

# 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

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. 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.

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 & 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.

This Program is designed to accommodate students who wish to obtain a science teacher's license for junior and senior high schools.

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.

# Registration

Registration for the Biology Program follows the following guidelines:  
Students must take class subjects provided in the Student Handbook at the faculty committee's discretion.  
\*Students must earn the required credits (noted in the Student Handbook) for high school teacher (science teacher) certification.

Type	Subject	Require No. of credits										
Liberal Arts Education Subjects	General Education Courses	2										
	University Education	2										
	First-Year Students	2										
	General Education Courses	12										
	English Usage	2										
	Communication I	2										
	Communication II	2										
	Foreign Languages (French, Spanish, German, Korean, and Japanese (Note 5))	(0)										
		2										
Specialized Education Subjects	General Education Courses (Note 6)	(0)										
		2										
		2										
		2										
Total (Subjects)		34										

- (Note 1) Field Research "Speaking World" that is conducted through self-study, and English Seminar "Speaking World" that is conducted through self-study, may also be accepted as credit for graduation based on Achievement Test for Foreign Language Skill Test (TOEFL) scores I, II, and III.
- (Note 2) The credit for "Foreign Language" is limited to 2 credits for each language.
- (Note 3) The credit of the subject "Science of the Earth" is limited to 2 credits.
- \* Note for the "Specialized Education Subjects" (Note 4) To achieve the 71 credits required for graduation, the "Specialized Education Subjects" must be completed in a certain period, and can only accept a limited number of students.
- (Note 5) To achieve the 71 credits required for graduation, the "Specialized Education Subjects" must be completed in a certain period, and can only accept a limited number of students.
- (Note 6) The credits that exceed 1 subject (2credits) are accepted as credit for graduation.
- (Note 7) "Summer Course for Marine Biology A", "Practice for Marine Biology A", and "Practice for Marine Biology B" shall be offered alternately for second-year and third-year students every other year.
- (Note 8) "Marine Biology A" shall be offered intensively in a certain period, and can only accept a limited number of students.
- (Note 9) "Marine Biology B" shall be offered intensively, three times a year, and can only accept a limited number of students.
- (Note 10) "Marine Biology C" shall be offered intensively in a certain period (in or after the fifth semester).
- (Note 11) "Marine Biology D" shall be offered intensively in a certain period (in or after the fifth semester).
- (Note 12) To achieve the 128 credits required for graduation, it is required to earn 10 or more credits regardless of the categorization of Liberal Arts Education Subjects and Specialized Education Subjects, in addition to the required credits for each subject category (118 credits in total that consist of 34 credits for Liberal Arts Education Subjects and 71 credits for Specialized Education Subjects).
- However, the credit for the subjects listed below is not accepted as the required credit for graduation: For the details of subjects related to educational personnel certification, refer to the list of required subjects in "Acquisition of Educational Personnel Certification" in the Student Handbook.
- Any credit that exceeds 12 credits
  - "Health and Sports Courses"
  - Any credit for subjects only related to educational personnel certification
  - Credits for "Experiments in General Biology A", "Experiments in Chemistry A", "Laboratory Work in Biology A" and "Experiments in General Geology A"
  - "Basic Specialized Subjects" and "Specialized Subjects" provided in another program in another school (except those that are admitted by the faculty committee of Biology Program)

(Specialized Education)

Type	Subject type	Required	Class subjects, etc.	No. of credits	Type of course									
		No. of credits			registration	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	
						1	2	3	4	5	6	7	8	
General Subjects	Basic Subjects	13	Introduction to Mathematics	2		○	2	3	4	5	6	7	8	
			Introduction to Information Mathematics	2			○							
			Introduction to Physics A	2		○								
			Introduction to Physics B	2			○							
			Introduction to Chemistry A	2		○								
			Introduction to Chemistry B	2			○							
			Introduction to Biological Sciences A	2		○								
			Introduction to Biological Sciences B	2			○							
			Introduction to Earth and Planetary Sciences A	2		○								
			Introduction to Earth and Planetary Sciences B	2			○							
			3 subjects (6 credits) from the ten subjects above											
			Basic Biological Science A	2		②								
			Basic Biological Science B	2		②								
	Biological Sciences	7	English Seminar on Biological Science	1	Required			①						
			Seminar on Biological Science	2				②						
			Practice for Fundamental Biology I	4				④						
		26	Practice for Fundamental Biology II	4					④					
			Practice for Fundamental Biology III	6	Required					⑥				
			Practice for Fundamental Biology IV	4								④		
			Special Study for Graduation	Each 4									④	④
			Advanced Mathematics	2						○				
			Advanced Physics	2					○					
			Advanced Chemistry	2	Elective/required							○		
		At least 2	Advanced Biology	2					○					
			Advanced Earth and Planetary Science	2								○		
			Specialized Subjects	71 (Note 7)	Biochemistry A	2				○				
	Genetics A	2						○						
	Microbiology	2							○					
	Plant Ecology A	2							○					
	Molecular Genetics A	2							○					
	Cell Biology A	2							○					
	Plant Taxonomy	2							○					
	Animal Physiology A	2									○			
	Regulation of Animal Morphology	2									○			
	Developmental Biology A	2									○			
	Plant Physiology A	2									○			
	Biological Informatics	2									○			
	Molecular Genetics B	2									○			
	Plant Physiology B	2									○			
	Plant Ecology B	2									○			
	Biochemistry B	2										○		
	Genetics B	2										○		
	Molecular Cell Biology	2										○		
	Comparative Embryology	2										○		
	Plant Morphology	2										○		
	Seminar	2	Cell Biology B	2							○			
			Developmental Biology B	2							○			
			Animal Physiology B	2							○			
			Endocrinology・Immunology	2							○			
			Genome Biology	2							○			
			Systems Biology	2							○			
			Regeneration Biology	2							○			
			Seminar for Developmental Biology	2										○
			Seminar for Cell Biology	2										○
			Seminar for Molecular Physiology	2										○
			Seminar for Plant Taxonomy and Ecology	2										○
Seminar for Plant Physiological Chemistry			2										○	
Seminar for Plant and Microbial Molecular Genomics			2										○	
Summer Course	At least 1	Seminar for Molecular Genetics	2	Elective/required									○	
		Seminar for Molecular Plant Biology	2										○	
		Seminar for Gene Chemistry	2										○	
	Seminar for Evolution and Development	2										○		
	Seminar for Island Biology	2										○		
	Seminar for Plant Genetic Resources	2										○		
	Seminar for Amphibian Biology	2										○		
	Summer Course for Marine Biology A	1					○							
	Practice for Phytogeography	1	Elective/required			○								
	Practice for Ecology	1						○						
	Summer Course for Marine Biology B	1							○					
	Marine Biological Course (Note 10)	2					○							
	Marine course for marine biological education (Note 11)	1		○	○									
“Special Lectures in Biological Science” (Note 12)	Each 1 or 2	Free elective						○	○	○	○			
Biology Internship	1							○						
“Basic Specialized Subjects” and “Specialized Subjects” offered by other programs of School of Science			○	○	○	○	○	○	○	○	○			
Any subject	10	(Note 13)	○	○	○	○	○	○	○	○	○			
Total	128													

# Academic achievements of Biology Program

## Relationships between the evaluation items and evaluation criteria

Academic achievements		Evaluation criteria		
Evaluation items		Excellent	Very Good	Good
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 avademic articles.	To be able to solve physiological problems and to understand English academic papers.
	(3) To obtain the following 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	Being able to acquire experimental capability	To acquire skills for experiments.
Comprehensive Abilities	(1) To handle biological research, and to be able to proactively work on it.	Superbly being able to handle biological research, and to be able to proactively work on it.	Being able to handle biological research, and to be able to proactively work on it.	Being able to handle biological research, and to be able to proactively work on it.
	(2) To learn how to summarize the presentation and announce it.	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.

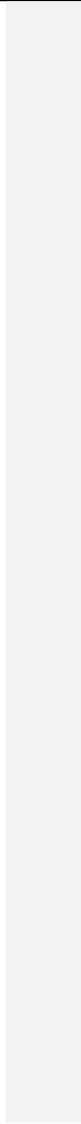
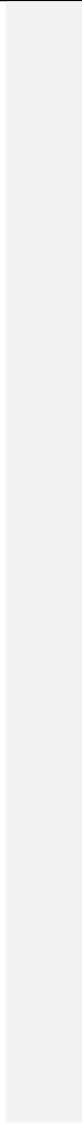
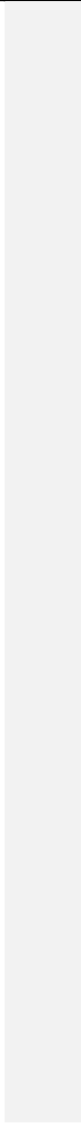
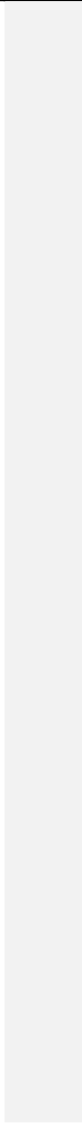
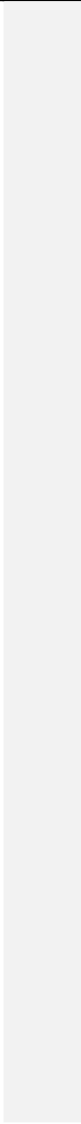
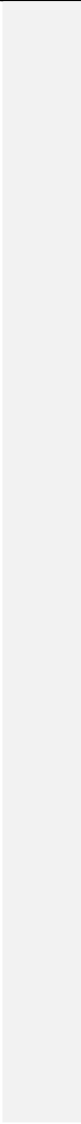
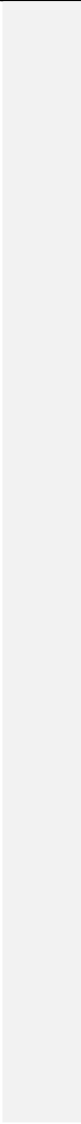
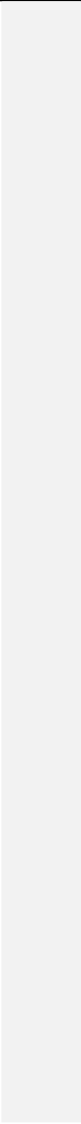
## Academic achievements of Education in the Major Program



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