

長庚大學生物醫學研究所博士班必選修科目表 (一一四學年度入學學生適用)

Ph.D. Curriculum (2025~2026) International Division of Medical Research

Graduate Institute Of Biomedical Sciences, Chang Gung University 2025.04

一、本所博士班畢業學分數至少需達 18 學分(不含論文 6 學分) Minimum Graduation Credits for Doctoral Program: 18 credits (excluding 6 credits for dissertation)

組別	生化暨細胞 分生組	微生物暨免 疫組	生理暨藥理 學組	多體學暨智 運組	生物技術組 (英文課程)	天然藥物組	國際學生組
必修	20	18	18	16	13	12	10
選修	0	0	0	2	5	6	8

書報討論課程於修滿四學分且提前通過學位考試者可免修剩餘學分，但仍需補足畢業學分。列於本所必選修科目表之課程皆可納入畢業學分核算。經指導老師同意，亦可選修本校其他博士班課程以達畢業總學分數要求，唯非本所課程之總學分數不可超過畢業學分數中選修總學分數之百分之五十。直攻博士班之學生，畢業時需達 30 學分(不含論文 6 學分)。

Division	Biochemistry & Cellular Molecular Biology	Microbiology & Immunology	Physiology & Pharmacology	Multi-Omics Informatics & Intelligence Computing	Biotechnology	Natural Products	International Division of Medical Research
Required	20	18	18	16	13	12	10
Elective	0	0	0	2	5	6	8

Students who complete 4 Seminar credits and pass the degree exam early may be exempt from the remaining Seminar credits but must still meet total graduation credit requirements. Courses listed in the department's required/elective list count toward graduation. With advisor approval, students may take doctoral courses from other departments, but these may not exceed 50% of the elective credits. Direct-entry PhD students must complete 30 credits (excluding 6 dissertation credits) for graduation.

二、“博士論文”(6學分) 於通過學位考試並繳交通過審核論文後給予。

The "Doctoral Dissertation" (6 credits) will be granted after passing the degree examination and submitting the approved dissertation.

三、生物技術組僅認可英語授課課程課程，也認可選修本校其他博士班英文授課之課程，但不可超過選修總學分數之百分之五十。選讀博士班之生物技術組學生，認可生醫所及生技系碩士班之碩博課程 12 學分(含必修高等生物技術學 2 學分)。

For the Biotechnology Division, only English-taught courses are recognized. English-taught doctoral courses from other departments at CGU are also acceptable, but may not exceed 50% of the total elective credits. Students in the direct-entry PhD program under the Biotechnology Division may count up to 12 credits of master's/PhD-level courses from the Institute of Biomedical Sciences and the Department of Biotechnology (including the required 2-credit Advanced Biotechnology course) toward their degree.

四、畢業要求資訊請見當年度學生手冊

For detailed graduation requirements, refer to the student handbook of the corresponding academic year.

領域/組別	必修(R)/ 選修(E)	科目代號	科目名稱	學分	開課 年級	上學期	下學期	備註
共同必修科目 General Required Courses	R	BMD009	書報討論(*) Seminar(*)	8	1	√	√	一~四年級必修，共八學分。如提前完成學位考試及畢業手續，該學期及之後學分得免修。一~四年級間，若至其他研究機構或業界研習，學生須提出申請，經生醫所核定，該學期可免修。Required for 1st~4th year students (8 credits total). Credits for the current and future semesters may be waived if graduation is completed early. Students conducting approved research or internships outside the institute may also waive credits for that semester.
					2	√	√	
					3	√	√	
					4	√	√	
	R	BMD114	醫學新知導論 Current Topics in Biomedical Sciences	2	1	√		左列科目為博士班核心課程，為必修三選一。99 學年度起適用。 The courses listed on the left are core PhD courses; choose one of three. Effective from the 2010 academic year.
	R	BMD102	科學研究方法 Scientific Methods	2	1		√	
	R	BMD402	科學倫理與論文寫作(*) Scientific Integrity and Scientific Writing(*)	2	2		√	

必修	生化暨細胞分生學組 Biochemistry & Cellular Molecular Biology	R	BMD304	高等生化學 Advanced Biochemistry	3	1	√	於碩士班期間曾修習並通過左列科目，可於錄取後至開學前一週申請免修(需附成績單及經指導教授、授課教師及所長同意)。If taken during a master's program, a waiver may be requested before the semester starts (with transcript and approval from advisor, course instructor, and director).
		R	BMD305	細胞生物學 Cell Biology	3	1	√	
		R	BMD303	分子生物學 Molecular Biology	4	1	√	
	微生物暨免疫學組 Microbiology & Immunology	R	BMD601	微生物學-細菌學(*) Microbiology-Bacteriology(*)	2	1	√*	1. 於碩士班期間曾修習並通過左列科目，可於錄取後至開學前一週申請免修(需附成績單及經指導教授、授課教師及所長同意)。2. 細菌學、寄生蟲學於上學期開設中文、英文各一班。病毒學上學期開設英文班，下學期開設中文班。1. If taken during a master's program, a waiver may be requested before the semester starts (with transcript and approval from advisor, course instructor, and director). 2. Bacteriology and Parasitology are offered in both Chinese and English in the first semester. Virology is offered in English in the first semester and in Chinese in the second.
		R	BMD603	微生物學-寄生蟲學(*) Microbiology-Parasitology(*)	2	1	√*	
		R	BMD602	微生物學-病毒學(*) Microbiology-Virology(*)	2	1	√*	
		R	BMD605	免疫學 Immunology	2	1	√	
	生理暨藥理學組 Physiology & Pharmacology	R	BMD201	生理學 Physiology	4	1	√	1. 二選一。 2. BMD201 與醫學系及中醫系合開。 3. 若五年內曾通過同課程、同學分數者，經指導教授、授課教師及所長同意後，得申請免修，仍需補足畢業學分數。 1. Select one of two. 2. BMD201 is co-offered with the School of Medicine and School of Chinese Medicine. 3. If the same course and credits were passed within the last 5 years, a waiver may be requested with approval, but graduation credits must still be fulfilled.
		R	BMD704	人體生理學(*) Human Physiology(*)	4	1	√	
		R	BMD202	藥理學(*) Pharmacology(*)	4	1	√*	

	R	BMD705	醫學藥理學(*) Medical Pharmacology(*)	4	1	√	√	1. Select one of two. 2. BMD202 is co-offered with the School of Medicine and School of Chinese Medicine. 3. If the same course and credits were passed within the last 5 years, a waiver may be requested with approval, but graduation credits must still be fulfilled.
多體學資訊暨智慧運算學組 Multi-Omics Informatics & Intelligence Computing	R	BMD501	多體學生物醫學研究特論(*) Special Topics in Multi-Omic Perspective of Biomedical Study(*)	2	1	√	√*	三選二 Select two of three.
	R	BMD502	計算生物學 Computational Biology	2	1	√		
	R	BMD246	高級生物統計學(*) Advanced Biostatistics(*)	2	1	√		
	R	BMD503	精準醫療與分子檢測產業 Precision Medicine and Molecular Diagnostic Industry	2	1		√	
生物技術組 Biotechnology	R	BMD401	系統生物學之先進技術(*) Advanced Technologies in Systems Biology(*)	3	1	√		
	R	BMD402	科學倫理與論文寫作(*) Scientific Integrity and Scientific Writing (*)	2	1		√	
天然藥物組 Natural Products	R	BMD802	高等天然藥物學特論(*) Special Topics in Natural Products(*)	2	1	√		
選修 Elective	E	BMD355	專題討論-生化暨細胞分生 (一) (*) Special Topics in Biochemistry, Cell & Molecular Biology (1) (*)	2	1	√		
	E	BMD254	生醫英語期刊專業語法(*) Biological and Biomedical English Paper Writing Style(*)	2	1	√		
	E	BMD671	生化暨分子生物學(*) Biochemistry and Molecular Biology(*)	2	1	√		
	E	BMD522	分子病毒學實作(*) Molecular Virology Laboratory(*)	2	1	√		暑期實作課程，上限 10 人 Summer practical course, limited to 10 participants.
	E	BMD521	蛋白質體學與質譜分析 Proteomics and Mass Spectrometry	1	1	√		暑期講授課程，上限 60 人 Summer lecture course, limited to 60 participants.
	E	BMD348	生技產業校外實習 Practical Training in Biotechnology Industry	1	1	√		暑期實習課程，上限 10 人 Summer practical course, limited to 10 participants.
	E	BMD344	膜轉運與胞吐特論(*) Special Topics in Membrane Trafficking and Exocytosis(*)	2	1		√	
	E	BMD356	專題討論-生化暨細胞分生 (二) (*) Special Topics in Biochemistry, Cell & Molecular Biology (2) (*)	2	1		√	
	E	BMD664	論文與計畫寫作(*) Writing Theses and Research Proposals(*)	2	1	√	√*	提供中英文課程各一班，每班上限 15 人 One Chinese and one English class are offered, with a limit of 15 participants per class.
	E	BMD652	高等免疫學(*) Advanced Immunology (*)	3	1	√		具有免疫基礎之研究生 For students with a basic knowledge of immunology.

E	BMD653	熱帶醫學 Tropical Medicine	2	1	√	自 109 學年度起，隔年開設 Starting from the 109th academic year, offered every other year.
E	BMD656	微生物與人類歷史 Microbes and Human History	2	1	√	自 105 學年度開始，隔年開設—上限 30 人 Limited to 30 participants.
E	BMD661	病毒-寄主互動特論 Special Topics in Virus-Host Interactions	2	1	√	自 111 學年度起隔年開設，需修過微生物學。 Only for students who have completed Microbiology course.
E	BMD660	細菌致病分子學(*) Bacterial Pathogenesis (*)	2	1	√	自 91 年始，隔年開設 Starting from the 91th academic year, offered every other year.
E	BMD241	訊號傳遞(*) Signal Transduction(*)	2	1	√	
E	BMD243	循環系統特論(*) Special Topics in Circulation(*)	3	1	√	上限 10 位 Limited to 10 participants.
E	BMD244	神經科學 Neuroscience	2	1	√	
E	BMD247	內分泌學 Endocrinology	2	1	√	
E	BMD252	老化特論 Special Topics in Aging	2	1	√	
E	BMD248	藥理學特論(*) Special Topics in Pharmacology(*)	2	1	√	自 112 學年度始，隔年開設 Starting from the 112th academic year, offered every other year.
E	BMD253	星型膠細胞生理病理學 Astrocytes in the Pathophysiology of the Nervous System	2	1	√	
E	BMD733	神經生物學 Neurobiology	2	1	√	與醫學系同修
E	BMD453	分子影像(*) Molecular Imaging(*)	3	1	√	自 96 學年度起，隔年開設 Starting from the 96th academic year, offered every other year.
E	BMD460	疫苗研發(*) Vaccine Development(*)	3	1	√	自 98 學年度起，隔年開設 Starting from the 98th academic year, offered every other year.
E	BMD454	新興病毒特論(*) Special Topics in Emerging Viruses(*)	2	1	√	
E	BMD665	RNA 病毒特論(*) Special Topics in RNA Viruses(*)	2	1	√	
E	BMD466	自由基生物醫學(*) Free Radical Biology and Medicine(*)	2	1	√	
E	BMD464	轉譯癌症醫學(*) Translational Cancer Medicine(*)	2	1	√	碩博合開，且須修過「細胞生物學」或「分子生物學」 For students who have completed "Cell Biology" or "Molecular Biology".
E	BMD461	高等細菌學(*) Advanced Bacteriology (*)	2	1	√	
E	BMD811	高等劑型設計特論(*) Special Topics in Dosage Form Design (*)	2	1	√	
E	BMD812	天然物與血栓平衡(*) Natural Products and the Balance of Thrombosis(*)	2	1	√	

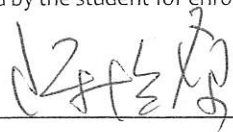
E	BMD814	發炎藥理學特論 Special Topics in Inflammopharmacology	2	1	√		
E	BMD824	藥廠與專利申請實務特論 Special Topics in the Pharmaceutical Factory and Patent Application	2	2	√		碩博合開
E	BMD822	中藥資訊研究(*) Information Studies of Traditional Chinese Medicine(*)	2	2	√		碩博合開
E	BMD815	高等藥物化學特論(*) Special Topics in Advanced Medicinal Chemistry(*)	2	2	√		碩博合開
E	BMD816	高等基因藥理學特論(*) Special Topics in Pharmacogenomics(*)	2	2		√	自 110 學年度起，隔年開設 Starting from the 110th academic year, offered every other year.
E	BMD820	藥效學特論 Special Topics in Pharmacodynamics	2	1		√	碩博合開
E	BMD821	製藥生技學特論(*) Special Topics in Industrial Pharmaceutical Biotechnology(*)	2	1		√	碩博合開
E	BMD817	表觀遺傳學特論(*) Special Topics in Epigenetics(*)	2	2		√	自 111 學年度起，隔年開設 Starting from the 111th academic year, offered every other year.
E	BMD823	中草藥產業技術開發(*) Industrial Development of Chinese Medicine and Herbal Drugs(*)	2	2		√	碩博合開
E	BMD255	應用於天然藥物開發之結構生物學(*) Structural biology for natural product- based drug discovery(*)	2	1		√	
E	BMD256	癌症與精準醫學中的天然藥物(*) Natural products in cancer and precision medicine(*)	2	1		√	
E	BMD349	體學時代的生物技術與生物標誌 Biotechnology and Biomarkers in the 'Omic Era'	1	1	√		暑期講授課程，上限 60 人 Summer lecture course, limited to 60 participants.
E	BMD505	質譜定量蛋白質體學 Mass Spectrometry-Based Quantitative Proteomics	1	1	√		暑期講授課程，上限 30 人 Summer lecture course, limited to 30 participants.
E	BMD506	質譜定量蛋白質體學實驗 Mass Spectrometry-Based Quantitative Proteomics-Laboratory	1	1	√		暑期實作課程，上限 30 人 Summer practical course, limited to 30 participants.
E	BMD504	蛋白質體學與質譜分析實驗 Proteomics and Mass Spectrometry- Laboratory	1	1	√		暑期實作課程，上限 30 人 Summer practical course, limited to 30 participants.
E	BMD507	轉錄體學與數據分析應用 Transcriptomics and Data Analysis Application	1	1	√		暑期講授課程，上限 60 人 Summer lecture course, limited to 60 participants.
E	BMD508	胞外體特論 Extracellular Vesicles	2	1	√		暑期講授課程，上限 25 人 Summer Lecture course, limited to 25 participants.
E	BMD523	生物資訊 (*) Bioinformatics (*)	2	1	√		
E	BMD666	生物資訊分析 Bioinformatics Analysis	2	1	√		
E	BMD667	生物資訊分析實作 Practical Bioinformatics Analysis	1	1	√		
E	BMD509	進階流行病學 Advanced Epidemiology	3	1	√		
E	BMD510	基因體學於精準醫療應用與分析 Application and Analysis of Genomics in Precision Medicine	2	1	√		

E	BMD512	抗體製備與純化 Production and Purification of Antibodies	1	1		√	
E	BMD513	抗體製備與純化實作 Production and Purification of Antibodies (Hands-On)	1	1		√	
E	BMD514	高通量定序分析 High-Throughput Sequencing Analysis	2	1		√	
E	BMD515	高通量定序分析實作 High-Throughput Sequencing Analysis-Practice	1	1		√	
E	BMD516	多體學視覺化分析 Multi-Omics and Visual Analytics	2	1		√	
E	BMD517	核酸適體開發與生醫應用 Generation of DNA/RNA Aptamer for Clinical Application	1	1		√	
E	BMD518	核酸適體開發與生醫應用實作 Generation of DNA/RNA Aptamer for Clinical Application- Practice	1	1		√	
E	BMD519	進階代謝體學 Advanced Metabolomics	1	1		√	
E	BMD520	進階代謝體學實驗 Advanced Metabolomics Experiment	1	1		√	
E	BMD668	應用於新興感染症之動物模式(*) Animal Model for Studying Emerging Infectious Diseases(*)	2	1	√		
E	BMD669	基因組數據科學(*) Genomic Data Science(*)	2	1	√		
E	BMD670	深度學習與 Python 語言(*) Deep Learning with Python(*)	2	1	√		
E	BMD403	細胞分子生物學(*) Molecular & Cellular Biology(*)	2	1	√		
E	BMD524	人畜共通病毒感染症學(*) Zoonotic Viral Infections(*)	2	1	√		
E	BMD672	細胞生物學特論(*) Advanced Cell Biology (*)	2	1		√	
E	BMD673	高等免疫學新知(*) Advances in Immunology(*)	2	1		√	
E	BMD674	細胞生長與細胞凋亡(*) Cell Growth and Apoptosis (*)	2	1		√	
E	BMD404	新興病毒新知技術特論(*) Technologies and Advances in Emerging Viral Infections(*)	2	1		√	
E	BMD675	分子病毒方法學概論(*) Methodology of Molecular Virology(*)	2	1		√	
E	BMD676	抗病毒藥物之研發(*) Anti-Virus Drug Development(*)	2	1		√	
E	BMD677	高等臨床病毒學(*) Advanced Clinical Virology(*)	2	1		√	
E	BMD678	檢驗試劑之研發(*) Test Reagent Kit Development(*)	2	1		√	

註： 1、打(*)者為英文授課。Courses marked with an asterisk (*) are taught in English.

2、學生所選欲修習之科目，需經過指導老師之同意及簽名。Any course selected by the student for enrollment must be approved and signed by the academic advisor.

課程委員會召集人 Convenor of the Curriculum Committee :



所長 Director :

