/ 資工系 ECE/CS	
		計算機組織 Computer Organization		3	資工系 CS	可以電機系課程「計算機組織」抵免之 Can be waived by “Computer Organization” offered by ECE Dept.
		演算法概論 Intro. to Algorithms		3	資工系 CS	可以電機系課程「演算法」或「演算法概論」或「演算法導論」抵免之 Can be deducted from the ECE course "Algorithm" or "Introduction to Algorithm" or "Introduction to Algorithm"
		離散數學 Discrete Mathematics		3	資工系 CS	可以電機系課程「離散數學」抵免之 Can be waived by “Discrete Mathematics” offered by ECE Dept.
		資料結構與物件導向程式設計 Data Structures and Object-oriented Programming		3	資工系 CS	可以電機系課程「資料結構」及「物件導向程式設計」抵免之 Can be waived by “Data Structures” and “Object- oriented Programming” offered by

					ECE Dept.
	基礎程式設計 Basic Programming		0	資工系 CS	本課程及格條件為通過「程式能力鑑定」Students will be considered passing this course by passing the "Programming Appraisal"
選修 Elective Courses	編譯器設計概論 Intro. to Compiler Design	3		資工系 CS	任選3科 (電機系類似課程可以申請抵免) Pick at least 3 courses (Similar ones in ECE department can be used to waive courses listed here)
	嵌入式系統總整與實作 Embedded Systems Capstone <註：本課程為第二專長總整課程>		3	資工系 CS	
	計算機網路概論 Intro. to Computer Networks	3		資工系 CS	
	網路程式設計概論 Intro. to Network Programming	3		資工系 CS	
	通訊原理與無線網路 Principles of Communications and Wireless Networks		3	資工系 CS	
	計算機圖學概論 Intro. to Computer Graphics	3		資工系 CS	
	影像處理概論 Intro. to Image Processing		3	資工系 CS	
	數值方法 Numerical Methods		3	資工系 CS	
	資料庫系統概論 Introduction to Database Systems		3	資工系 CS	
	機器學習概論 Introduction to Machine Learning	3		資工系 CS	
	密碼學概論 Introduction to Cryptography		3	資工系 CS	
	計算機系統管理 Computer System Administration	3		資工系 CS	
	高等 UNIX 程式設計 Advanced Programming in the UNIX Environment		3	資工系 CS	
	數位電路實驗	3		資工系	

		Digital Circuit Lab.			CS	
		正規語言概論 Introduction to Formal Language		3	資工系 CS	
		微處理機系統原理與實作 Microprocessor Systems: Principles and Implementation	3		資工系 CS	
		競技程式設計(一) Competitive Programming(I)	3		資工系 CS	
		圖形理論 Graph Theory		3	資工系 CS	
		人工智慧概論 Intro. to Artificial Intelligence		3	資工系 CS	
專業選修領域 Elective Courses in Professional Programs	應從本系開授之專業選修核心課程至少修得 12 學分(不含基礎必修、「資 訊通訊」與「計算機工程」領域核心 課程、專業必修實驗課程與專題) ， 且所修課程不可與資訊工程跨域模組 之任一課程重覆。 At least 12 credits from core courses elective courses (Excluding basic compulsory, core courses in "Information and Communication" and "Computer Engineering", and professional compulsory experimental courses and topics) In addition, none of the selected curriculums should be the same as ones in the “CS department cross-disciplinary program courses”.		12			
共同必修 General education courses			校訂共同科目依照本校相關規定。 General education courses should follow the university regulations.			
最低畢業學分 Minimum Credits Required for Graduation			128			

註：資工系重要課程擋修制度請參閱資工系學士班修業辦法。