

國立陽明交通大學資訊工程學系「電機工程跨域學程」實施要點

National Yang Ming Chiao Tung University

Department of Computer Science

Implementation Guidelines for Cross-Disciplinary Program in Electrical and Computer Engineering Department

資訊工程學系 110 學年度第 4 次課程委員會修訂(110 年 10 月 25 日)

資訊學院 110 學年度第 3 次課程委員會修訂(110 年 11 月 1 日)

110 學年度第 3 次校課程委員會通過(110 年 12 月 2 日)

110 學年度第 2 次教務會議核備通過(110 年 12 月 16 日)

資訊工程學系 111 學年度第 4 次課程委員會修訂(111 年 12 月 22 日)

資訊學院 111 學年度第 3 次課程委員會修訂(111 年 12 月 28 日)

資訊工程學系 111 學年度第 6 次課程委員會修訂(112 年 4 月 14 日)

資訊學院 111 學年度第 4 次課程委員會修訂(112 年 4 月 18 日)

111 學年度第 3 次校課程委員會通過(112 年 5 月 16 日)

111 學年度第 4 次教務會議核備通過(112 年 5 月 30 日)

資訊工程學系 112 學年度第 8 次課程委員會修訂(113 年 4 月 9 日)

資訊學院 112 學年度第 4 次課程委員會修訂(113 年 5 月 8 日)

112 學年度第 3 次校課程委員會通過(113 年 5 月 20 日)

- 一、依據國立陽明交通大學跨域學程實施辦法，國立陽明交通大學資訊工程學系(以下簡稱本系)為鼓勵大學部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，特訂定本實施要點。

These Implementation Guidelines are prescribed by National Yang Ming Chiao Tung University Department of Computer Science (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 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「電機工程跨域學程」(以下簡稱本學程)，於修畢後可於畢業證書上加註「電機工程」為跨域專長。

According to NYCU Implementation Guidelines for Cross-Disciplinary Program, students in our department could be remarked as “Cross-Disciplinary Specialty” on the diploma once they complete this program.

三、本要點實施細節

1.適用對象：本校資訊工程學系申請「電機工程跨域學程」的學生適用本要點。

2.申請程序：

(1)本系學生欲修習本學程者得於每學年下學期向本系提出申請，經本系及電機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「資訊工程學系『電機工程跨域學程』必修科目表」，其課程包含：校必修，本系基礎必修課程(參閱資訊工程學系「電機工程跨域學程」必修科目表)，以及電機工程學系的跨域模組課程(30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(2)中所規定之課程，可回復修習原資訊工程學系的學士學位課程。
- (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)跨域模組課程與學生本系應修課程及學分重複者，由電機系指定之相關選修課程補足。

Guidelines in detail

1) People applicable to this program: undergraduate students who are in the Department of Computer Science want to apply for Cross-Disciplinary Program in the Department of ECE.

2) Procedure to apply for this program:

(I)Students may submit applications to our department during the second semester every year.

The application will be evaluated by the Curricular Committees at the CS and the ECE departments respectively. Students are enrolled in the cross-disciplinary program only after their applications have been approved by both departments.

(II)Courses included in this program are listed on “The Required Course List for the students at our department study cross-disciplinary program in the department of Electrical and Computer Engineering”. Courses are classified as:

Required courses of the university

Core curriculum at our department: take CS courses **60** credits as criterion

Cross-disciplinary program module courses at ECE department: 30 credits

At least 128 credits are required for graduation

(III)If students at our department 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 of Computer Science.

(IV)Besides compulsory courses that have been marked as waivable, students may submit applications for waiving other courses.

(V)If any course in the cross-disciplinary program module has the same name or curriculum as one of the compulsory courses that students have taken and passed in our department, the credits of the course are not counted in the program. Students should take the other elective courses appointed by the department of Electrical and Computer Engineering to fulfill the graduation credits.

四、本系之單位主管或其指定之專任教師擔任學程召集人，統籌執行學程各項事宜。學程召集人需指定至少一名專任教師擔任跨域學程導師，專責輔導跨域學程學生。

Our department assigns one full-time teacher to be the mentor of the cross-disciplinary program and forms 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規定辦理。

In order to encourage different departments or colleges working together for designing cross-disciplinary curriculum, teaching hours for the innovative cross-disciplinary 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、修讀跨域學程學生在申請通過已修習及格之科目學分，若合於第二專長模組課程應修課程學分，得經第二專長的系所或學院審查同意後，予以追加採認。

The credits having obtained before students were admitted to take the cross-disciplinary program only can be counted if the credits are recognized by the department or college of the second specialty.

- 七、修讀跨域學程學生之選課手續應於加退選期限內完成，且每學期所修之第二專長模組課程科目、學分及成績均列記於其歷年成績表內。

Students taking a cross-disciplinary program shall enroll courses of the program by the deadlines of course registration. The courses, credits, and grades of the cross-disciplinary program module curriculums should be listed in the annual transcripts in each semester.

- 八、學生之第二專長模組課程學分及成績分別併入學期修讀學分總數及學期平均成績計算。

The courses, credits, and grades of cross-disciplinary program are added into the student's semester credits and average grade.

- 九、修讀跨域學程學生，擬終止修讀跨域學程者，應至教務處申請撤銷其跨域學程資格，並回復至所屬學系修課規定。其已修習及格之第二專長模組課程學分，經所屬學系核定，報教務處備查後得抵免其所屬學系選修課程學分。

Students taking a cross-disciplinary program and intending to terminate the study in the cross-disciplinary program should apply the withdrawal from the program to the Office of Academic Affairs and its graduation criterion should follow the regulations and requirements of their major department. The credits of the cross-disciplinary program can be used as credit waiver against the ones of core courses in the major department with the approval of the major department and submit to the Office of Academic Affairs meantime.

- 十、修讀跨域學程學生凡符合跨域學程規定畢業者，其畢業生名冊、歷年成績表及學位證書應加註跨域專長名稱。但畢業時如尚未修滿跨域學程規定之科目與學分，不得申請發給有關跨域學程之任何證明。

For students who earn sufficient credits and meet the requirements of the cross-disciplinary program, the department of the cross-disciplinary program will be noted in the graduate roster, transcripts, and diplomas, otherwise, no certificate of the cross-disciplinary program will be issued.

- 十一、本要點如遇修訂，須主動知會電機工程學系。

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

- 十二、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 regulations.

十三、本要點經系、院及校級課程委員會審查通過後實施，修訂時亦同。

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

資訊工程學系「電機工程跨域學程」必修科目表

Courses for Our Department

Cross-disciplinary Program in ECE Department

類別 Category	選別 Classification	科目名稱 Courses	學分 Credits		開課系 所 Dept.	備註 Remarks
			上學期 Fall Semester	下學期 Spring Semester		
本系基礎必修 (60 學分) Core curriculum at our department (60 credits)		物理(一)(二) Physics (I)(II)	3	3	本校 NYCU	三選一 Pick 1 out of 3
		普通生物(一)(二) General Biology (I)(II)				
		化學(一)(二) Chemistry (I)(II)				
		微積分(一)(二) Calculus(I)(II)	4	4	資工系 CS	
		線性代數 Linear Algebra	3			
		計算機概論與程式設計 Intro. to Computers and Programming	3			
		資料結構與物件導向程 式設計 Data Structures and Object-oriented Programming		3		
		離散數學 Discrete Mathematics		3		
		數位電路設計 Digital Circuit Design		3		
		機率 Probability	3			
		數位電路實驗 Digital Circuit Lab.	3			
		演算法概論 Intro. to Algorithms	3			
		作業系統概論 Intro. to Operating Systems	3			
		計算機組織 Computer Organization		3		
		資訊工程專題(一)(二) Computer Science and Engineering Projects(I)(II)	2	2		可以「電機資 訊跨領域專題 (一)(二)」申 請免修 Can be waived by “Cross- disciplinary Project (I)(II)” offered by CS Dept.

		微處理機系統原理與實作 Microprocessor Systems: Principles and Implementation	3			
		編譯器設計概論 Intro. to Compiler Design	3			
		訊號與系統 Signals and Systems		3		
		嵌入式系統總整與實作 Embedded Systems Capstone		3		
		生涯規劃及導師時間 Career Planning and Mentor's Hours	0	0		
		服務學習(一) Service Learning I		0		
		服務學習(二) Service Learning II	0			
		資訊工程研討 Computer Science Seminars	0			
		基礎程式設計 Basic Programming		0		本課程及格條件為通過「程式能力鑑定」 Pass=Passing Basic Computer Programming Exam
<p>電機系跨域模組 (30 學分) 修畢於畢業證書加註「跨域專長：電機工程」</p> <p>Cross-disciplinary modules at other department (30 credits)</p> <p>Could be remarked as “Cross-Disciplinary Specialty” on the diploma</p>	必修 Compulsory Courses	邏輯設計 Logic Design	3		電機系 ECE	可以資工系課程「數位電路設計」抵免之 Can be waived by “Digital Circuit Design” offered by CS 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	需資訊工程學系和電機工程學系教授共同指導 The student shall be jointly supervised by professors of ECE and CS
		電子學(一) Electronics (I)	3		電機系 ECE	
		電子實驗(一) Electronics Labs (I)	2		電機系 ECE	
		微分方程 Differential Equations	3		電機系 ECE	可以資工系課程「微分方程」抵免之 Can be waived

						by “Differential Equations” offered by CS Dept.
		專業必修實驗(十八選二) Major compulsory labs(Pick 2 out of 18)	3	電機系 ECE		可以資工系課程「數位電路實驗」及「微處理機系統實驗」抵免之 Can be waived by “Digital Circuit Lab.” and “Microprocess or System Lab.” offered by CS Dept.
	選修 Elective Courses	電磁學 Electromagnetics	3	電機系 ECE		任選 3 科 (資工系類似課程可以申請抵免) Pick at least 3 courses (Similar ones in our department can be used to waive courses listed here.)
		自動控制系統 Automatic Control Systems	3	電機系 ECE		
		數位訊號處理導論 Introduction to Digital Signal Processing	3	電機系 ECE		
		超大型積體電路導論 Introduction to VLSI Circuits	3	電機系 ECE		
		類比積體電路導論 Introduction to Analog Integrated Circuits	3	電機系 ECE		
		通訊原理(一) Principle of Communication Engineering (I): Analog and Digital Systems	3	電機系 ECE		
		電力電子導論 Introduction to Power Electronics	3	電機系 ECE		
		微波工程導論 Foundations for Microwave Engineering	3	電機系 ECE		
		數據通訊 (網路通訊原理) Data Communication (Principles of Network Communications)	3	電機系 ECE		
		材料科學導論 Introduction to Material Science	3	電機系 ECE		
		電磁波 Electromagnetic Wave	3	電機系 ECE		
		感測與光電導論 Introduction to Sensor and Optoelectronics	3	電機系 ECE		

	半導體元件物理 Semiconductor Device Physics	3	電機系 ECE	
	半導體工程 Semiconductor Engineering	3	電機系 ECE	
	近代物理導論 Introduction to Modern Physics	3	電機系 ECE	
	量子力學導論 Introduction to Quantum Mechanics	3	電機系 ECE	
	固態物理(一) Solid State Physics(I)	3	電機系 ECE	
	固態物理(二) Solid State Physics(II)	3	電機系 ECE	
	電子設計自動化演算法 與實作 Electronic Design Automation Algorithms and Implementation	3	電機系 ECE	
	控制系統設計 Design and Simulation of Control System	3	電機系 ECE	
	數位控制系統 Digital Control System	3	電機系 ECE	
	語音處理導論 Introduction to Speech Processing	3	電機系 ECE	
	互動式音訊處理導論 Introduction to Interactive Audio Processing	3	電機系 ECE	
	數位通訊導論 Introduction to Digital Communications	3	電機系 ECE	
	進階物件導向程式設計 Introduction to Artificial Intelligence	3	電機系 ECE	
	人工智慧導論 Introduction to Artificial Intelligence	3	電機系 ECE	
	電力工程導論 Introduction to Electrical Power Engineering	3	電機系 ECE	
	天線導論 Introduction to Antennas	3	電機系 ECE	
	網路程式設計 Network Programming	3	電機系 ECE	
	電子學(二) Electronics (II)	3	電機系 ECE	

		電子實驗(二) Electronics Labs (II)	2	電機系 ECE	
		醫學工程導論 Introduction to Biomedical Engineering Research	3	電機系 ECE	
校必修 General education course			學分數 依入學年度規定 Credits: base on the rules of the admission year	校定必修：依入學年 度規定 General education courses: base on the rules of the admission year	
最低畢業學分 Minimum Credits Required for Graduation			128		
※重要課程擋修制度請參閱本系學士班修業辦法。 For the prerequisite of some important courses, please check the undergraduate regulations.					