國立交通大學生物科技學系跨域學程實施要點
NCTU Department of Bioinformatics and Systems Biology
Implementation Guidelines for Cross-Disciplinary Program

一、 依據國立交通大學跨域學程實施辦法,國立交通大學生物科技學系(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 Chiao Tung University Department of Bioinformatics and Systems Biology (hereinafter referred to as Our Department) based on NCTU 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 to expand second specialty.

二、 本要點所稱跨域學程係指由各學系、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28-32學分為原則,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 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、 本要點實施對象

Article Three   Implementation objects of these Guidelines

1.凡本校 104 學年度（含）之後入學之學士班學生均適用本要點。

1. People applicable to this program: undergraduate students who are or after class of 2019

2.本系學生欲修習跨域學程者

2. For the student of our department who would like to take cross-disciplinary program

(1) 得於大一下學期或大二下學期向本系提出申請,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 could be submitted to our department during the second semester of the first year or the second semester of the second year. The 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 information of evaluation documents needed to be prepared as well as the quota opened to the students of our department to study for this program in the given year will be released on the announcement. The application should be 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 only take the cross-disciplinary program after evaluation by both sides.

(2) 本系學生修習跨域學程的課程,列示於『生物科技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28學分),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 studied by students in our department should be listed

on "The Required Course List for the students at our department study cross-disciplinary program in Department of Bioinformatics and Systems Biology." The courses include required courses of the university (including 28 credits of 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 at other department) with at least 128 graduate credits. The cross-disciplinary module curriculum at other department would be recognized as cross-disciplinary specialty, and it will be remarked after the title of our department on the diploma.

(3) 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，改修習原學系的學士學位課程。

(3) For students at our department who study for cross-disciplinary program but are not able to complete the program, they shall give up the cross-disciplinary program and transfer to study for the bachelor degree program at the original department.

3. 外系學生欲修習跨域學程且選擇本系做為其跨域專長者

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

(1) 得於大一下學期或大二下學期向其所屬學系（以下簡稱原系）提出申請，通過原系以及本系的雙邊審查後，方可進入跨域學程。

(1) They could submit the application to the department that they belong to during the second semester of the first year or the second semester of the second year, they could only 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：校必修(含共同必修28學分)，原系基礎必修課程，原系跨域模組課程，以及列示於『生物科技學系跨域模組課程必修科目表』的模組課程，畢業學分以128學分為原則，並於畢業證書原系名稱後加註生物科技或分子醫學為其跨域專長。

(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 required courses of the university (including 28 credits of 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 Bioinformatics and Systems Biology" with at least 128 graduate credits. The Bioinformatics and Systems Biology will be remarked as their cross-disciplinary specialty after the title of their original department on the diploma.

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，兩位以上教師開授跨領域之創新整合式課程，得依本校教師授課鐘點核計原則第9條第6款規定，教師的授課鐘點數可按到場時數計，但以開課前該門課程實際簽呈為依據。

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 by the actual time of teaching according to Subparagraph 6, Article 9 of National Chiao Tung University Teaching Hours Accounting Principle; however, it will be in accordance with the official approval of the curriculum before the course starts.

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、 本要點經系課程委員會、院課程委員會及校級課程委員會通過並提教務會議核備後實施，修訂時亦同。

Article Seven These guidelines were approved by Curricular Committee at university level and then submitted to the Council of Academic Affairs for approval-for-reference before putting it into practice; the same shall be done upon any amendment thereto.

生物科技學系跨域學程 本系學生 必修科目表（A）
The Required Course List for the students at our department study cross-disciplinary program in Department of Bioinformatics and Systems Biology

類別 Category	科目名稱 Course Name	學分 Credit	開課系所 Department	備註 Remark
本系基礎必修 75 學分 Core curriculum at our department（75 credits）	化學 Chemistry	3	生科系 Department of Bioinformatics and Systems Biology	必修 51 學分 51 credits are required
	化學實驗 Chemistry Labs.	1		
	物理(一)(二)Physics(I)(II)	6		
	物理實驗 Physics Labs.	1		
	普通生物學(一)(二)General Biology(I)(II)	6		
	普通生物實驗 General Biology Lab.	1		
	微積分(一)(二)Calculus(I)(II)	6		
	程式語言 Programming Language	2		
	程式語言演習 Programming Language Exercise	1		
	計算生物概論 Int. to Computational Biology	2		
	有機化學(一)(二)Organic Chemistry(I)(II)	6		
	有機化學實驗 Organic Chemistry Lab.	2		
	生物化學(一)(二)Biochemistry(I)(II)	6		
	生物化學實驗(一)(二)Biochemistry Lab.	2		
	分子生物學(一)Molecular Biology (I)	3		
	書報討論 Seminar	1		
	服務學習(一)(二)Service-Learning	2		
	生物科技生涯規劃 Career and Planning on Biotechnology	0		
	生物科技概論(一)(二) Introduction to Biotechnology (I) (II)	0		
	物理化學(一)(二)(三) Physical Chemistry (I) (II) (III)	9	生科系 Department of Bioinformatics and Systems Biology	五選二(至少修習 6 學分) (at least 6 credits are required)
	分析化學 Analytical Chemistry	3		
	儀器分析 Instrumental Analysis	3		
	細胞生物學(一)(二)Cell Biology (I)(II)	4	生科系 Department of Bioinformatics and Systems Biology	左列課程至少選 12 學分 At least 12 credits are required from the listed courses
	分子生物學(二)Molecular Biology (II)	3		
	微生物學 Microbiology	3		
	神經生物學(一)(二)Neurobiology (I)(II)	4		
	生理學 (一)(二)Anatomical Physiology (I)(II)	4		

	遺傳學 Genetics	3		
	免疫學 Immunology	3		
	腫瘤生物學 Oncology	3		
	結構生物學 Structural Biology	2		
	生物統計 Biostatistics	3	生科系 DBSB	五選一（至少修習 3 學分）(at least 3 credits are required)
	生科應用數學 Applied Mathematics for Biological Science and Technology	3		
	生物序列分析與高通量技術 Biological Sequence Analysis and High Throughput Technologies	3	生資所 Institute of Bioinformatics and Systems Biology	
	結構生物資訊 Structural Bioinformatics	3		
	生物機器學習 Machine Learning for Biology	3		
	細胞生物學實驗 Cell Biology Lab.	1	生科系 DBSB	三選二（至少修習 2 學分）(at least 2 credits are required)
	微生物學實驗 Microbiology Lab.	1		
	計算生物實驗 Computational Biology Lab.	1		
	專題研究（一）(二)(三)(四)(五) Research (I) (II) (III) (IV) (V)	5	生科系 DBSB	六門至少選一門（至少修習 1 學分）(at least 1 credits are required)
	實驗室見習 Laboratory Rotation	1		
他系跨域模組（28-32 學分）Cross-disciplinary modules at other department（28-32 credits）	本校各系所或學院所提供之跨域模組學程，擇一修畢 The cross-disciplinary modules offer by departments or colleges at our university; choose one to complete.			
	合計 Total			校必修（含共同必修 28 學分（含外語課程必修 8 學分），至多採計 40 學分）[註 2] Required courses of the university (including 28 credits of general education subjects, 8 credits of foreign language course inclusive with the maximum 40 credits countable) [Note 2]
最低畢業學分 Minimum Graduate Credits		128		

註 1：（A）表中之本系跨域模組＝（B）表

Note 1: The cross-disciplinary modules at our department on list (A) = list (B)

註 2：本校共同必修科目表規定，外語課程必修至少 6 學分。如大學部學生修習共同必修學分數超過 28 學分以上，本校至多可採至 40 學分於最低畢業學分內，但各學系另有規定者，從其規定。

Note 2: According to the rules prescribed by Table of General Education Subject of our university, at least 6 credits of foreign language courses must be taken. For the students in the bachelor degree program who study general education subjects more than 28 credits, our university could calculate 40 credits to the minimum graduate credits; please follow the regulations from each department if it is specially defined.

生物科技學系跨域模組課程 必修科目表（B）
The Required Course List for the students study cross-disciplinary module curriculum in Department of Bioinformatics and Systems Biology

類別 Category	科目名稱 Course Name	學分 Credit	開課系所 Department	備註 Remark
(一)生物科技跨域模組（共 32 學分） (I) Cross-disciplinary modules at Department of Bioinformatics and Systems Biology（32 credits）	化學 Chemistry	3	生科系 Department of Bioinformatics and Systems Biology	必修 23 學分 Core curriculum 23 credits
	普通生物學(一)(二)或近代生物學(一)(二) General Biology(I)(II)	6		
	有機化學(一)Organic Chemistry(I)	3		
	生物化學(一)Biochemistry(I)	3		
	分子生物學(一)Molecular Biology (I)	3		
	細胞生物學(一)Cell Biology (I)	2		
	遺傳學 Genetics	3		
修畢於畢業證書加註『跨域專長：生物科技』 It could be remarked as "Cross-Disciplinary Specialty : Bioinformatics and Systems Biology" on the diploma after the module curriculum is completed.	微生物學 Microbiology	3	生科系 Department of Bioinformatics and Systems Biology	左列課程至少選 9 學分 at least 9 credits are required
	生物化學(二)Biochemistry(II)	3		
	分子生物學(二)Molecular Biology (II)	3		
	細胞生物學(二)Cell Biology (II)	2		
	免疫學 Immunology	3		
	病毒學 Virology	3		
	腫瘤生物學 Oncology	3	分醫所 Ins. of Molecular Medicine and Bioengineering	
	生物科技之專利趨勢分析 Patent Analysis of Biotechnology	3		
	神經生物學 (一)(二) Neurobiology (I)(II)	4	生科系 Department of Bioinformatics and Systems Biology	
生物科技跨域模組 總學分 Cross-disciplinary modules at Department of Bioinformatics and Systems Biology Total Credits		32		

類別 Category	科目名稱 Course Name	學分 Credit	開課系所 Department	備註 Remark
(二)分子醫學跨域模組（共 28 學分） (II) Cross-disciplinary modules of Molecular Medicine and Bioengineering at Department of Bioinformatics and Systems Biology（28credits）	普通生物(一)(二)或近代生物學(一)(二) General Biology(I)(II)	6	生科系 Department of Bioinformatics and Systems Biology	必修 18 學分 Core curriculum 18 credits
	生物化學(一)(二)Biochemistry(I)(II)	6		
	分子生物(一)(二) Molecular Biology (I) (II)	6		
	細胞生物(一)(二) Cell Biology (I)(II)	4	生科系 DBSB	左列課程至少選 10 學分 at least 10 credits are
	人體生理學 Human Physiology	3	分醫所 Ins. of Molecular Medicine and Bioengineering	
	免疫學 Immunology	3	生科系 DBSB	

修畢於畢業證書加註『跨域專長：分子醫學』 It could be remarked as "Cross-Disciplinary Specialty : Molecular Medicine and Bioengineering" on the diploma after the module curriculum is completed.	腫瘤生物學 Oncology	3	分醫所 Ins. of Molecular Medicine and Bioengineering	required
	微生物學 Microbiology	3	生科系 DBSB	
	細菌致病機制 Bacterial Pathogenesis	2	分醫所 Institute of Molecular Medicine and Bioengineering	
	高等生物工程 Advanced Bioengineering	2		
	高等分子醫學 Advanced Molecular Medicine	2		
	組織學 Histology	3		
	轉譯醫學:病理學 Translational Medicine: Pathology	2		
	結構生物學 Structural Biology	2	生科系 DBSB	
	遺傳學 Genetics	3		
分子醫學跨域模組 總學分 Cross-disciplinary modules of Molecular Medicine and Bioengineering at Department of Bioinformatics and Systems Biology Total Credits		28		