Ming Chuan University Department of Biotechnology - Biotechnology Industry Special Cohort Course Outline for all students entering in 2024-2025 page 1 of 13

						year				year				year				year		
	Course	Credits	Hours		all		ring		all		ring		all		ing		all		ring	Note
				class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
Core	中國文學鑑賞與創作	2	2	2																
Required	(-)00123																			
Courses	Chinese Literature:																			
	Appreciation and																			
	Creative Writing 1																			
	中國文學鑑賞與創作	2	2		2															
	(_)00124																			
	Chinese Literature:																			
	Appreciation and																			
	Creative Writing 2																			
	應用英文(一)01108	0	2	1	1															Note 1
	Practical English 1																			
	應用英文(二)01109	0	2			1	1													Note 1
	Practical English 2																			
	應用英文(三)01208	0	2					1	1											Note 1
	Practical English 3																			
	應用英文(四)01209	0	2							1	1									Note 1
	Practical English 4																			
	商務溝通英文(一) 01306	2	3									2	1							Note 1
	English for Business																			
	Communication 1																			
	商務溝通英文(二) 01307	2	3											2	1					Note 1
	English for Business																			
	Communication 2																			
	職場應用英文(一) 01406	2	3													2	1			Note 1
	Practical English of																			
	Professionals 1																			
	職場應用英文(二) 01407	2	3															2	1	Note 1
	Practical English of																			
	Professionals 2																			

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						year				year			3 rd y	year				year			
	Course	Credits	Hours		all		ring	Fa			ring		all		ing		all		ring		Note
				class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class			
	人工智慧概論 00911	2	3	2	1															Note 1	
	Applied Information																				
	Technology: Office																				
	Software																				
	程式設計 13285	2	3			2	1													Note 1	
	Programming Design																				
	通識教育	12	12																	Note 2	
	General Ed																				
	體育(壹~肆)	0	8	2		2		2		2											
	Physical Education																				
	(1)~(4)																				
	Subtotal	28																			
Professional	Fundamental Chemistry	3	3	3																	
Required	(E) 基礎化學 39121																				
Courses	Fundamental Chemistry	1	3	1	2																
	Lab (E)																				
	基礎化學實驗 39122																				
	Physics principles for	3	3	3																	
	biologist 物理原則 39117																				
	普通生物學(一) 39104	3	3	3																	
	General Biology-1																				
	普通生物學實驗(一) 39105	1	3	1	2																
	General Biology Lab1																				
	普通生物學(二) 39106	3	3			3															
	General Biology-2																				
	生物科技綜論 39119	2	2			2															
	General Discussion on																				
	Biotechnology																				
	有機化學 39201	3	3			3															
	Organic Chemistry																				

Ming Chuan University Department of Biotechnology - Biotechnology Industry Special Cohort Course Outline for all students entering in 2024-2025 page 3 of 13

					year				year			3 rd					year		
Course	Credits	Hours	Fa			ing		all		ring	Fa		Spr			all		ring	Note
			class	lab	class		class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
有機化學實驗 39202	1	3			1	2													
Organic Chemistry Lab.																			
生技法規與學術倫理	2	2			2														
39120 Laws, Standards,																			
and Academic Ethics on																			
Biotechnology																			
新生專題討論 39118	1	1	1																
Freshman Seminar																			
分析化學(含實驗) 39216	3	3					3												
Analytical																			
Chemistry(Lab)																			
生物化學(一)39212	4	4					4												
Biochemistry-1																			
生物化學實驗(一) 39206	1	3					1	2											Service Learning
Biochemistry Lab1																			
生物化學(二)39213	4	4							4										
Biochemistry-2																			
微生物學 39207	3	3							3										
Microbiology																			
微生物學實驗 39208	1	3							1	2									
Microbiology Lab.																			
生物統計學 39306	3	3									3								
Biostatistics																			
實驗室品質管理系統	3	3											3						
39319 Laboratory Quality																			
Management System																			
專題討論(一)39403	1	1													1	0			
Seminar 1																			
專題討論(二)39404	1	1															1	0	
Seminar 2																			

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							year			2 nd y					year				year		Note
	Cours	e	Credits	Hours		all		ing	Fa		Spr		Fa			ing		all		ring	
					class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
		Subtotal	47																		
Professional	Biomedical	微積分 39115	3	4	3	1															
Elective	Program	Calculus																			
Courses		動物生理 39233	3	3					3												
		Animal Physiology																			
		動物細胞培養及應用	2	2							2										
		39241																			
		Animal Cell Culture																			
		and Application																			
		免疫學 39333	3	3									3								
		Immunology																			
		細胞生物學 39203	3	3									3								
		Cell Biology																			
		細胞生物學實驗	1	3									1	2							
		39204																			
		Cell Biology Lab.																			
		分子生物學 39316	3	3									3								
		Molecular Biology																			
		疫苗學 39334	3	3											3						
		Vaccine &																			
		Vaccination																			
		實驗動物醫學 39433	3	3															3		
		Laboratory Animal																			
		Medicine																			
		基因轉殖 39443	2	2															2		
		Gene Transfer																			
		病毒學 39434	3	3													3				
		Virology																			
		基因體學 39235	3	3							3										
		Genomics																			

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					year			2 nd y					year				year		Note
Course	Credits		Fa			ing	Fa			ring	Fa		Spr	ing		all		ring	
			class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
分子遺傳學與應用	3	3					3												
39248																			
Molecular genetics																			
and applications																			
生物序列分析實作	3	3							3										
39242																			
Special Topics to																			
Genome Project &																			
Annotation																			
藥學概論 39353	3	3					3												
Introduction to																			
Pharmacy																			
生物無機化學 39331	3	3									3								
Bioinorganic																			
Chemistry																			
生物儀器分析暨應用	3	3									3								
39349																			
Applied																			
Bioinstrumentation																			
and Analysis																			
生物資訊學(一)	2	3											2	1					Computer courses
39317																			
Bioinformatics-1																			
生物資訊學(二)	2	3													2	1			Computer courses
39345																			
Bioinformatics-2																			
分子生物學特論	3	3											3						
39448																			
Special Topics in																			
Molecular Biology																			

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Course							/ear			2 nd y					year				year		Note
要白生化與豫學技術 3 3 應用 39363 Proteomic technology application 那粉發育與幹細影學 3 3 39364 Developmental and stem cell biology 事場研究(-)3948 1 1 Research Training 1 身場研究(-)39405 1 Research Training 2 全有資分離與二維電 2 多有資產與工作電 2 2 该 39445 Protein Separation and Two Dimensional Electrophoresis 至有資產品處理與資 2 2 营債分析 39446 Protein preparation and mass spectrum analysis 3 3 3 Biofood 专秦學 39237 3 3 3 Program 全化工程等論 39351 3 3 3 Biofochemistry Engineering & Metrition 2 3 3 3 植物生理 39221 3 3 3 3 3	Course	;	Credits	Hours																	
Rem 193963 Proteomic technology application Exemption Ex					class	lab	class	lab	class	lab	class	lab	class	lab		lab	class	lab	class	lab	
Proteomic technology application			3	3											3						
technology application 形形發育與幹細範學 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3																					
Application Ship Specific part Ship Specific																					
BENS																					
Substitution		application																			
Developmental and stem cell biology		胚胎發育與幹細胞學	3	3											3						
Stem cell biology																					
早題研究(一)39318																					
Research Training 1																					
専題研究(二)39405 1 1 1 1 1 1 1 1 1			1	1											1						
専題研究(二)39405 1 1 1 1 1 1 1 1 1		Research Training 1																			
Research Training 2		專題研究(二)39405	1	1													1				
蛋白質分離與二維電 2 2 冰 39445 Protein Separation and Two Dimensional Electrophoresis 2 蛋白質樣品處理與質 2 2 譜儀分析 39446 Protein preparation and mass spectrum analysis 3 Biofood 營養學 39237 3 3 Program Nutrition 4 化工程導輸 39351 3 3 Introduction to Biochemistry Engineering 植物生理 39231 3 3 3																					
Protein Separation and Two Dimensional Electrophoresis 蛋白質樣品處理與質 2 2		蛋白質分離與二維電	2	2													2				
and Two Dimensional Electrophoresis Electrophoresis 医白質様品處理與質 2 2		泳 39445																			
and Two Dimensional Electrophoresis Electrophoresis 医白質様品處理與質 2 2		Protein Separation																			
Electrophoresis 蛋白質樣品處理與質 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3																					
蛋白質樣品處理與質 譜儀分析 39446 Protein preparation and mass spectrum analysis 2 2 Biofood Program 營養學 39237 Nutrition 3 3 Program Nutrition 生化工程導論 39351 Introduction to Biochemistry Engineering 植物生理 39231 3 3		Dimensional																			
蛋白質樣品處理與質 譜儀分析 39446 Protein preparation and mass spectrum analysis 2 Biofood Program 營養學 39237 Nutrition 3 L化工程導論 39351 Introduction to Biochemistry Engineering 植物生理 39231 3 3 3 3 3 3 3 3 3 4 4 5 4 6 4 7 4 8 4 8 4 8 4 8 4 8 4 8		Electrophoresis																			
諸儀分析 39446 Protein preparation and mass spectrum analysis Biofood Program 營養學 39237 3 3 Nutrition ± 化工程導論 39351 3 3 Introduction to Biochemistry Engineering 植物生理 39231 3 3 植物生理 39231 3 3			2	2															2		
Protein preparation and mass spectrum analysis Biofood 營養學 39237 3 3 3																					
and mass spectrum analysis																					
Biofood 營養學 39237 3 3 3 3 3 3 3 3 3																					
Biofood Program 營養學 39237 3 </td <td></td>																					
Program	Biofood		3	3					3												
生化工程導論 39351 3 Introduction to Biochemistry Engineering 植物生理 39231 3 1 3 3 3 3 3 3 3	Program																				
Introduction to Biochemistry Engineering 相物生理 39231 3 3 3			3	3					3												
Biochemistry		1 -		_					-												
Engineering 3 植物生理 39231 3																					
植物生理 39231 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			1																		
		植物生理 39231	3	3					3						t	t	t	t			
ו ו ודומווג דוועאוטוטפע ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו		Plant Physiology																			

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					ear			2 nd y					year				year		Note
Course	Credits	Hours	Fa		Spr		Fa		Spr		Fa			ing	Fa			ring	
			class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
化妝品學 39343	3	3					3												
Cosmetics Science																			
香草植物栽培與應用	3	3					3												
39246																			
Herb Plant																			
Cultivation and																			
Application																			
營養學(英) 39225	3	3							3										
Nutrition (E)																			
食品化學 39244	3	3							3										
Food Chemistry																			
食品分析(含實	3	3							3										
驗)39245																			
Food Analysis (Lab)																			
植物組織培養及應用	3	3							3										
39239																			
Tissue culture and																			
Application																			
環境生態學 39247	3	3							3										
Environmental																			
Ecology																			
食品微生物(含實	3	3									3								
驗)39346																			
Food Microbiology																			
(Lab)																			
農業與食品工業廢棄	2	2									2								
物處理 39444																			
Agriculture and																			
Food Industrial																			
Waste Management																			

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				1 st y	ear			2 nd y	ear				year				year		Note
Course	Credits	Hours	Fal			ing	Fa			ing	Fa			ing		all		ing	
			class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	class	lab	
魚菜共生農法的	理論 3	3									3								
與實作 39362																			
The Principle ar	nd																		
Practice of																			
Aquaponics																			
酵素學 39332	3	3											3						
Enzymology																			
食品衛生與安全	3	3											3						
39344																			
Food Safety																			
發酵學 39338	3	3											3						
Fermentation																			
食材的科學與文	化 3	3											3						
39348																			
The Science and																			
Culture Behind	Food																		
Material																			
食品加工(含實	3	3													3				
驗)39450																			
Food Process (L																			
保健營養食品 39		3													3				
Dietary Suppler	ments																		
and Functional																			
Foods																			
以上專業選修學程至少需修 27 個	個學分 Profess	sional ele	ctives n	nust b	e sele	cted at	least 2	27 cred	lit hou	ırs									

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					1 st	year			2 nd	year			3 rd	year			4 th	year		
	Course	Credits	Hours	Fa	ıll	Spi	ring	Fa	all	Spi	ring	Fa	all	Spi	ring	Fa	all	Sp	ring	Note
				class	lab	class	lab													
Other	基礎化學(英)39123	3	3	3																
Elective	Fundamental Chemistry (E)																			
Course	基礎化學實驗(英)39124	1	3	1	2															
	Fundamental Chemistry Lab (E)																			
	普通生物學(一)(英)39125	3	3	3																
	General Biology I (E)																			
	普通生物學實驗(一)(英)39126	1	3	1	2															
	General Biology Lab I (E)																			
	微生物學(英)39127	3	3					3												
	Microbiology (E)																			
	微生物學實驗(英)39128	1	3					1	2											
	Microbiology Lab (E)																			
	生物化學(一)(英) 39219	4	4					4												
	Biochemistry I (E)																			
	生物統計學(英) 39220	3	3									3								
	Biostatistics (E)																			
	程式設計(一) 39253	2	3					2	1											
	Programming Design-1																			
	程式設計(二) 39254	2	3							2	1									
	Programming Design-2																			
	普通生物學實驗(二)39256	1	3							1	2									
	General Biology Lab2																			
	生物有機化學 39255	2	2					2												
	Bioorganic Chemistry																			
	生物科技法 39252	2	2							2										
	Biotechnology Law																			
	生態學 39354 Ecology	2	2									2								
	國際生物科技產業 39361											2								
	International Biotech Industry																			

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研究論文寫作 39359 Research Paper Writing	1	1					1			
產業實習 39459 Internship in Industry	1	1						1		
企業實習BIO19	3							3		
企業進階實習 39460 Advanced Internship	3								3	
職場實務專題 39461 Seminar on Industry Practice	3								3	
生物檢測器 39431 Biosensor	3	3						3		
生物科技專利及智慧財產權 39455 Biotechnical Intellectual Property Rights and Patents	2	2						2		
生物科技產業 39451 Introduction of Bioindustry	2	2						2		
物理化學 39452 Physic Chemistry	3	3						3		
Subtotal Required Course Credits	75									
Subtotal Elective Course Credits	53									
Subtotal Professional Elective Course Credits	27									
Subtotal Elective courses from other schools	26									
Grand Total	128									

Notes:

- 1.依本校學則規定,大學部學生需通過「服務學習」、「英語能力」、「資訊能力」、「中文能力」、「運動能力」及「專業基本能力」檢定,始得畢業。
- 1.In accordance with the General Provisions for Study, undergraduate students need to satisfactorily complete Service Learning, meet the university-wide basic competencies of English, Information Technology, Chinese, and Sports, and pass the core competencies of their department to be eligible for graduation.
- 2.通識教育課程在畢業前至少必須修完 12 學分,課程分「人文」、「社會」、「自然」三個領域,每個領域再分「核心」、「延伸」二類,每個學生在每一領域的每一類至少必須修一門課 2 學分方得畢業。通識教育課程以 12 學分為限,超修者不得列計於畢業學分內。
- 2.Students who entered in and since the 2008-09 academic year need to complete at least 12 General Education course credits. General Education courses are divided into three areas: Humanities, Social Science, and Natural Science. Each area is divided into two subcategories: core and

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extended. Students need to take 1 two-credit course in both of the subcategories within each area to be eligible for graduation. Only 12 course credits will be counted toward graduation. Additional course credits earned in General Education courses are not counted toward graduation.

- 3.本系承認外系選修學分數至多為26學分。教育學程之學分數不得列計於畢業學分內。
- Elective credits of the other departments are, at most, 26 credits. Course credits from the "Teacher Education Program" of the Teacher Education Center cannot be counted toward students' final grades
- 4.修習本系開設(英)之課程,經系主任同意後可列入本系專業選修學分,可追溯至113學年度以前入學學生適用。
- 4. Students can choose the course (E) from BT, which can be counted as their graduation credits under the approval of the department chair, can be included in the elective credits of the department, and can be applied retroactively to students who entered the university before the 2024-2025 academic year.
- 5.本必選修科目表之選修課程,可追溯至113學年度以前入學學生適用。
- 5. The newly added elective courses in this academic year can be applied retroactively to students who entered the university prior to the 2024-2025 academic year.
- 6.修習與需重補修本系專業課程者,經系主任同意後可修其他學系相同科目名稱或本系相同名稱(英)之課程,並可列入畢業學分,可追溯至 113 學年度以前入學學生適用。
- 6. When taking and retaking professional courses, students can choose the same course name, the same course name (E), or the same course content as substitutions under the approval of the department chair. These courses can be regarded as graduation credits and applied retroactively to students who entered the university before the 2024-2025 academic year.
- 7.學生選修本系碩士班課程,經系主任同意後可視為本系專業選修,其學分數得列計於畢業學分內,可追溯至 **113** 學年度以前入學學生適用。
- 7.Students can choose the course from BT master program, which can be counted as their graduation credits under the approval of the department chair, and can be applied retroactively to students who entered the university prior to the 2024-2025 academic year.
- 8.專業選修的2個學程,至少必須選修其中1個學程,所選學程至少應修15學分。
- 8. Professional Electives can be selected from two programs of study, students must first complete one of these of study, each consisting of at least 15 course credits.
- 9.專業選修至少需修 27 個學分。
- 9. Professional electives must be selected at least 27 credit hours.
- 10.未列於畢業架構的跨領域學分學程之學分,可認列為外系學分。
- 10. The credits of interdisciplinary focused course program are not included in course structure diagram that can be regarded as the other department credits
- 11.新增必修課程,非原架構學生修習可認列為選修學分,並追溯至113 學年度以前入學學生。

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- 11. The required courses on this Course Outline may be counted as elective course credits toward total graduation credits by students who entered the university prior to the 2024-2025 academic year.
- 12.應屆畢業生及延修生若因體育必修課程未通過得以綜合體育一、綜合體育二對抵,至多對抵兩門體育必修課程,該課程對抵可追溯至 109 學年度以前入學學生適用。
- 12. Graduating students and students in the extended study period who did not pass required courses of Physical Education can waive a maximum of two (2) required Physical Education courses by passing Comprehensive Physical Education I, Comprehensive Physical Education II. This regulation is applicable for those admitted in and prior to 2020-2021 academic year.
- 13.外國生、僑生、港澳生若中文能力不佳,可選修國際學院基礎華語(一)(二),替代中國文學鑑賞與創作(一)(二);本課程可追溯至110學年度以前入學學生適用。
- 13.If International students, overseas students or students from Hong Kong and Macao are not good at Chinese, they can take the courses of Basic Chinese I & II through International College instead of taking Chinese Literature: Appreciation and Creative Writing I & II. This regulation can be applied to students who entered the university prior to the 2021-2022 academic year.

基本能力	檢定標準
1.具備生命科學領域相關知識能力 Possess professional knowledge and related ability in life sciences field	(1) 修習任一專業(生物醫學、食品 生技)學程15學分規定 Complete 15 credits in one of the programs mentioned below: biomedical program, food biotechnology program (2) 修生物科技學系開設專業選修課 程達27學分 Complete 27 credits of professional elective courses offered by the Department of Biotechnology
2.具備團隊合作溝通協調能力 Teamwork and communication skills	以下檢定標準擇一 Choose one of the evaluation criteria mentioned below: (1) 修畢本系開設以分組實習為主的

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必修實驗室課程,其中三科學期成 績達70分以上者。

Students are required to complete required laboratory courses opened by the department for group internship, and the semester grade of 3 of these courses should be over 70.

(2) 修習企業進階實習與職場實務專 題課程,學期成績達70分以上 者。

Students' semester grade for Advanced Enterprise Internship and Seminar on Industry Practice should be over 70.