

**Course Structure for Ph. D Program**  
**Cellular and Molecular, Department of Life Science**  
**National Taiwan Normal University**

Adaptive to Class of	Required Credit(s)	Elective Credit(s)	Free Elective Credit(s)	Minimum Total Credits for Graduation
112	13.0	11.0	0.0	24.0

Note: The first alphabet "E" on the course name refers to the course in English as a medium of instruction

**I. Required Courses: 0.0 credit is required**

**II. Elective Courses: 0.0 credit is required**

**III. Courses Offered to Students in Different Divisions**

Required Course, 13.0 credits are required

Course Code	Course Name	Credit(s)	Credit Unit		Note
			Lecture Hour	Lab/Practice Hour	
BIC8007	1 Research Methods of Experimental Biology	2.0	2.0	0.0	
BIC0138	2 Cellular and Molecular Biology	3.0	3.0	0.0	
BID0165	3 Seminar	2.0	2.0	0.0	This course must be retaken with a passing score for 4 times

Elective Course: 11.0 credits are required

Direct Admission to Doctoral Program from Master's Program must Practice 17 credits

Course Code	Course Name	Credit(s)	Credit Unit		Note
			Lecture Hour	Lab/Practice Hour	
<b>1 Core Elective Curriculum 2 courses are least required</b>					
BIC0139	1-1 Protein and Enzyme Chemistry	3.0	3.0	0.0	
BIC8016	1-2 Writing Scientific Papers in English	3.0	3.0	0.0	
BIC7009	1-3 Immunochemistry	3.0	3.0	0.0	
BIC0133	1-4 Topics in Molecular Biology	2.0	2.0	0.0	
BID0169	1-5 Special Topic on Signal Transduction	3.0	3.0	0.0	
BIC0186	1-6 Protein Engineering	3.0	3.0	0.0	
BIC0173	2 Evolutionary Biology	3.0	3.0	0.0	
BIC0174	3 E Advanced Ecology	3.0	3.0	0.0	
BIC8010	4 Research Methods in Ecology and Evolution	1.0	1.0	0.0	
BIC0011	5 Experimental Design and Data Analysis	3.0	3.0	0.0	
BIC7007	6 Population Genetics and Evolution	3.0	3.0	0.0	
BIC7012	7 Principles of Phylogenetics	3.0	3.0	0.0	
BIC8018	8 Topics on Animal Physiology (I)	2.0	2.0	0.0	
BIC7015	9 Comparative Animal Physiology	3.0	3.0	0.0	
BIC0119	10 Learning and memory	3.0	3.0	0.0	
BID0074	11 Topics in Sensory Physiology	3.0	3.0	0.0	
BIC0052	12 Neuropharmacology	3.0	3.0	0.0	
BIC8006	13 Topics on Animal Physiology (II)	2.0	2.0	0.0	
BIC0017	14 Topics in Fish Physiology	3.0	3.0	0.0	
BID0069	15 Topics in principle of phylogenetics	3.0	3.0	0.0	
BID0072	16 Topics in Plant Growth and Development	2.0	2.0	0.0	
BID0075	17 Topics in Brain Physiology	3.0	3.0	0.0	
BIC0016	18 E Topics in Plant Molecular Biology	2.0	2.0	0.0	
BIC0021	19 Topics in Molecular Genetics	3.0	3.0	0.0	
BIC0038	20 Studies in Adaptation and Natural Selection	2.0	2.0	0.0	
BIC0059	21 Architecture of Brain	3.0	3.0	0.0	
BIC0061	22 Principles and Methods of Plant Taxonomy	3.0	3.0	0.0	
BIC0101	23 Paper Writing and Presentation in Biological Science	2.0	2.0	0.0	
BIC0153	24 Regression Analysis	3.0	3.0	0.0	
BIC0185	25 Adaptation and Natural Selection	3.0	3.0	0.0	
BIC7001	26 Special Topics on Intellectual Property	2.0	2.0	0.0	
BIC8003	27 Ecology and Evolution of Amphibians and Reptiles	2.0	2.0	0.0	
BIC8012	28 Oxidative Stress Physiology	3.0	3.0	0.0	
BIC8020	29 Biotechnology for the Drug Development	2.0	2.0	0.0	
BIC7002	30 Industrial Practice	3.0	3.0	0.0	
BIC7003	31 Molecular Evolution	3.0	3.0	0.0	
BIC7004	32 Translational Medicine — Novel Compounds and Chinese Herbal Medicines	2.0	2.0	0.0	
BIC7005	33 E Drug Development and Translational Medicine	2.0	2.0	0.0	
BIC7010	34 Neuroethology	3.0	3.0	0.0	
BIC8021	35 Experimental Physiology	2.0	2.0	0.0	
BIC8022	36 E Behavioral Ecology	3.0	3.0	0.0	

Course Code	Course Name	Credit(s)	Credit Unit		Note
			Lecture Hour	Lab/Practice Hour	
BIC8009	37 Advanced Seminar (I)	0.0	0.0	0.0	
BIC8014	38 Advanced Seminar (II)	0.0	0.0	0.0	
BID0166	39 Issues and Rationale of Biological Education	3.0	3.0	0.0	
BIC8023	40 Application of Optoelectronic Technology in Biomedical	2.0	2.0	0.0	
BIC8027	41 E Topics in Virology	2.0	2.0	0.0	
BIC8025	42 E Introduction to Statistical Analysis	3.0	3.0	0.0	
BIC8029	43 E Laboratory Rotations in Cell and Molecular Biology	3.0	3.0	0.0	
BIC8026	44 E Linear and Logistic Regression Models	3.0	3.0	0.0	
BIC8028	45 E Apply Sciences Lead to Biotechnology Industry	2.0	2.0	0.0	
BID0168	46 Special Topic on Endocrinology	3.0	3.0	0.0	

IV. Free Elective Credits: 0.0 credit is required