

# For entrants in AY 2022

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	
<p>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 &amp; cellular levels to individual &amp; crowd levels, and research activities to explore biological phenomena. To understand and explore biological phenomena, it is necessary to acquire knowledge of animals, plants, and microorganisms, as well as basic skills in ecology, physiology, biochemistry, genetics, and other related fields, and to gain a deep understanding of topics ranging over interdisciplinary fields. The results of detailed investigations have been utilized as examples of biotechnology or as techniques to assess the impact of human activities on the natural world.</p> <p>The Biology Program can be classified into liberal arts education subjects and specialized education subjects. Liberal arts education subjects consist of Peace Science Courses, Basic Courses in University Education, Common Subjects, and Foundation Courses. Peace Science Courses, Basic Courses in University Education &amp; Common Subjects, which are positioned as general cultural subjects that should be acquired as a functioning member of society or as an individual, are important in forming a social point of view and for personality development. Offered classes can be chosen according to individual students' interests. Fundamental subjects are intended to provide a basic knowledge in the science field such as basic science. Specialized education subjects include basic specialized subjects and specialized subjects. Biology, which is a specialism in this program, places importance on the concept of knowledge and practices. Students can acquire practical skills while taking experiments from the second year in addition to lectures and seminars. Therefore, students will acquire basic knowledge and skills in biology through fundamental subjects, basic specialized subjects, and specialized subjects which are systematically and organically constructed mainly around the four pillars of zoology, botany, biochemistry, and genetics. Furthermore, students will acquire the ability to summarize the knowledge they have acquired and their achievements into a report, and the skills needed to effectively communicate their knowledge and achievements through seminars and practices. In the final academic year, students will conduct graduation research in their laboratory. While learning the latest experimental techniques, they will improve their own awareness as a specialist in biology by working on unsolved problems.</p> <p>This Program is designed to accommodate students who wish to obtain a science teacher's license for junior and senior high schools.</p>	
3. Diploma policy (policy for awarding degrees and goal of the program)	

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, and offers a system of flexible education while taking into consideration students' proficiency levels.

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.

- In the 1st academic year, students learn general knowledge by liberal arts education subjects and basic biological knowledge by some specialized subjects including "Basic Biological Science A and B".

- Specialized subjects in 2nd and 3rd years include contents related to various fields in biology ranging from molecular & cellular levels to individual & crowd levels. Most of the subjects are compulsory elective. The students learn special knowledge proactively.

- In the 2nd and 3rd year, students learn basic skills in practical biology by "Practice for Fundamental Biology I – IV". Students also learn how to summarize the results, to discuss on the results, and to make reports.

- In the final academic year, students will work on the latest research tasks in their laboratory. The resulting achievements will be presented in the presentation session for graduation theses, and students will receive an evaluation from faculty members of the Program in Biological Science.

#### 5. Start time and acceptance conditions

The School of Science gives entrance examinations by Department. The Biology Program shall mainly target entrants to the Department of Biological Science, who select this Program at the time of admission. Therefore, students will receive an education in line with the Biology Program from the beginning of the first year. However, entrants to the Department of Biological Science are assumed to have mastered the subjects listed below by the end of their high school years. Those who have not taken or have not mastered any of these subjects must take

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.

Students' academic achievements from admission to the current semester will be indicated as one of three levels: "Excellent," "Very Good," and "Good," based on evaluation criteria 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 – 4.00
Very Good	2.00 – 2.99
Good	1.00 – 1.99

\* 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.

## 9. Graduation thesis (graduation research) (meaning, student allocation, timing, etc.)

### 1. Purpose

On the basis of the basic knowledge and basic skills in biology that they have acquired by the third year, students will be involved in the most advanced research conducted in the laboratory at their assignment

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 lecture of "Advanced Biology" 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 meet the "conditions for taking graduation research."

(For the "conditions for taking graduation research," please see the Handbook for 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 Fundamental Biology IV", a wish survey will be conducted for applicant students 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

"Plan" and "Do" shall be conducted by the Faculty Council in Charge of Major Program in Biology (Chief: Dean of the Department).

"Check" and "Act" shall be conducted by the Faculty Council in Charge of Major Program in Biology, taking into account the contents of the report on the consultation between the Dean of the Department and the Academic Affairs Advisory Committee of the Department of Biological Science based on the materials prepared by the Faculty Council in Charge of the Major Program in Biology.

For faculty members who belong to the Faculty Council in Charge of the Major Program, please see Attached Sheet 5.

(2) Evaluation of the program

1. Criteria for program assessment

- (1) Graduates' proficiency levels
- (2) Students' degrees of satisfaction
- (3) Faculty members' degrees of satisfaction
- (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 "Students-oriented Education" as 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.

# Table of Registration Standards for Biology Program (Entrants of 2022)

Refer to the requirements for attending the course.

Students are required to take class subjects in other programs and schools, as well as in other universities, in addition to the class subjects listed in this table, and the credit for such subjects that the faculty committee of the Biology Program certifies is accepted as the credit for graduation.

\* Students who have earned the required credits in the Students Handbook for the details concerning the type 1 license for junior high school teacher (science), the type 2 license for senior high school teacher, and the curator license.

## Liberal Arts Education

Type	Course type	Class subjects, etc.	Credits	Type of course registration	Year in which the subject is taken (*The lower figure means semester)(Note 1)															
					1st grade		2nd grade		3rd grade		4th grade									
					Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall								
Liberal Arts Education Subjects	Common Subjects	Peace Science Courses	1	Elective	○															
		Transition to University Education	1	Required	②															
		Online English Seminar for First-Year Students (Note 2)	1	Required	②															
		Area Courses* (Note 3)	1	Elective/required	○	○	○	○												
		English Usage I	1	Required	①															
		English Usage II	1	Required		①														
		Communication IA	1	Required	①															
		Communication IB	1	Required	①															
		Communication IIA	1	Required		①														
		Communication IIB	1	Required		①														
		Foreign Languages: Basic Studies I	1	Elective	○															
		Foreign Languages: Basic Studies II	1	Elective	○															
		Foreign Languages: Basic Studies III	1	Elective		○														
		Foreign Languages: Basic Studies IV	1	Elective		○														
		Introduction to Information and Data Sciences	2	Required	②															
		Programming	2	Elective		○														
		Computer Science	2	Elective		○														
		Cooperation Courses* (Note 4)	1 or 2	Elective	○	○														
		Practical Experiments and Laboratory Work in Biology I	1	Required		①														
		Practical Experiments and Laboratory Work in Biology II	1	Required		①														
Physical Chemistry	2	Elective/required																		
Physical Chemistry (2 credits) from the two subjects above	2	Elective/required																		
Foundation Courses																				
Practical Experiments and Laboratory Work in Physics I	1	Elective																		
Practical Experiments and Laboratory Work in Physics II	1	Elective																		
Practical Experiments and Laboratory Work in Chemistry I	1	Elective																		
Practical Experiments and Laboratory Work in Chemistry II	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences I	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences II	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences III	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences IV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences V	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences VI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences VII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences VIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences IX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences X	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XXXIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XL	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences XLIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences L	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LVIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXVII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXVIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXIX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXX	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXIII	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXIV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXV	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXVI	1	Elective																		
Practical Experiments and Laboratory Work in Earth Sciences LXXVII	1	Elective																		



Academic achievements of Biology Program  
 Relationships between the evaluation items and evaluation criteria

Academic achievements	Evaluation criteria			
	Excellent	Very Good	Good	
Comprehensively Understanding	(1) Studying to understand the parts, peace, foreign languages, and society.	Superbly being able to understand.	Being able to understand well.	Being able to understand.
	(2) Understanding and knowledge in science.	Superbly being able to understand and learn.	Being able to understand and acquire.	Being able to understand and acquire.
	(3) To understand and knowledge on specific.	Superbly being able to understand and learn.	Being able to understand and acquire.	Being able to understand and acquire.
	(1) To acquire abilities information security 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 biological issues and reading comprehension of English theses.	Superbly being able to solve several biological issues and English theses.	Being able to sufficiently solve various biology issues, read English academic articles.	To be able to solve physiological problems and to understand English academic papers.
	(3) To acquire the ability of experiment: experimental skills in research: 1) Basic skills to manage experiments, record observed natural phenomena, Ability to collect and assess biological research such as animals, plants, and ways of experiments	Superbly being able to acquire the ability of experiment: handle biological research, and to be able to proactively work on it.	Being able to acquire experimental capability biological research, and to be able to proactively work on it.	To acquire skills for experiments. biological research, and to be able to proactively work on it.
Comprehensively Abilities	(1) To learn how to summarize presentation thesis, summarize situation 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.

Academic achievements of 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	
											(1)				(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		
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	2	Required	1	100	2																100
Liberal Arts Education	Communication	2	Required	2	100	2																100
Liberal Arts Education	Foreign Languages: Basic Studies	1	Free elective	1	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies	1	Free elective	1	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies	1	Free elective	2	100	1																100
Liberal Arts Education	Foreign Languages: Basic Studies	1	Free elective	2	100	1																100
Liberal Arts Education	Introduction to Information and Data Sciences	2	Required	1- 2T							100	2										100
Liberal Arts Education	Ground zero programming	2	Elective/required	2- 3T							100	2										100
Liberal Arts Education	Fundamental Date Science	2	Elective/required	2- 4T							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	2	Required	2- 3T											100	2						100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology	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		2	Elective/required	2- 3T											100	1						100











