

Appended Form 1

Specifications for Major Program

Name of School (Program) [School of Science (Department of Biological Science)]

Program name (Japanese)	生物学プログラム
(English)	Biology

1. Degree to be obtained: Bachelor of Science

2. Overview

The Biology Program aims to contribute to the progress of mankind through both educational activities that develop human resources who can understand biological phenomena from various angles ranging from molecular & cellular levels to individual & crowd levels, and research activities to explore biological phenomena, it is necessary to

This Program is designed to educate engineers who have knowledge and practical experience in biology and who engage in basic research and applications, and human resources who can play an active role in the front line in various related fields such as practical work in the industrial world and science education, as well as human resources who can function internationally with presentation abilities.

We will award a bachelor degree in science to students who have acquired the knowledge and skill listed below and the standard number of credits specified in the curriculum based on a comprehensive judgment of their education level and expertise, as well as the results of their graduation research.

- The degree recipient can understand biological phenomena from various angles ranging from molecular & cellular levels to individual & crowd levels, and research activities to explore biological phenomena.

- The degree recipient has knowledge and skills in liberal arts education subjects and specialized education subjects.

- The degree recipient has basic knowledge and skills in English for specialized area in the biology field.

- The degree recipient has practical skills in biological sciences and ability to take initiative in solving the problems in the biology field.

- The degree recipient can describe the opinion related to the biology field and make a presentation.

4. Curriculum policy (policy for organizing and implementing the curriculum)

To achieve the goals described in the Diploma policy, this Program offers educational programs that take into account the concept and methods of modern biology, inheriting the traditions of the Imperial University Teachers College,

Specifically, the four-year curriculum is structured so that students can complete their liberal arts education subjects in the first and second years, and take specialized class subjects in their second and third years. Most of these class subjects are selectively required, and students are recommended to study them independently

supplementary education.

Subjects: English, Mathematics, Physics, Chemistry, and Biology

Although the Biology Program is open to all students at the University, the requirements for students outside the Department of Biological Science to select this Program shall be separately specified based on the regulations on transferring to a different School or transferring a different Department.

6. Obtainable qualifications

1. Teaching Licenses

(1) Type-1 Junior High School Teaching License (science)

(2) Type-1 High School Teaching License (science)

2. Qualification as a curator.

7. Class subjects and their contents

* For the class subjects, refer to the subject table in Attachment 1.

* For the details of the class subjects, refer to the syllabus that is published for each academic year.

8. Academic achievement

At the end of each semester, evaluation criteria will be shown with a clear indication of attainment standards according to the evaluation items for academic achievements.

teria calculated by adding the weighted values to numerically converted evaluations of their academic achievements (S = 4, A = 3, B = 2, and C= 1) in each subject being evaluated.

Evaluation of academic achievement	Converted value
S (90 or more points)	4
A (80 89 points)	3
B (70 79 points)	2
C (60 69 points)	1

Academic achievement	Evaluation criteria
Excellent	3.00

* Refer to the relationship between evaluation items and evaluation criteria described in Attachment 2.

* Refer to the relationship between evaluation items and class subjects described in Attachment 3.

* Refer to the curriculum map in Attachment 4.

destinations. Through that experience, they will absorb the latest knowledge focusing on the relevant research field, and acquire advanced skills. Also, they will learn how to advance their research and refine their capabilities as an engineer or a researcher with originality, aspiration, patience, a spirit of cooperation, and flexibility, and will acquire abilities that they can use in a graduate school or in corporate or social activities. They will enhance their presentation skills through daily discussions and seminars in their laboratory. In completing the Program, they will be able to gain confidence from summarizing the content of their one-year graduation research into a graduation thesis, and by giving a poster presentation on their thesis.

2. Outline of research

An outline of each laboratory is introduced on the official website of the Department of Biological Science. It is also possible to gain information on the activities of laboratory by talking with faculty members qualified to give guidance on graduation research, and/or with students from a graduate school or of the School of Science who belong to a laboratory. Please refer to the explanation on the research content of each laboratory given in the that will be offered in the third year.

3. Time and Method of assignment

Time of assignment: Students will receive their assignment at the beginning of the fourth year. However, target students must

(
Students of the School of Science.)

Method of assignment: For graduation thesis, students are basically assigned to the laboratory where they carry out "Practice for Fundamental Biology IV" during the second semester of the third academic year. In order to assign in which laboratory they carry out "Practice for s after completion of the first semester of the third academic year. If the number of applicants exceeds the capacity of a given laboratory, priority will be given to students with higher academic achievements.

10. Responsibility

(1) Responsibility for PDCA (plan, do, check, and act) cycle

Dean of the Department).

(2) Evaluation of the program

1. Criteria for program assessment

- (1) proficiency levels
- (2)
- (3)
- (4) Achievements in graduate research

2. Implementing the assessment

- (1) Graduates will make an external assessment.
- (2) Enrollees and graduates will respond to a questionnaire on the assessment of the entire Program.
- (3) Faculty members will respond to a questionnaire on the assessment of the entire Program.
- (4) Graduates will respond to a questionnaire on their achievements in graduate research.

3. The idea and method of feedback for students

With - our basic principle, we will comprehensively review the results of the external assessments by graduates and the questionnaire on the assessment responded to by enrollees and graduates in each fiscal year to identify any problems with the Program. The structure of the Program and the class content will be modified by the Faculty Council in Charge of Major Program in Biology as required.

Academic achievements of Biology Program

Relationships between the evaluation items and evaluation criteria

Academic achievements		Evaluation criteria		
Evaluation items		Excellent	Very Good	Good
Knowledge and Understanding	(1) Studying to understand liberal arts, peace, foreign languages, culture and society.	Superbly being able to understand.	Being able to understand well.	Being able to understand.
	(2) Understanding and learning basic knowledge in scientific fields.	Superbly being able to understand and learn.	Being able to understand and acquire.	Being able to understand and acquire.
	(3) To understand and acquire advanced knowledge on specialties in biology.	Superbly being able to understand and learn.	Being able to understand and acquire.	Being able to understand and acquire.
Abilities and Skills	(1) To acquire abilities to understand information security compliance, to collect and evaluate data.	Superbly being able to understand the information security compliance, collect data, and assess them.	Being able to understand well about information security compliance and collect data and evaluate it.	To be able to collect and evaluate data by understanding Information Security Compliance.
	(2) Acquiring ability to apply basic knowledge to biological issues and reading comprehension of English theses.	Superbly being able to solve several biological issues and read English theses.	Being able to sufficiently solve various biology issues, read english avademic articles.	To be able to solve physiological problems and to understand English academic papers.
	(3) Based on basic knowledge which is already acquired, to obtain the following experimental skills in order to practice research: 1) Basic observation skills and skills to manage experiments. 2) Ability to record observed natural phenomena. 3) Ability to collect and assess data.	Superbly being able to acquire the ability of experiments	Being able to acquire experimental capability	To acquire skills for experiments.
Comprehensive Abilities	(1) Understanding rudimentary matters for biological research such as observation of animals plants and ways of experiments and writing reports through observation of research objects, collection, consideration, discussion and presentation.	To sufficiently understand elementary items needed to handle biological research, and to be able to proactively work on it.	To understand elementary items needed to handle biological research, and to be able to proactively work on it.	To understand elementary items needed to handle biological research, and to be able to proactively work on it.
	(2) To absorb cutting-edge knowledge, acquire high-level skills, learn how to conduct research, improve presentation ability through discussion, summarize research results as a graduation thesis.	Superbly being able to tackle with research, integrate and announce it.	Being able to sufficiently address a research and summarize it and make a presentation	Being able to tackle with research, summarize, and make a presentation.

Placement of Liberal Arts Education in the Major Program

Relationships between the evaluation items and class subjects

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items															Total weighted values of evaluation items in the subject		
					Knowledge and Understanding					Abilities and Skills					Comprehensive Abilities							
					(1)		(2)		(3)	(1)		(2)		(3)	(1)		(2)					
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject			
Liberal Arts Education	Peace Science Courses	2	Elective/required	1-2T	100	1															100	
Liberal Arts Education	Introduction to University Education	2	Required	1-1T	100	1																100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1-2T												100	2					100
Liberal Arts Education	Area Courses	12	Elective/required	1-2	100	1																100
Liberal Arts Education	Basic English Usage I	1	Required	1	100	1																100
Liberal Arts Education	Basic English Usage II	1	Required	2	100	1																100
Liberal Arts Education	Communication I	2	Required	1	100	2																100
Liberal Arts Education	Communication II	2	Required	2	100	2																100
Liberal Arts Education	Foreign Languages: Basic Studies I	1	Free elective	1	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies II	1	Free elective	1	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies III	1	Free elective	2	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies IV	1	Free elective	2	100	1																100
Liberal Arts Education	Exercise in Information Literacy	2	Required	1-1T							100	2										100
Liberal Arts Education	Social Cooperation Courses	0	Free elective	1-2	100	1																100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology I	2	Required	2-3T											100	2						100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology II	2	Required	2-4T											100	2						100
Liberal Arts Education	General Chemistry	2	Elective/required	1-1T			100	1														100
Liberal Arts Education	Fundamental Physical Chemistry	2	Elective/required	2-3T			100	1														100
Liberal Arts Education	Statistical Data Analysis	2	Elective/required	1-1T			100	1														100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	Elective/required	2-3T											100	1						100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics II	2	Elective/required	2-4T											100	1						100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the subject
					Knowledge and Understanding						Abilities and Skills						Comprehensive Abilities				
					(1)		(2)		(3)		(1)		(2)		(3)		(1)		(2)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Advanced Physics	2	Elective/required	4-4T					100	1											100
Specialized Education	Advanced Chemistry	2	Elective/required	6-4T					100	1											100
Specialized Education	Advanced Biology	2	Elective/required	5-2T					100	1											100
Specialized Education	Advanced Earth and Planetary Science	2	Elective/required	6-3T					100	1											100
Specialized Education	Microbiology	2	Elective/required	6-3T																	

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the subject
					Knowledge and Understanding						Abilities and Skills						Comprehensive Abilities				
					(1)		(2)		(3)		(1)		(2)		(3)		(1)		(2)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Animal Physiology B	2	Elective/required	5-2T					100	2											100
Specialized Education	Plant Physiology B	2	Elective/required	4-4T					100	2											100
Specialized Education	Plant Ecology B	2	Elective/required	4-3T					100	2											100
Specialized Education	Endocrinology•Immunology	2	Elective/required	5-1T					100	2											100
Specialized Education	Genome Biology	2	Elective/required	5-2T					100	2											100
Specialized Education	Systems Biology	2	Elective/required	5-1T					100	2											100
Specialized Education	Regeneration Biology	2	Elective/required	5-1T					100	2											100
Specialized Education	Seminar for Developmental Biology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Cell Biology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Molecular Physiology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Plant Taxonomy and Ecology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Plant Physiological Chemistry	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Plant and Microbial Molecular Genetics	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Molecular Genetics	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Molecular Plant Biology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Gene Chemistry	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Evolution and Development	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Island Biology	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Plant Genetic Resources	2	Elective/required	8									100	2							100
Specialized Education	Seminar for Amphibian Biology	2	Elective/required	8									100	2							100
Specialized Education	Summer Course for Marine Biology A	1	Elective/required	3											100	2					100
Specialized Education	Practice for Phytogeography	1	Elective/required	3											100	2					100
Specialized Education	Practice for Ecology	1	Elective/required	4											100	2					100
Specialized Education	Summer Course for Marine Biology B	1	Free elective	5											100	2					100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items															Total weighted values of evaluation items in the subject	
					Knowledge and Understanding					Abilities and Skills					Comprehensive Abilities						
					(1)		(2)		(3)	(1)		(2)		(3)	(1)		(2)				
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject		Weighted values of evaluation items
Specialized Education	Marine Biological Course	2	Free elective	3											100	2					100
Specialized Education	Marine course for marine biological education	1	Free elective	1-2											100	2					100
Specialized Education	Biology Internship	1	Free elective	5									100	2						100	

Curriculum Map of Biology Program

Academic achievements Evaluation items	1st grade		2nd grade		3rd grade		4th grade	
	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
Studying to understand liberal arts, peace, foreign languages, culture and society.	Communication IA (◎)	Communication IIA (◎)						
	Communication IB (◎)	Communication IIB (◎)						
	Foreign Languages: Basic Studies I (△)	Foreign Languages: Basic Studies III (△)						
	Foreign Languages: Basic Studies II (△)	Foreign Languages: Basic Studies IV (△)						
	Basic English Usage I (◎)	Basic English Usage II (◎)						
	Area Courses (○)	Area Courses (○)						
	Social Cooperation Courses (△)	Social Cooperation Courses (△)						
	Peace Science Courses (◎)							
	Introduction to University Education (◎)							
	General Chemistry (○)	Fundamental Physical Chemistry (○)						
Understanding and learning basic knowledge in scientific fields.	Statistical Data Analysis (○)							
	Introduction to Mathematics (○)	Introduction to Information Mathematics (○)						
	Introduction to Physics A (○)	Introduction to Physics B (○)						
	Introduction to Chemistry A (○)	Introduction to Chemistry B (○)						
	Introduction to Biological Sciences A (○)	Introduction to Biological Sciences B (○)						
	Introduction to Earth and Planetary Sciences A (○)	Introduction to Earth and Planetary Sciences B (○)						
	Basic Biological Science A (◎)	Genetics A (○)	Microbiology (○)	Developmental Biology A (○)	Cell Biology B (○)	Advanced Chemistry (○)		
	Basic Biological Science B (◎)	Biochemistry A (○)	Plant Ecology A (○)	Plant Physiology A (○)	Developmental Biology B (○)	Advanced Earth and Planetary Science (○)		
			Cell Biology A (○)	Biological Informatics (○)	Biochemistry B (○)			
			Molecular Genetics A (○)	Molecular Genetics B (○)	Genetics B (○)			
To understand and acquire advanced knowledge on specialties in biology.			Plant Taxonomy (○)	Animal Physiology A (○)	Molecular Cell Biology (○)			
				Regulation of Animal Morphology (○)	Animal Physiology B (○)			
				Plant Physiology B (○)	Comparative Embryology (○)			
				Plant Ecology B (○)	Plant Morphology (○)			
				Advanced Physics (○)	Advanced Mathematics (○)			
					Endocrinology・Immunology (○)			
					Advanced Biology (○)			
					Genome Biology (○)			
					Systems Biology (○)			
					Regeneration Biology (○)			
To acquire abilities to understand information security compliance, to collect and evaluate data.	Exercise in Information Literacy (◎)							
		English Seminar on Biological Science (◎)	Seminar on Biological Science (◎)		Biology Internship (△)			
Acquiring ability to apply basic knowledge to biological issues and reading comprehension of English theses.								Seminar for Developmental Biology (○)
								Seminar for Cell Biology (○)
								Seminar for Molecular Physiology (○)
								Seminar for Plant Taxonomy and Ecology (○)
								Seminar for Plant Physiological Chemistry (○)
								Seminar for Plant and Microbial Molecular Genomics (○)
								Seminar for Molecular Genetics (○)
								Seminar for Molecular Plant Biology (○)
								Seminar for Gene Chemistry (○)
								Seminar for Evolution and Development (○)
							Seminar for Island Biology (○)	
							Seminar for Plant Genetic Resources (○)	
							Seminar for Amphibian Biology (○)	

Academic achievements Evaluation items		1st grade		2nd grade		3rd grade		4th grade	
		Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
Based on basic knowledge which is already acquired, to obtain the following experimental skills in order to practice research: 1) Basic observation skills and skills to manage experiments. 2) Ability to record observed natural phenomena. 3) Ability to collect and assess data.		Experimental Methods and Laboratory Work in Biology I (◎)	Experimental Methods and Laboratory Work in Earth Sciences I (○)						
		Experimental Methods and Laboratory Work in Biology II (◎)	Experimental Methods and Laboratory Work in Earth Sciences II (○)						
		Experimental Methods and Laboratory Work in Physics I (○)	Practice for Fundamental Biology I (◎)	Practice for Fundamental Biology II (◎)	Practice for Fundamental Biology III (◎)	Practice for Fundamental Biology IV (◎)			
		Experimental Methods and Laboratory Work in Physics II (○)	Summer Course for Marine Biology A (○)	Practice for Ecology (○)	Summer Course for Marine Biology B (△)				
		Experimental Methods and Laboratory Work in Chemistry I (○)	Practice for Phytogeography (○)						
		Experimental Methods and Laboratory Work in Chemistry II (○)	Marine Biological Course (△)						
		Marine course for marine biological education (△)							
Comprehensive Abilities	Understanding rudimentary matters for biological research such as observation of animals・plants and ways of experiments and writing reports through observation of research objects, collection, consideration, discussion and presentation.	Introductory Seminar for First-Year Students (◎)							
	To absorb cutting-edge knowledge, acquire high-level skills, learn how to conduct research, improve presentation ability through discussion, summarize research results as a graduation thesis, and deliver presentations.							Special Study for Graduation (◎)	Special Study for Graduation (◎)

Liberal Arts Education Subjects

Basic Specialized Subjects

Specialized Education Subjects

Graduation Thesis

(◎)Required

(○)Elective/required

(△)Free elective