

For entrants in AY 2018

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 & cellular levels to individual & crowd levels, and research activities to explore biological phenomena. To understand and explore biological phenomena, it is necessary to acquire a 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 roughly 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 join a laboratory to conduct graduation research. 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 a knowledge of 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 in English. Also, this Program is designed to accommodate students who want to go on to engage in advanced research and education in graduate school, and aims to produce competent scientists and engineers who can play independent and active roles through undergraduate education and education in graduate school.

To achieve these goals, 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. In the final academic year, students will be assigned to laboratories and work on the latest research tasks. The resulting achievements will be presented at a presentation session for graduation theses, and will receive an evaluation from faculty members of the Program in Biological Science.

This educational program is designed to enable students to become educators or researchers who can understand phenomena observed in living organisms from various angles ranging from molecular & cellular levels to individual & group levels, and who can think deeply, develop a unique perspective, and demonstrate rich creative power. We will award a bachelor degree in science to students who have acquired 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.

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

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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 final academic year, students will be assigned to laboratories and work on the latest research tasks. 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.

In this process, students' motivation will be improved by reaffirming phenomena in the natural world based on the knowledge and skills they have acquired, by developing ideas of applying these knowledge and skills, by

understanding socially important problems that need to be solved, and by planning measures to apply their acquired knowledge and skills. We will not only teach the latest knowledge in lectures and practices, but also explain the association between the history of development of the academic field and social conditions in those days, and the organic relationships between fields, as well as untapped fields and phenomena, integrating these issues into lectures and practices as required.

It is very important to improve students' communication skills. To this end, by working with co-working students, senior students, and working members of society around these students, as well as leading researchers at research sites, we will increase the opportunities for communication between these people and the students. Japanese language skills involved in summarizing, organizing sentences and speaking based on thorough reading and listening and the ability to master a foreign language can be improved through repetition. Similarly, students' ability to understand others can also be enhanced through continual communications with their senior students and coworkers. We will frequently ask students to prepare reports of lectures and practical sessions in order to develop their ability to write reports and theses. The work to implement and summarize deep discussions in their field of expertise based on the results of experiments they have conducted into a thesis will be practiced in their graduation research in the final academic year.

Although these subjects would appear to be very hard work for students, if they can experience more advanced knowledge of science in other fields after acquiring some scientific knowledge and experience, the various types of knowledge they have acquired will become organically linked one after another. This will give students an easier and more enjoyable time learning, and their abilities will develop before they are aware of it. Also, since giving a presentation and preparing a thesis not only strengthens students' presentation skills but also clarifies the kinds of knowledge and points in their research themes that are missing with others pointing them out, the quality of their research will be improved.

In this way, the curriculum has been devised to offer various ideas to cultivate a motivated and independent learning attitude in students.

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 in 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.