資訊工程學系
Department of Computer Science
108 學年度 (Academic Year 2019) (109.10 修訂)

類別 Type		科目名稱 Courses Name		學分 Credit								備註 Remarks
				第一學年 Grade 1		第二學年 Grade 2		第三學年 Grade 3		第四學年 Grade 4		
				1st	2nd	1st	2nd	1st	2nd	1st	2nd	
校定必修 (26 學分) (備註 1) **(外籍生請參閱備註 2)** University Compulsory Courses (26 credits) (Note 1) **(International students see Note 2)**	通識課程 General Education Curriculum	核心課程 General Education Course		至少 6								至少 18 學分 (備註 3) At least 18 credits (Note 3)
		跨院基本素養 General Education Course: Intercollegiate		至少 2								
		校基本素養 General Education Course: Literacy		至少 6								
	外國語文 Foreign Language	英文基礎課程 Fundamental English Courses		4								至少 8 學分 (備註 4) At least 8 credits (Note 4)
		英文進階或其他外語課程 English Advanced or other Foreign Language Courses		4								
	其他必修課程 Other Compulsory Curriculum	體育 Physical Education		0	0	0	0	0	0			6 學期 6 semesters
		服務學習(一) Service Learning (I)			0							備註 5 Note 5
		服務學習(二) Service Learning (II)				0						
	學術倫理教育 Academic Ethics Education Program			0								備註 6 Note 6
	生涯規劃及導師時間 Career Planning and Mentor's Hours			0	0							備註 7 Note 7
	性別平等教育線上訓練課程 Gender Equity Education Online Training Course			0								備註 8
基礎科學 (14 學分) Basic Science (14 credits)	物理(一)(二) Physics (I) (II)			3	3							三選一 (備註 9) Choose 1 out of 3 (Note 9)
	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							
必修 (31 學分) Compulsory courses (31 credits)	線性代數 Linear Algebra			3								
	計算機概論與程式設計 Intro. to Computers and Programming			3								備註 10 Note 10
	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						
	演算法概論 Intro. to Algorithms					3						備註 11 Note 11
	基礎程式設計 Basic Programming						0					備註 12 Note 12

	計算機組織 Computer Organization				3						
	作業系統概論 Intro. to Operating Systems					3					
	資訊工程研討 Computer Science Seminars					0					
	資訊工程專題(一)(二) Computer Science and Engineering Projects (I) (II)							2	2	備註 11 Note 11	

甲組 (5**7**學分) (備註 16) 自行選擇 「學程選修」 或 「跨域學程」 Program A (57 credits) (Note 16) Choose "Elective Program Courses" or "Cross-Disciplinary Program"	學程選修 Elective Program Courses	學程選修 (12 學分) Elective Program Courses (12 credits)	從七大主題學程自行選擇一個主題學程(詳見下表)。 Choose one topic out of seven topics (details as attached list).
		專業選修 (30 學分) Elective Professional Courses (30 credits)	需修本系所開授的各專業科目(含學士班、研究所選修課程)。 All elective courses offered by the Dept. of CS (including elective courses in both undergraduate and graduate programs)
		自由選修 (1**5**學分) Free Elective Courses (15 credits)	包含： 1.本系所及外系所開授的科目。 2.通識課程至多採計 4 學分。 不包含：體育、服務學習、軍訓、護理。 Including: 1. All elective courses offered by the Dept. of CS and other department 2. General Education Curriculum: at most 4 credits. Not including: Physical Education, Service Learning, Military Training Office, Health Services
	跨域學程 Cross-Disciplinary Program	跨域學程 (28-32 學分) Cross-Disciplinary Program (28-32 credits)	從本校跨域學程中自行選擇一個跨域學程，並依規申請。 Choose one "Cross-Disciplinary Program" in our university, and apply by regulations.
		自由選修 (2**5**-2**9**學分) Free Elective Courses (25-29 credits)	包含： 1.本系所及外系所開授的科目。 2.通識課程至多採計 4 學分。 不包含：體育、服務學習、軍訓、護理。 Including: 1. All elective courses offered by the Dept. of CS and other department 2. General Education Curriculum: at most 4 credits. Not including: Physical Education, Service Learning, Military Training Office, Health Services
乙組 (5**7**學分) Program B (57 credits)		學程選修 (12 學分) Elective Program Courses (12 credits)	從七大主題學程自行選擇一個主題學程(詳見下表)。 Choose one topic out of seven topics (details as attached list).
		專業選修 (30 學分) Elective Professional Courses (30 credits)	需修本系所開授的各專業科目(含學士班、研究所選修課程)。 All elective courses offered by the Dept. of CS (including elective courses in both undergraduate and graduate programs)
		自由選修 (1**5**學分) Free Elective Courses (15 credits)	包含： 1.本系所及外系所開授的科目。 2.通識課程至多採計 4 學分。 不包含：體育、服務學習、軍訓、護理。 Including: 1. All elective courses offered by the Dept. of CS and other

		department 2. General Education Curriculum: at most 4 credits. Not including: Physical Education, Service Learning, Military Training Office, Health Services
本系最低畢業學分 Graduation Requirements		128

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七大主題學程
Seven Topics of Program
108 學年度(Academic Year 2019)

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主題 Topics	科目名稱 Courses Name	第二學年 Grade 2		第三學年 Grade 3		第四學年 Grade 4	
		1st	2nd	1st	2nd	1st	2nd
人工智慧與 數據科學 AI and Data Science	資料庫系統概論 Intro. to Database Systems		3				
	人工智慧概論 Intro. to Artificial Intelligence		3				
	機器學習概論 Intro. to Machine Learning			3			
	人工智慧總整與實作(備註 11) Artificial Intelligence Capstone (Note 11)				3		
資訊安全 Computer Security	計算機網路概論 Intro. to Computer Networks	3					
	密碼學概論 Intro. to Cryptography		3				
	網路程式設計概論 Intro. to Network Programming			3			
	電腦安全總整與實作(備註 11) Computer Security Capstone (Note 11)				3		
多媒體工程 Multimedia Engineering	數值方法 Numerical Methods		3				
	計算機圖學概論 Intro. to Computer Graphics			3			
	影像處理概論 Intro. to Image Processing				3		
	多媒體與人機互動總整與實作(備註 11) Multimedia and Human Computer Interaction Capstone (Note 11)					3	
網路工程 Network Engineering	計算機網路概論 Intro. to Computer Networks	3					
	通訊原理與無線網路 Principles of Communications and Wireless Networks		3				
	網路程式設計概論 Intro. to Network Programming			3			
	網路系統總整與實作(備註 11) Network Systems Capstone (Note 11)				3		
系統軟體 System Software	編譯器設計概論 Intro. to Compiler Design			3			
	計算機系統管理 Computer System Administration					3	
	高等 UNIX 程式設計				3		

主題 Topics	科目名稱 Courses Name	說明	上學期		下學期
	Advanced Programming in the UNIX Environment				
	作業系統總整與實作(備註 11) Operating Systems Capstone (Note 11)				3
軟硬體整合 Software and Hardware Integration	數位電路實驗 Digital Circuit Lab.		3		
	編譯器設計概論 Intro. to Compiler Design			3	
	微處理機系統原理與實作 Microprocessor Systems: Principles and Implementation			3	
	嵌入式系統總整與實作(備註 11) Embedded Systems Capstone (Note 11)			3	

主題 Topics	科目名稱 Courses Name	說明	上學期	下學期
計算理論 Theory of Computation	組合數學 Combinatorial Mathematics	左列課程 任選四科 Choose four courses from the left column		3
	人工智慧概論 Intro. to Artificial Intelligence			3
	數值方法 Numerical Methods			3
	正規語言概論 Intro. to Formal Languages			3
	競技程式設計(一)(備註 11) Competitive Programming (I) (Note 11)		3	
	圖形理論 或 基礎圖論 Graph Theory or Fundamental Graph Theory			3
	難解計算問題專論(備註 11) Selected Topics in Intractable Problems (Note 11)			3
	隨機演算法(備註 11) Randomized Algorithms (Note 11)			3
	資訊理論與壓縮編碼的應用 Information Theory and Data Compression Practices			3
	機器學習演算法理論基礎 Algorithmic Foundation of Machine Learning			3

備註 Note

1. 請參閱本校「共同課程通則」。

   Details as "National Chiao Tung University Regulations for General Education Courses of Undergraduate Students".

2. 請參閱本校「學士班外籍生共同課程通則」。外籍生不足的 2 學分，以「專業或自由選修」補足。

Details as "National Chiao Tung University Regulations for General Education Courses of Undergraduate International Students". International Students lack two credits can take "Elective Professional Courses" or "Free Elective Courses".

3. 請參閱本校「通識課程修習辦法」。

   Details as "National Chiao Tung University Guidelines for General Education Curriculum Study".

4. 請參閱本校「外語課程修習辦法」。

   Details as "NCTU Foreign Language Course Selection Policy".

5. 請參閱本校「服務學習課程實施辦法」。

   Details as "NCTU Service Learning Course Measures".

6. 請參閱本校「學生學術及研究倫理教育課程實施辦法」。

   Details as "NCTU Students' Academic and Research Ethics Education Program Implementation Rules".

7. 自 101 學年度起入學者，學士班一年級學生每學期必修『生涯規劃及導師時間』（0 學分），需通過 2 學期始得畢業。

   All the undergraduate freshmen are required to take "Career Planning and Mentor's Hours" every semester (0 credits) and pass two courses before graduation.

8. 請參閱本校「性別平等教育線上訓練課程實施辦法」

   Details as "National Chiao Tung University's Implementing Guidelines for the Gender Equity Education Online Training Course".

9. 若選修物理(一)(二)，共計 8 學分，則可減少專業選修學分 2 學分。

   Students who complete "Physics (I) and (II)", which are 8 credits in total, may waive 2 credits from Elective Professional Courses.

10. 學生「入學前」參加本系『程式能力鑑定』成績為 5 分(含)以上，得「於入學時」申請免修『計算機概論與程式設計』(無學分)。

    Before entering the university, students who pass the "Basic Computer Programming Exam" with higher than 5 points can submit the application of credit exemption for "Intro. to Computers and Programming" (0 credit).

11. 重要課程擋修制度：

    (1)若資料結構與物件導向程式設計[1 下]不及格，擋修演算法概論[2 上]。

    (2)若演算法概論[2 上]和正規語言概論[2 下]不及格，擋修難解計算問題專論[4 下]。

    (3)若演算法概論[2 上]不及格，擋修隨機演算法[4 下]。

    (4)若基礎程式設計[2 下]不及格，擋修以下科目：

    ・人工智慧總整與實作[3 下]

    ・電腦安全總整與實作[3 下]

    ・多媒體與人機互動總整與實作[4 上]

    ・網路系統總整與實作[3 下]

    ・作業系統總整與實作[4 下]

    ・嵌入式系統總整與實作[3 下]

    ・競技程式設計(一) [3 上]

    (5)若資訊工程專題(一)[3 上、3 下]不及格，擋修資訊工程專題(二)[3 下、4 上]。

Important prerequisite on course selection:
(1) Pass the Data Structures and Object-oriented Programming [Spring of AY 1] before taking Intro. to Algorithms [Fall of AY 2].
(2) Pass the "Intro. to Algorithms" [Fall of AY 2] and "Introduction to Formal Language" [Spring of AY 2] before taking "Selected Topics in Intractable Problems" [Spring of AY 4].
(3) Pass the "Intro. to Algorithms" [Fall of AY 2] before taking" Randomized Algorithms" [Spring of AY 4].
(4) Pass the Basic Programming [Spring of AY 2] before taking
・Artificial Intelligence Capstone [Spring of AY 3]
・Computer Security Capstone [Spring of AY 3]
・Multimedia and Human Computer Interaction Capstone [Fall of AY 4]
・Network Systems Capstone [Spring of AY 3]
・Operating Systems Capstone [Spring of AY 4]
・Embedded Systems Capstone [Spring of AY 3]
・Competitive Programming(I) [Fall of AY 3]
(5) Pass the Computer Science and Engineering Projects (I) [both Fall and Spring of AY 3] before taking Computer Science and Engineering (II) [Spring of AY 3 and Fall of AY 4].

12. 『基礎程式設計』及格條件為通過『程式能力鑑定』。

To pass "Basic Programming", students must pass the "Basic Computer Programming Exam."

13. 畢業前須通過 1 門本系開授或認可之英文授課專業課程。（註：專題或研討類型之課程除外。）Students must complete one professional, English-medium course offered by the Department of CS. （Note: Projects or seminars are not included）

14. 各組必修學分須修習本系所開授之課程。必修課程需重修，然因不可抗拒之理由，需修習外系所開課程，以抵本系必修課程者，須填送表一。

Students must take compulsory courses that are offered by the CS college. Students who failed compulsory courses must retake the same courses. Students may apply for an exception (retaking the same courses offered by other colleges at NCTU) by submitting Form I with their reasons indicated.

15. 擬修習外系英文授課專業課程，並申請為本系畢業學分規定之「畢業前須通過 1 門本系開授或認可之英文授課專業課程」者，須填送表二。

Students who choose to take professional, English-medium course offered by other colleges at NCTU must fill in and submit Form II for approval.

16. 乙組學生若表現優異可經申請審核通過後轉為甲組，轉組後需符合甲組修業規定。

Outstanding performance students of program B can apply to program A and graduation degree of program A must be satisfied.

17. 修讀本系雙主修必修科目為基礎科學 14 學分、必修 31 學分及專業選修 30 學分。

Students pursuing a double major should complete Basic Science Courses (14 credits), Compulsory Courses (31 credits) and Elective Professional Courses (30 credits).

資訊工程學系輔系科目表

Department of Computer Science Minor Program

108 學年度(Academic Year 2019)(109.05 修訂)

科目名稱 Course Name	學分數 Credits	科目名稱 Course Name	學分數 Credits	選別 Type
演算法概論◎ Introduction to Algorithms	3	作業系統概論 Introduction to Operating Systems	3	必修 Required
計算機組織 Computer Organization	3	基礎程式設計 Basic Programming	0	
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 Design	3	
離散數學 Discrete Mathematics	3	數位電路設計 Digital Circuit Design	3	任選三門 At least 3
正規語言概論 Introduction to Formal Languages	3	微處理機系統實驗 或 微處理機系統原理與實作 Microprocessor System Lab. or Microprocessor Systems: Principles and Implementation	3	
軟體工程概論 Introduction to Software Engineering	3	網路程式設計概論 Network Programming	3	
計算機網路概論 Introduction to Computer Networks	3	編譯器設計概論 Introduction to Compiler Design	3	
人工智慧概論 或 人工智慧總整與實作◎ Intro. to Artificial Intelligence or Artificial Intelligence Capstone	3	資料庫系統概論 Introduction to Database	3	
計算機圖學概論 Introduction to Computer Graphics	3	訊號與系統 Signals and Systems	3	
影像處理概論 Introduction to Image Processing	3	網路通訊原理 或 通訊原理與無線網路 Principles of Communications Networks or Principles of Communications and Wireless Networks	3	
電路與電子學(一) Electrical Circuits and Electronics I	3	數位系統設計 Digital Systems Design	3	
嵌入式系統總整與實作◎ Embedded Systems Capstone	3			

註1：上列課程需為本系開設之課程，如有不可抗拒的理由，需修習外系所開課程，修課前需經
　　　系主任同意。

註2：「軟體工程概論」可以資工系「系統化軟體開發實務」課程抵免之。

◎：重要課程擋修制度請參閱如下：

(1)若資料結構與物件導向程式設計[1 下]→若該科不及格，擋修演算法概論[2 上]。

(2)若基礎程式設計[2 下]不及格，擋修以下科目：

• 人工智慧總整與實作[3 下]

• 嵌入式系統總整與實作[3 下]