Ph.D Graduate Program Curriculum (2020~2021) Revised in November 2020

1. Students pursuing a PhD degree must fulfill a minimum 18 course credits and 6 credits for PhD dissertation.

Division	Biochemistry and Cell Molecular Biology	Microbiology	Physiology and Pharmacology	Biotechnology	Natural Products
Required	20	18	18	13	14
Elective	0	0	0	5	4

Those who have completed 4 seminar credits and passed the final defense are exempted from the rest of the seminar credits. Students may choose any courses listed below. With the consent of the advisor, students may also take courses offered by other doctoral programs in CGU to meet the credit requirement for graduation; only the total credits earned from other PhD programs cannot exceed 50% of the total elective credits for graduation. For students without a MS degree, 30 credits are required for graduation (plus 6 credits for PhD dissertation).

2. The 6 credits for "PhD Dissertation" are given after passing the final defense.
3. All courses offered by the Biotechnology division are taught in English. Students are allowed to take courses (taught in English) from other doctoral programs in CGU, only the total credits cannot exceed 50% of the total elective credits for graduation. For students without a MS degree, up to 12 course credits earned from the master program (including 2 credits of the Advanced Biotechnology course) can be counted towards graduation.
4. For international students, 18 course credits plus 6 credits of the "PhD Dissertation" are required for graduation. Students must take the seminar course (1 credit per semester) for the first 8 semesters. Other credits may be fulfilled with courses listed below. All course selection needs to be approved by the research advisor.
5. See PhD student manual for graduation requirements

Divisions	Required (R) or Elective (E)	Course Title	Credit	Year	Fall	Spring	Note	
Core Required Courses	R	Seminar (*)	8	1~4	8		Required for the first 4 years of study, a total of 8 credits. If the student completes the doctoral degree in less than 4 years, the credits for the graduation semester and later will be exempted. If the student studies abroad during the first 4 years of study, the student must obtain approval for exemption from the Biomedical Institute.	
	R	Current Topics in Biomedical Sciences	2	1	2		Offered annually	Completion of at least one course (starting in 2010).
	R	Scientific Methods	2	1		2		
	R	Scientific Integrity and Scientific Writing (*)	2	2		2	Offered every 2 years, starting 2018	
Division of Biochemistry, Cellular and Molecular Biology	R	Advanced Biochemistry	3	1	3		Required courses for PhD program. Students may be exempted from if the student has acquired credits from previous program(s). Application for exemption needs to be provided with the transcript and approved by the advisor, the lecturer, and the head of GIBMS. Application must be completed a week before the first day of the semester.	
	R	Cell Biology	3	1	3			
	R	Molecular Biology	4	1		4		
Division of Microbiology	R	Microbiology-Bacteriology	2	1	2			
	R	Microbiology-Parasitology	2	1	2			
	R	Microbiology-Virology	2	1		2		
	R	Immunology	2	1		2		
Division of Physiology and Pharmacology	R	Physiology	4	1		4	Offered jointly with the School of Medicine and School of Traditional Chinese Medicine Course may be exempted for students who have successfully completed an identical or equivalent course in the past 5 years.	
	R	Pharmacology	4	1	4			
	R	Human Physiology	4	1	4		For international students only	
	R	Medicinal Pharmacology	4	1		4		
Division of Biotechnology	R	Advanced Technologies in Systems Biology (*)	3	1	3			

	R	Scientific Integrity and Scientific Writing (*)	2	1		2	
Division of National Product	R	Special Topics in Pharmaceutical Biotechnology	2	1	2		
	R	Special Topics in Natural Products	2	1		2	
Elective Courses	E	Special Topics in Gene Regulation	2	1	2		
	E	Special Topics in Biochemistry, Cell & Molecular Biology (1) (*)	2	1	2		
	E	Biological and Biomedical English Paper Writing Style	2	1	2		
	E	Biotechnology and Biomarkers in the 'Omic Era'	1	1	1		Summer course, class limit: 60 students
	E	Mass Spectrometry-based Quantitative Proteomics (Hands-on)	1	1	1		Summer course, class limit: 30 students
	E	Transcriptomics (Hands-on)	1	1	1		Summer course, class limit: 20 students
	E	Proteomics and Mass Spectrometry (Hands-on)	1	1	1		Summer course, class limit: 30 students
	E	Practical Training in Biotechnology Industry	1	1	1		Summer practice course
	E	Antibodies: Production and Purification (Hands-on)	1	1		1	
	E	Special Topics in Membrane Trafficking and Exocytosis	2	1		2	
	E	Special Topics in Biochemistry, Cell & Molecular Biology (2) (*)	2	1		2	
	E	Writing theses and research proposals	2	1	2		
	E	Bioinformatics	2	1	2		
	E	Advanced Immunology (*)	3	1	3		For students who have basic knowledge in Immunology
	E	Tropical Medicine	2	1	2		Offered every two years, starting in 2006
	E	Microbes and Human History	2	1	2		Offered every two years, starting in 2016 class limit: 30 students
	E	Bacterial Pathogenesis	2	1		2	Offered every two years, starting in 2002
	E	Special Topics in Virus-Host Interactions	2	1	2		Prerequisite: Microbiology
	E	Special Topics in Epstein-Barr Virus and associated diseases	2	1		2	Offered every two years, starting in 2003
	E	Special Topics in Hepatitis Viruses	2	1		2	
	E	High-Throughput Sequencing Analysis	2	1		2	
	E	Signal Transduction	2	1	2		
	E	Special Topics in Circulation	3	1	3		
	E	Neuroscience	2	1	2		
	E	Neurochemistry	2	1	2		
	E	Advanced Biostatistics	2	1	2		
	E	Endocrinology	2	1	2		
	E	Special Topics in Aging.	2	1		2	
	E	Special Topics in Pharmacology	2	1		2	Offered every two years, starting in 2011
	E	Special Topics in Endocrinology	2	1		2	

	E	Astrocytes in the Pathophysiology of the Nervous System	2	1		2	
	E	Neurobiology	2	1		2	Offered jointly with Dept. of Medicine
	E	Molecular Imaging (*)	3	1	3		Offered every two years, starting in 2007
	E	Vaccine Development (*)	3	1	3		Offered every two years, starting in 2008
	E	Special Topics in Emerging Viruses (*)	2	1	2		
	E	Special Topics in RNA Viruses (*)	2	1	2		
	E	Free Radical Biology and Medicine	2	1	2		
	E	Translational Cancer Medicine (*)	2	1	2		Offered jointly with the MS program Prerequisite: Cell Biology or Molecular Biology
	E	Advanced Bacteriology (*)	2	1		2	
	E	Specific topics of Biosecurity Practice for High Security Level Labs (*)	2	1		2	
	E	Special Topics in Dosage form Design	2	1	2		
	E	Natural Products and The Balance of Thrombosis	2	1	2		
	E	Special Topics in Pharmacodynamics	2	1		2	Offered jointly with the MS program
	E	Special Topics in Industrial Pharmaceutical Biotechnology	2	1		2	Offered jointly with the MS program
	E	Special Topics in Inflammopharmacology	2	1	2		
	E	Special Topics in The Pharmaceutical Factory and Patent Application	2	2	2		Offered jointly with the MS program
	E	Information Studies of Traditional Chinese Medicine	2	2	2		Offered jointly with the MS program
	E	Special Topics in Advanced Medicinal Chemistry	2	2	2		
	E	Special Topics in Pharmacogenomics	2	2	2		
	E	Special Topics in Epigenetics	2	2		2	
	E	Industrial Development of Chinese Medicine and Herbal Drugs	2	2		2	Offered jointly with the MS program
	E	Biochemistry and Molecular Biology (*)	2	1	2		Offered jointly with the Graduate Program in Molecular Medicine
	E	Bioinformatics & BioStatistics (*)	2	1	2		
	E	Topics in Molecular Medicine (*)	2	2		2	
	E	Cellular Physiology & Signal Transduction (*)	2	1	2		
	E	Advanced Cell Biology (*)	2	1		2	
	E	Advances in Microbiology (*)	2	1		2	
	E	Advances in Immunology(*)	2	1		2	
	E	Cell growth and apoptosis (*)	2	1		2	

Notes: 1. An asterisk (*) indicates courses taught in English.

2. Course selection and registration must be approved and signed by the thesis mentor.

Director:_____ Curriculum Committee Chairman:_____