

中國醫藥大學 生命科學院生物科技學系 必修畢業學分認定表 111 學年度入學適用

China Medical University Department of Biological Science and Technology Requirement for Undergraduate Majors (Applicable for 2022-2023 Enrollees)

第 1 頁 / 共 3 頁

列印日期(Date) : 113年11月25日

科目名稱 Course Title	修別 Type	學分 Credits	一年級		二年級		三年級		四年級		課程分類 Category	備註 Remarks
			Freshman		Sophomore		Junior		Senior			
			上	下	上	下	上	下	上	下		
生物學(A-1)(Biology(A-1))	必(R)	2.0	2.0								系定核心必修(Core Required)	
生物學實驗(A-1)(Biology Laboratory(A-1))	必(R)	1.0	1.0								系定核心必修(Core Required)	
生物學(A-2)(Biology (A-2))	必(R)	2.0		2.0							系定核心必修(Core Required)	
生物學實驗(A-2)(Biology Laboratory(A-2))	必(R)	1.0		1.0							系定核心必修(Core Required)	
有機化學(A)(Organic chemistry(A))	必(R)	2.0		2.0							系定選組必修A組(Division Required A)	
分析化學(A-1)(Analytical chemistry (A-1))	必(R)	2.0			2.0						系定選組必修A組(Division Required A)	
生命科學倫理(Bioethics)	必(R)	2.0			2.0						系定核心必修(Core Required)	
生物化學(A-1)(Biochemistry(A-1))	必(R)	2.0			2.0						系定選組必修B組(Division Required B)	
生物化學實驗(A-1)(Biochemistry laboratory (A-1))	必(R)	1.0			1.0						系定選組必修C組(Division Required C)	
生物科技應用與發展(Application and development of biotechnology)	必(R)	2.0			2.0						系定核心必修(Core Required)	
科技探索(Technology exploration)	必(R)	1.0			1.0						系定核心必修(Core Required)	全英文授課(Fall English)
書報討論(Discussion in lecture)	必(R)	1.0			1.0						系定核心必修(Core Required)	
儀器分析(Instrumental analysis)	必(R)	2.0			2.0						系定核心必修(Core Required)	
分析化學(A-2)(Analytical chemistry (A-2))	必(R)	2.0				2.0					系定選組必修A組(Division Required A)	
分析化學實驗(A)(Analytical chemistry laboratory (A))	必(R)	1.0				1.0					系定選組必修C組(Division Required C)	
生物化學(A-2)(Biochemistry(A-2))	必(R)	2.0				2.0					系定選組必修B組(Division Required B)	
生物化學實驗(A-2)(Biochemistry laboratory (A-2))	必(R)	1.0				1.0					系定選組必修C組(Division Required C)	
書報討論(Discussion in lecture)	必(R)	1.0				1.0					系定核心必修(Core Required)	
細胞生物學(Cell biology)	必(R)	3.0				3.0					系定核心必修(Core Required)	中草藥生物技術學分學程·生物技術學分學程(Chinese Herbal Medicine Biotechnology Credit Program·Biotechnology Credit Program)
細胞生物學實驗(Cell biology laboratory)	必(R)	1.0				1.0					系定核心必修(Core Required)	
分子生物學(Molecular biology)	必(R)	3.0					3.0				系定核心必修(Core Required)	精準醫學學分學程(Precision Medicine Credit Program)
分子生物學實驗(Molecular biology laboratory)	必(R)	1.0					1.0				系定核心必修(Core Required)	
文獻選讀(一)(Literature reading (I))	必(R)	1.0						1.0			系定核心必修(Core Required)	
文獻選讀(一)(Literature reading (I))	必(R)	1.0							1.0		系定核心必修(Core Required)	
生物科技研究方法(Research methodology of biotechnology)	必(R)	2.0							2.0		系定核心必修(Core Required)	生物技術學分學程(Biotechnology Credit Program)
生物科技產業現況(Current status of biotechnology industry)	必(R)	3.0							3.0		系定核心必修(Core Required)	
生物統計學(Biostatistics)	必(R)	2.0							2.0		系定核心必修(Core Required)	
生理學(C)(Physiology (C))	必(R)	3.0							3.0		系定選組必修B組(Division Required B)	
文獻選讀(二)(Literature reading (II))	必(R)	1.0								1.0	系定核心必修(Core Required)	全英文授課(Full English)
智慧財產權與實務(Intelligent property & practice)	必(R)	2.0								2.0	系定核心必修(Core Required)	
文獻選讀(二)(Literature reading (II))	必(R)	1.0								1.0	系定核心必修(Core Required)	全英文授課(Full English)
合計 必修 總學分(Requirement subtotal)		52.0	3.0	5.0	13.0	11.0	5.0	11.0	3.0	1.0		

校內注意事項

- 111學年度入學生畢業學分認定表備註：  
 一、畢業前必須通過英文鑑定，方能畢業。相關規定依本校「學生英文能力鑑定實施辦法」辦理。  
 二、體育課一年級為必修，每學期0學分，不及格不得畢業。大學部二年級以上為選修，每學期一學分。

Note of CMU

- For students enrolled in the fall semester of 2022:  
 1. According to the regulation of CMU Students' English Proficiency Assessment, Students must pass the minimal English Proficiency Requirement before graduation.  
 2. Taking Physical Education Course is compulsory for first year students

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三、國防軍事訓練改為選修，每週上課2小時為1學分，成績及格者，83年次以前同學以每8堂課折算1日役期(1門課折抵4日役期，2門課折抵9日役期，以此類推)。83年次以後同學每門課折抵2日訓期。

四、通識教育課程分為正式課程及通識教育活動：

(一)正式課程：必修28學分

1. 英文必修4學分

英文課程採分級制，分級以大學指考及學測成績為依據，分級結果於選課前公告。如達該學系英文畢業檢定標準，經所屬學系審核通過，得免修英文4學分，相關細則依「中國醫藥大學英文暨英語聽講必修課程免修學分實施要點」規定辦理。

2. 資訊相關課程(2學分)

3. 服務學習課程(1學分)

4. 通識課程(21學分)

(1)核心通識課程：至少修習10學分，五大類中至少任選三大類。

A. 語文類：國文、英文進階課程及第二外語課程等。

B. 人文藝術類：文學藝術類、歷史文明類等。

C. 社會科學類：法政類；社會、心理、人類、教育、性別研究類；管理、經濟類等。

D. 自然科學類：基礎科學類；生命科學類；應用科學類；科學技術類等。

E. 運動知能類：如運動心理學、運動生理學、國際賽事分析與博奕事業、運動與健康的學理探討等學術類課程。如屬該學系之必選修課程者，將設限不得認列為通識學分。

(2)跨學院通識課程：至少須修習跨學院課程4學分。

(二)通識教育活動：0學分，學生須於在學期間參與至少16小時通識教育中心所認定之演講與校外所舉辦之展演活動；成績以通過/不通過計分。相關細則依「通識教育活動實施要點」規定辦理。

五、服務學習時數：需修習通識必修1學分(可認列18小時服務學習課程)(醫學系、中醫學系另於下學期開設系上必修1學分)之服務學習課程，以及6小時志願服務基礎教育訓練、6小時服務學習講座參與、18小時志工服務(不含服務學習講座)，共計需完成48小時之服務學習時數，始符合畢業資格。

※志願服務基礎訓練由學務處服務學習中心舉辦(另行公告)，其他未盡事宜請詳閱「服務學習課程實施要點」(學務處服務學習中心網頁)。

六、畢業前必須參加校內舉辦之基礎心肺復甦術訓練，方具畢業資格。相關規定依本校「學生基礎心肺復甦術訓練實施要點」辦理。

七、本學分表做為畢業學分認定之依據。

## 生物科技學系注意事項

一、教育目標：

1. 培養學生對近代生物科技發展之瞭解
2. 藉由專業知識之訓練以連結近代生物科技之應用
3. 培育生技產學界之研發人才

二、111學年度入學新生實施，本系為四年制，最低畢業學分數為128學分，必修71學分(含通識28學分及系定必修43學分分為「核心必修課程(36學分)」及「選組必修課程(7學分)」)，選修57學分。

三、1. 選組必修課程(7學分)

(A組)有機化學(A)2學分、分析化學(A-1)2學分、分析化學(A-2)2學分(至少選1門)。

(B組)生物化學(A-1)2學分、生物化學(A-2)2學分、生理學(C)3學分(至少選3學分)。

(C組)生物化學實驗(A-1)1學分、生物化學實驗(A-2)1學分、分析化學實驗(A)1學分(實驗課三選二，至少選2學分)。

2. 若有超修之學分，視為自由選修學分。

(0 credits), students must pass to graduate. For second year or above, Physical Education is elective with 1 credit per semester.

3. Defense Education Military Training Course is elective, with 2 hours per week (1 credit).

4. General education courses consist of formal courses and general education activities:

(1) Formal courses: 28 required credits

i. English (4 credits): A level-based class grouping system is adopted based on students' score of the entrance examination. Students who meet the department's English graduation standard and are approved by the department can be exempted from the course.

ii. Technology Information-related courses (2 credits)

iii. Service learning courses (1 credit)

iv. General education courses (21 credits)

Core general education courses: Minimum of 10 credits, with at least three of the five categories. (Language, Humanities and arts, Social sciences, Natural sciences, Sports)

Cross-college general education courses: Minimum of 4 credits.

(2) General education activities: 0 credits. Students must participate in at least 16 hours of activities held by the General Education Center, scores will be marked as pass/fail.

5. Service learning hours: 1 credit of compulsory general education (can be listed in 18 hours of service learning courses) (School of Medicine and Chinese Medicine will offer 1 credit of compulsory course in the 2nd semester), 6 hours of voluntary service basic training, 6 hours participation service-learning lectures, and 18 hours of volunteer service. A total of 48 hours is required to be eligible for graduation.

※ Voluntary service basic training will be held by the Office of Student Affairs (to be announced).

6. Students must participate in the basic cardiopulmonary resuscitation training held by the university before graduation.

7. This list is used as the recognition basis of courses and credits required for graduation

## Note of Department of Biological Science and Technology

\*Our department is a four-year system, the minimum number of graduation credits is 128 credits, 71 credits of required courses (including 28 credits of general studies and 43 credits of required courses of the department are divided into \*core required courses (36 credits) and \*selected required courses (7 credits points)), 57 credits of electives.

\*1. Required courses for group selection (7 credits, divided into three groups)

(Group A) 2 credits of Organic Chemistry (A), 2 credits of Analytical Chemistry (A-1), 2 credits of Analytical Chemistry (A-2) (choose at least 1 course).

(Group B) Biochemistry (A-1) 2 credits, Biochemistry (A-2) 2 credits, Physiology (C) 3 credits (choose at least 3 credits).

(Group C) Biochemistry Experiment (A-1) 1 credit, Biochemistry Experiment (A-2) 1 credit, 1 credit for Analytical Chemistry Experiment (A) (choose 2 out of 3 experimental courses, at least 2 credits).

2. If there are extra credits, it is regarded as a free elective.

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單位主管簽章：

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China Medical University Department of Biological Science and Technology Elective for Undergraduate Majors (Applicable for 2022-2023 Enrollees)

第 1 頁 / 共 3 頁

列印日期(Date) : 113年11月25日

科目名稱 Course Title	修別 Type	學分 Credits	一年級		二年級		三年級		四年級		課程分類 Category	備註 Remarks
			Freshman		Sophomore		Junior		Senior			
			上	下	上	下	上	下	上	下		
生醫科技人物誌(Character in biological science and technology)	選(E)	2.0	2.0								系定選修(Departmental Elective Courses)	
普通化學(C)(General chemistry (C))	選(E)	2.0	2.0								系定選修(Departmental Elective Courses)	
普通化學實驗(B)(General chemistry laboratory (B))	選(E)	1.0	1.0								系定選修(Departmental Elective Courses)	
普通物理學(B)(General physics (B))	選(E)	2.0	2.0								系定選修(Departmental Elective Courses)	
微積分(一)(Calculus (I))	選(E)	2.0	2.0								系定選修(Departmental Elective Courses)	
生物科技學簡介(Preview of biological science & technology)	選(E)	2.0		2.0							系定選修(Departmental Elective Courses)	
有機化學實驗(A)(Organic chemistry laboratory(A))	選(E)	1.0		1.0							系定選修(Departmental Elective Courses)	
應用化學(Applied chemistry)	選(E)	2.0		2.0							系定選修(Departmental Elective Courses)	全英文授課(Full English)
環境生物學(Environmental biology)	選(E)	3.0		3.0							系定選修(Departmental Elective Courses)	
中藥概論(Introduction to Chinese crude drugs)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
奈米生技(Nano biotechnology)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
疾病與藥物導論(Introduction to disease & drug)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
專題研究(一)(Project study(I))	選(E)	1.0			1.0						系定選修(Departmental Elective Courses)	
電腦在生物醫學上的應用(Application of computer in biomedical science)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
電腦輔助藥物設計(Computer aided drug design)	選(E)	3.0			3.0						系定選修(Departmental Elective Courses)	
環境毒理學概論(Introduction to environmental toxicology)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
中醫學概論(B)(Introduction to Chinese medicine (B))	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
生技與微生物學(Biotechnology & microbiology)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
生技儀器分析與應用(Biotechnology instrumentation and applicatio)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
生物數學(Bio-mathematics)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
自由基生物醫學(Free radicals in biology and medicine)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
專題研究(二)(Project study(II))	選(E)	1.0			1.0						系定選修(Departmental Elective Courses)	
跨域串思(Transdisciplinary dialogue)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
醫學工程(Medical engineering)	選(E)	2.0			2.0						系定選修(Departmental Elective Courses)	
分子神經藥理學暨藥物設計(Molecular neuropharmacology and drug design)	選(E)	2.0				2.0					系定選修(Departmental Elective Courses)	
生技產業實習(一)(Practice in biotech-industry(I))	選(E)	4.0				4.0					系定選修(Departmental Elective Courses)	
生技與免疫學(Biotechnology & immunology)	選(E)	2.0				2.0					系定選修(Departmental Elective Courses)	
專題研究(三)(Project study(III))	選(E)	1.0				1.0					系定選修(Departmental Elective Courses)	
腫瘤化學預防(Cancer chemoprevention)	選(E)	2.0				2.0					系定選修(Departmental Elective Courses)	
實驗動物(Laboratory animals)	選(E)	2.0				2.0					系定選修(Departmental Elective Courses)	
認知科學概論(Introduction to cognitive science)	選(E)	2.0				2.0					系定選修(Departmental Elective Courses)	
生物材料科學(Biomaterials science)	選(E)	2.0					2.0				系定選修(Departmental Elective Courses)	全英文授課(Full English)
生涯規劃與因應之道(Career planning & survival skills)	選(E)	1.0					1.0				系定選修(Departmental Elective Courses)	
生理學實驗(B)(Physiology laboratory (B))	選(E)	1.0					1.0				系定選修(Departmental Elective Courses)	
食品生物技術(Biotechnology of food science)	選(E)	2.0					2.0				系定選修(Departmental Elective Courses)	生物技術學分學程(Biotechnology Credit Program)
訊息路徑導論(Introduction to signaling pathways)	選(E)	2.0					2.0				系定選修(Departmental Elective Courses)	生物技術學分學程(Biotechnology Credit Program)
癌症學概論(Introduction to tumor biology)	選(E)	2.0					2.0				系定選修(Departmental Elective Courses)	

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China Medical University Department of Biological Science and Technology Elective for Undergraduate Majors (Applicable for 2022-2023 Enrollees)

第 2 頁 / 共 3 頁

列印日期(Date) : 113年11月25日

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			Freshman		Sophomore		Junior		Senior			
			上	下	上	下	上	下	上	下		
中醫在抗衰老與再生醫學上的應用(The application of chinese medicine in antiaging and regenerative medicine)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
生技產業實習(二)(Practice in biotech-industry(II))	選(E)	4.0								4.0	系定選修(Departmental Elective Courses )	
生物資訊暨程式設計(Bioinformatics & computer software design)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
訊息傳遞與疾病治療(Signal transduction and therapy in disease)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	線上課程(Online course)
專題研究(五)(Project study(V))	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
精準醫療檢測技術應用與開發(Precision medicine detection technology application and development)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
遺傳學(Genetics)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
分子生物學總論及應用(General Review and Applications of Molecular Biology)	選(E)	1.0								1.0	系定選修(Departmental Elective Courses )	
分子遺傳學(Molecular genetics)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
生技就業培訓專案(Biotechnology industrial training project)	選(E)	8.0								8.0	系定選修(Departmental Elective Courses )	
基因治療學(Gene therapy)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
專題研究(六)(Project study (VI))	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
細胞生物學總論及應用(General Review and Applications of Cell Biology)	選(E)	1.0								1.0	系定選修(Departmental Elective Courses )	
藥物開發簡介(Introduction of drug developmen)	選(E)	2.0								2.0	系定選修(Departmental Elective Courses )	
合計 選修 總學分(Elective subtotal)		105.0	9.0	8.0	14.0	15.0	15.0	10.0	16.0	18.0		

校內注意事項

Note of CMU

111學年度入學生畢業學分認定表備註：

- 一、畢業前必須通過英文鑑定，方能畢業。相關規定依本校「學生英文能力鑑定實施辦法」辦理。
- 二、體育課一年級為必修，每學期0學分，不及格不得畢業。大學部二年級以上為選修，每學期一學分。
- 三、國防軍事訓練改為選修，每週上課2小時為1學分，成績及格者，83年次以前同學以每8堂課折算1日役期(1門課折抵4日役期，2門課折抵9日役期，以此類推)。83年次以後同學每門課折抵2日訓期。
- 四、通識教育課程分為正式課程及通識教育活動：
  - (一)正式課程：必修28學分
    1. 英文必修4學分  
英文課程採分級制，分級以大學指考及學測成績為依據，分級結果於選課前公告。如達該學系英文畢業檢定標準，經所屬學系審核通過，得免修英文4學分，相關細則依「中國醫藥大學英文暨英語聽講必修課程免修學分實施要點」規定辦理。
    2. 資訊相關課程(2學分)
    3. 服務學習課程(1學分)
    4. 通識課程(21學分)
      - (1) 核心通識課程：至少修習10學分，五大類中至少任選三大類。
        - A. 語文類：國文、英文進階課程及第二外語課程等。
        - B. 人文藝術類：文學藝術類、歷史文明類等。
        - C. 社會科學類：法政類；社會、心理、人類、教育、性別研究類；管理、經濟類等。
        - D. 自然科學類：基礎科學類；生命科學類；應用科學類；科學技術類等。
        - E. 運動知能類：如運動心理學、運動生理學、國際賽事分析與博奕事業、運動與健康的學理探討等學術類課程。如屬該學系之必選修課程者，將設限不得認列為通識學分。
      - (2) 跨學院通識課程：至少須修習跨學院課程4學分。
    - (二) 通識教育活動：0學分，學生須於在學期間參與至少16小時通識教育中心所認定之演講與校外所舉辦之展演活動；成績以通過/不通過計分。相關細則依「通識教育活動實

For students enrolled in the fall semester of 2022:

1. According to the regulation of CMU Students' English Proficiency Assessment, Students must pass the minimal English Proficiency Requirement before graduation.
  2. Taking Physical Education Course is compulsory for first year students (0 credits), students must pass to graduate. For second year or above, Physical Education is elective with 1 credit per semester.
  3. Defense Education Military Training Course is elective, with 2 hours per week (1 credit).
  4. General education courses consist of formal courses and general education activities:
    - (1) Formal courses: 28 required credits
      - i. English (4 credits): A level-based class grouping system is adopted based on students' score of the entrance examination. Students who meet the department's English graduation standard and are approved by the department can be exempted from the course.
      - ii. Technology Information-related courses (2 credits)
      - iii. Service learning courses (1 credit)
      - iv. General education courses (21 credits)
- Core general education courses: Minimum of 10 credits, with at least three of the five categories. (Language, Humanities and arts, Social sciences, Natural sciences, Sports)
- Cross-college general education courses: Minimum of 4 credits.
- (2) General education activities: 0 credits. Students must participate in at least 16 hours of activities held by the General Education Center, scores will be marked as pass/fail.
5. Service learning hours: 1 credit of compulsory general education (can be listed in 18 hours of service learning courses) (School of Medicine and Chinese Medicine will offer 1 credit of compulsory course in the 2nd semester), 6 hours of voluntary service basic training, 6 hours participation service-learning lectures, and 18 hours of volunteer service. A total of 48 hours is required to be eligible for graduation.

中國醫藥大學 生命科學院生物科技學系 選修畢業學分認定表 111 學年度入學適用

China Medical University Department of Biological Science and Technology Elective for Undergraduate Majors (Applicable for 2022-2023 Enrollees)

施要點」規定辦理。

五、服務學習時數：需修習通識必修1學分（可認列18小時服務學習課程）（醫學系、中醫學系另於下學期開設系上必修1學分）之服務學習課程，以及6小時志願服務基礎教育訓練、6小時服務學習講座參與、18小時志工服務（不含服務學習講座），共計需完成48小時之服務學習時數，始符合畢業資格。

※志願服務基礎訓練由學務處服務學習中心舉辦（另行公告），其他未盡事宜請詳閱「服務學習課程實施要點」（學務處服務學習中心網頁）。

六、畢業前必須參加校內舉辦之基礎心肺復甦術訓練，方具畢業資格。相關規定依本校「學生基礎心肺復甦術訓練實施要點」辦理。

七、本學分表做為畢業學分認定之依據。

生物科技學系注意事項

一、教育目標：

1. 培養學生對近代生物科技發展之瞭解
2. 藉由專業知識之訓練以連結近代生物科技之應用
3. 培育生技產學界之研發人才

二、111學年度入學新生實施，本系為四年制，最低畢業學分數為128學分，必修71學分(含通識28學分及系定必修43學分分為「核心必修課程(36學分)」及「選組必修課程(7學分)」)，選修57學分。

三、1. 選組必修課程(7學分)

(A組)有機化學(A)2學分、分析化學(A-1)2學分、分析化學(A-2)2學分(至少選1門)。

(B組)生物化學(A-1)2學分、生物化學(A-2)2學分、生理學(C)3學分(至少選3學分)。

(C組)生物化學實驗(A-1)1學分、生物化學實驗(A-2)1學分、分析化學實驗(A)1學分(實驗課三選二，至少選2學分)。

2. 若有超修之學分，視為自由選修學分。

單位主管簽章：

※Voluntary service basic training will be held by the Office of Student Affairs (to be announced).

6.Students must participate in the basic cardiopulmonary resuscitation training held by the university before graduation.

7.This list is used as the recognition basis of courses and credits required for graduation

Note of Department of Biological Science and Technology

\*Our department is a four-year system, the minimum number of graduation credits is 128 credits, 71 credits of required courses (including 28 credits of general studies and 43 credits of required courses of the department are divided into \*core required courses (36 credits)and \*selected required courses (7 credits points)), 57 credits of electives.

\*1. Required courses for group selection (7 credits, divided into three groups)

(Group A) 2 credits of Organic Chemistry (A), 2 credits of Analytical Chemistry (A-1), 2 credits of Analytical Chemistry (A-2) (choose at least 1 course).

(Group B) Biochemistry (A-1) 2 credits, Biochemistry (A-2) 2 credits, Physiology (C) 3 credits (choose at least 3 credits).

(Group C) Biochemistry Experiment (A-1) 1 credit, Biochemistry Experiment (A-2) 1 credit, 1 credit for Analytical Chemistry Experiment (A) (choose 2 out of 3 experimental courses, at least 2 credits).

2. If there are extra credits, it is regarded as a free elective.