### 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, toiexploreabibiointerational sources are activities to explore fractional activities (1)5(s)-76(t)5(o)-79(i)5(ndi)-5(v)11(i)5(dual)

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, Vc d[[ gh Vhnhi b d[ [a mWa j Vi dc l a iV c cid dch gVi dc hij cih egd[ c n a k ah

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.

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Evaluation of academic	Converted
achievement	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 a ijg d[ 6 kVc 7 dad n 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 b ii dc idch[dgiV c gV j V dc g h Vg ( dg i dc idch [dg iV c gV j V dc g h Vg ! ea Vh h i = Vc Wdd [dg 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 jc Vb ciVa7 dad n ! V1 h hjgk n l aa W dc j i [dg Véea Vci hij cis 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

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#### (2) Evaluation of the program

- 1. Criteria for program assessment
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  - (2)  $H_j$  cih g hd[ hV h[Vi dc
  - (3) V j a in b b W g h g h d h V h V i d c
  - (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 Hj cihdg ci : j V dc Vhour 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

credit for those subjects that the faculty committee of the Biology Program certifies is accepted as the required credit for graduation.

the type 1 license for senior high school teacher (science), and the curator license.

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year, however, it is required to confirm the details in syllabus for that academic year, because the subject might be provided in a different semester or term.

Spanish, Russian, Chinese, and Korean)" in "Foreign Languages" are accepted as the credits required for "Human & Social Science Subjects".

"Online English Seminar B", that is earned through self-study, are accepted as the credit for the subject "Communication I and II".

"Credit based on Achievement in Foreign Language Skill Tests" in the Student Handbook.

credits for required subjects and 35 credits for elective required subjects.

limited number of students.

"Marine course for marine biological education" shall be offered intensively, three times a year, and can only accept a limited number of students.

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).

certification, refer to the list of required credits in "Acquisition of Educational Personnel Certification" in the Student Handbook.

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Image: Constraint of the second state of the seco				1	TRUE TO ECOLOGY		I	I	I	I	1	L	I		
Image: Constraint of the second state of the seco					Summer Course for Marine Biology B	1				L					
Each 1 Biology Internship     Free elective       "Basic Specialized Subjects" and "Specialized Subjects" offered by other programs of School of Science     Free elective       Total (Specialized Education Subjects)     84       Any subject     10					¥		]								
Biology Internship     1       "Basic Specialized Subjects" and "Specialized Subjects" offered by other programs of School of Science     1       Total (Specialized Education Subjects)     84       Any subject     10										<u> </u>		<u> </u>			
Total (Specialized Education Subjects)     84       Any subject     10					Biology Internship		Free elective								
Subjects" offered by other programs of School of Science     Subjects       Total (Specialized Education Subjects)     84       Any subject     10					"Basic Specialized Subjects" and "Specialized		1				1	1			
Total (Specialized Education Subjects)     84       Any subject     10					Subjects" offered by other programs of School of										I
Any subject 10		Total (Specialized Education Subjects)	8	1 34		1	L	1	1	1	1	I	1	1	
Total 128		Any subject	1	10											
			1	28											

# Sheet

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

		Academic achievements		Evaluation criteria	
		Evaluation items	Excellent	Very Good	Good
: adge	uipue	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.
and	15JJ (2)	KIIOWIEUUE III SCIEITLIIIC HEIUS.	Superbly being able to understand and learn.	Being able to understand and acquire.	Being able to understand and acquire.
Σ Ξ	(3)	KIIOWIEUUE OII SPECIAILIES III DIOIOUV.			Being able to understand and acquire.
S		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.
and Skills	(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.
Abilities ar		Based on basic knowledge which is already acquired, to obtain the following experimental skills in order to practice	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.
Compr Abi					Being able to tackle with research, summarize, and make a presentation.

### Placement of Liberal Arts Education in the Major Program

For an understanding of the advanced and specialized content in the Major Program, it is important to acquire broad and basic knowledge. To this end, we must give students guidance according to their needs so that they will be able to respond to specialized programs by choosing from liberal arts education subjects.

# Relationships between the evaluation items and class subjects

											E	Evaluati	on iten	ns							
					I	Knowled	lge and	Under	rstandin	g		A	bilities	and Ski	lls		Com	prehen	sive Ab	ilities	Total
Subject			Type of		(	1)		2)	()	3)	(	1)	(	2)	(	3)	(	1)	(	2)	weighted values of
Classification	Subject Name	Credits	course registration	Grade	Weighted values of evaluation items in the subject	Weighted values of evaluation items	evaluation items in the subject														
Liberal Arts Education	Peace Science Courses	2	Elective/requ ired	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/requ ired	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 <b>IV</b>	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/requ ired	1-1T			100	1													100
Liberal Arts Education	Fundamental Physical Chemistry	2	Elective/requ ired	2-3T			100	1													100
Liberal Arts Education	Statistical Data Analysis	2	Elective/requ ired	1-1T			100	1													100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	Elective/requ ired	2-3T											100	1					100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics II	2	Elective/requ ired	2-4T											100	1					100

											E	Evaluati	ion iten	IS							
					ł	Knowle	dge and	l Under	standin	ıg		А	bilities	and Ski	ills		Com	prehens	sive Ab	ilities	Total
Subject			Type of		(	1)	()	2)	()	3)	(	1)	()	2)	(	3)	(	1)	()	2)	weighted
Classification	Subject Name	Credits	course registration	Grade	Weighted values of evaluation items in the subject	Weighted values of evaluation items	values of evaluation items in the subject														
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry I	2	Elective/requ ired	2-3T											100	1					100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry II	2	Elective/requ ired	2-4T											100	1					100
Liberal Arts Education	Experimental Methods and Laboratory Work in Earth Sciences I	2	Elective/requ ired	3-1T											100	1					100
Liberal Arts Education	Experimental Methods and Laboratory Work in Earth Sciences II	2	Elective/requ ired	3-2T											100	1					100
Specialized Education	Introduction to Mathematics	2	Elective/requ ired	1-1T			100	1													100
Specialized Education	Introduction to Information Mathematics	2	Elective/requ ired	2-3T			100	1													100
Specialized Education	Introduction to Physics A	2	Elective/requ ired	1-2T			100	1													100
Specialized Education	Introduction to Physics B	2	Elective/requ ired	2-4T			100	1													100
Specialized Education	Introduction to Chemistry A	2	Elective/requ ired	1-1T			100	1													100
Specialized Education	Introduction to Chemistry B	2	Elective/requ ired	2-3T			100	1													100
Specialized Education	Introduction to Biological Sciences A	2	Elective/requ ired	1-2T			100	1													100
Specialized Education	Introduction to Biological Sciences B	2	Elective/requ ired	2-4T			100	1													100
Specialized Education	Introduction to Earth and Planetary Sciences A	2	Elective/requ ired	1-2T			100	1													100
Specialized Education	Introduction to Earth and Planetary Sciences B	2	Elective/requ ired	2-4T			100	1													100
Specialized Education	English Seminar on Biological Science	1	Required	2									100	2							100
Specialized Education	Basic Biological Science A	2	Required	1-1T					100	2											100
Specialized Education	Basic Biological Science B	2	Required	1-2T					100	2											100
Specialized Education	Seminar on Biological Science	2	Required	3-1T									100	2							100
Specialized Education	Practice for Fundamental Biology I	4	Required	3											100	2					100
Specialized Education	Practice for Fundamental Biology II	4	Required	4											100	2					100
Specialized Education Specialized	Practice for Fundamental Biology III Practice for Fundamental	6	Required	5											100	2					100
Education Specialized	Biology IV Special Study for	4	Required	6											100	2					100
Education Specialized	Graduation	各4	Required	7-8															100	3	100
Education	Advanced Mathematics	2	Elective/requ ired	5-1T					100	1											100

											E	Evaluati	on iten	ıs								
				1	ł	Knowled	dge and	l Under	standir	ıg		A	bilities	and Ski	lls		Com	prehen	sive Ab	ilities	Total	
Subject			Type of	1	(	1)	(	2)	(	3)	(	1)	()	2)	(	3)	()	1)	()	2)	weighted values of	
Classification	Subject Name	Credits	course registration		Weighted values of evaluation items in the subject	values of evaluation	Weighted values of evaluation items in the subject	Weighted values of evaluation items	values of	values of evaluation	evaluation	evaluation	Weighted values of evaluation items in the subject	weighted	Weighted values of evaluation items in the subject	values of evaluation	Weighted values of evaluation items in the subject	values of evaluation	evaluation	Weighted values of evaluation items	evaluation items in the subject	
Specialized Education	Advanced Physics	2	Elective/requ ired	<sup>1</sup> 4-4Т	<u> </u>				100	1											100	
Specialized Education	Advanced Chemistry	2	Elective/requ ired	<sup>1</sup> 6-4Т					100	1											100	
Specialized Education E	Educat <b>Educa</b> tnced Biology	2	Elective/requ ired	<sup>1</sup> 5-2Т					100	1											100	
Education	n)4]A KMGncæd AdtHa6BDC Planetary Science	C q3 <b>9</b> 24 4	48 <b>212</b> c7 <b>i6486</b> qu3 ired	3ffeW*nBT 6-31	C/F1 744 ′	Tf1 0 0 1	11618 423	322 Tm0 g	e5G <b>(</b> E)6(1	ec)–3(t) E	MC /P≮	MCID 71>	BDC q2 <b>9</b> 4	4 <b>9</b> 4177 353	76 1 3fðW	*nBT/F1	588 Tfl 0	0 1 2188!	1 40 <b>9</b> 4 Tm	10 33 <b>9</b> 0 g <b>(</b>	Education)]T	<b>(J</b> v)5(e)4(
<b>6p8</b> dialized Education	MidsAThielogy	2	Elective/requ																			

											E	Evaluati	lon iten	ıs							
					ł	Knowle	dge and	l Under	rstandin	g		A	bilities	and Ski	lls		Com	prehen	sive Ab	ilities	Total
Subject			Type of		(	1)	(	2)	()	3)	(	1)	()	2)	(	3)	(	1)	(	2)	weighted
Classification	Subject Name	Credits	course registration	Grade	Weighted values of evaluation items in the subject	Weighted values of evaluation items	values of evaluation items in the subject														
Specialized Education	Animal Physiology B	2	Elective/requ ired	5-2T					100	2											100
Specialized Education	Plant Physiology B	2	Elective/requ ired	4-4T					100	2											100
Specialized Education	Plant Ecology B	2	Elective/requ ired	4-3T					100	2											100
Specialized Education	Endocrinology • Immunology	2	Elective/requ ired	5-1T					100	2											100
Specialized Education	Genome Biology	2	Elective/requ ired	5-2T					100	2											100
Specialized Education	Systems Biology	2	Elective/requ ired	5-1T					100	2											100
Specialized Education	Regeneration Biology	2	Elective/requ ired	5-1T					100	2											100
Specialized Education	Seminar for Developmental Biology	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Cell Biology	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Molecular Physiology	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Plant Taxonomy and Ecology	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Plant Physiological Chemistry Seminar for Plant and	2	Elective/requ ired	8									100	2							100
Specialized Education	Microbial Molecular	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Molecular Genetics	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Molecular Plant Biology	2	Elective/requ ired	8									100	2							100
Specialized Education	Seminar for Gene Chemistry	2	Elective/requ ired	8									100	2							100
Specialized Education Specialized	Seminar for Evolution and Development	2	Elective/requ ired	8									100	2							100
Education Specialized	Seminar for Island Biology Seminar for Plant Genetic	2	Elective/requ ired	8									100	2							100
Education Specialized	Seminar for Plant Genetic Resources Seminar for Amphibian	2	Elective/requ ired	8									100	2							100
Education Specialized	Seminar for Amphibian Biology Summer Course for Marine	2	Elective/requ ired	8									100	2							100
Education Specialized	Biology A Practice for	1	Elective/requ ired Elective/requ	3											100	2					100
Education Specialized	Phytogeography	1	ired	3											100	2					100
Education Specialized	Practice for Ecology Summer Course for Marine	1	Elective/requ ired	4											100	2					100
Education	Biology B	1	Free elective	5											100	2					100

											E	Evaluati	lon iten	IS							
					ŀ	Knowled	lge and	l Under	standin	g		A	bilities	and Ski	lls		Com	prehens	sive Ab	ilities	Total
Subject			Type of		()	1)	()	2)	(;	3)	()	1)	()	2)	(	3)	(	1)	(	2)	weighted values of
Classification	Subject Name	Credits	course registration	Grade	evaluation	values of evaluation	values or	values of evaluation	values of evaluation itoms in	values of evaluation	evaluation	values of evaluation	values or	values of		values of	values of	values of evaluation	evaluation	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

## ciculum Map of Biology Program

iculum map of biolo	gy i i ogi alli							
Academic achievements Evaluation items		grade		grade		grade	4th gra	
Evaluation items	Spring semester Communication IA(@)	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
	Communication IB(©) Foreign Languages: Basic	Communication IIB(©) Foreign Languages: Basic						
	Studies I(A)	Studies III (A)						
	Foreign Languages: Basic Studies Ⅱ (△)	Foreign Languages: Basic Studies IV (△)						
ing to understand liberal arts, peace, foreign ages, culture and society.	Basic English Usage I(⊚)	Basic English Usage Ⅱ(◎)			·			
	Area Courses(O)	Area Courses(O)						
	Social Cooperation $Courses(\Delta)$	Social Cooperation $Courses(\Delta)$						
	Peace Science Courses(©)							
	Introduction to University Education(@)							
	General Chemistry(O)	Fundamental Physical Chemistry						
	Statistical Data Analysis(O)	(0)			·			
	Introduction to Mathematics(O)	Introduction to Information			·			
rstanding and learning basic knowledge in		Mathematics (CJ)						
tific fields.	Introduction to Physics A(O)	Introduction to Physics B(O)						
	Introduction to Chemistry A(O)							
	Introduction to Biological Sciences A(O)	Introduction to Biological Sciences B(O)						
	Introduction to Earth and Planetary Sciences A(Q)	Introduction to Earth and Planetary Sciences B(O)						
	Basic Biological Science A(  )	Genetics A(O)	Microbiology(O)	Developmental Biology A(O)	Cell Biology B(O)	Advanced Chemistry(O)		
	Basic Biological Science B(©)	Biochemistry A(O)	Plant Ecology A(O)	Plant Physiology A(O)	Developmental Biology $B(O)$	Advanced Earth and Planetary Science		
	0	,	Cell Biology A(O)	Biological Informatics(O)	Biochemistry B(O)			
			Molecular Genetics A(Q)	Molecular Genetics B(Q)	Genetics B(O)			
			Plant Taxonomy(O)	Animal Physiology A(O)	Molecular Cell Biology(O)			
				Regulation of Animal Morphology(O)	Animal Physiology B(O)			
nderstand and acquire advanced knowledge				Plant Physiology $B(O)$	${\sf Comparative}\;{\sf Embryology}({\sf O})$			
oecialties in biology.				Plant Ecology B(O)	Plant Morphology $(O)$			
				Advanced Physics(O)	Advanced Mathematics(O)			
					Endocrinology · Immunology (O)			
					Advanced Biology(O)			
					Genome Biology(O)			
					Systems Biology(O)			
					Regeneration Biology(O)			
equire abilities to understand information	Exercise in Information Literacy							
rity compliance, to collect and evaluate data.								
		English Seminar on Biological Science (@)	Seminar on Biological Science(©)		Biology Internship ( $\Delta$ )		Se	minar for Developmental $plogv(\Omega)$
								minar for Cell Biology(C
								minar for Molecular Phys
							(C Se	minar for Plant Taxonom
							Ec	ologv(O) minar for Plant Physiolo
							Ch	emistrv(O) minar for Plant and Mic
ring ability to apply basic knowledge to							Ma	blecular Genomics(Ω) minar for Molecular Ger
gical issues and reading comprehension of theses.							((	))
an anosos.								minar for Molecular Plan
								minar for Gene Chemist
							Se	minar for Evolution and
								velopment(O) minar for Island Biology
							Se	minar for Plant Genetic sources( $O$ ) minar for Amphibian Biol

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.		in Biology I (©)	Experimental Methods and Laboratory Work in Earth Sciences I (O)					
		in Biology II (@)	Experimental Methods and Laboratory Work in Earth Sciences II (O)					
		in Physics I (O)	Practice for Fundamental Biology I (@)	Practice for Fundamental Biology ∏ (⊚)	Π(@)	Practice for Fundamental Biology Ⅳ (◎)		
		Experimental Methods and Laboratory Work in Physics $II(O)$	Biology A(O)	Practice for Ecology(O)	Summer Course for Marine Biology $B(\Delta)$			
		Experimental Methods and Laboratory Work in Chemistry I (O)	$(\mathbf{O})$					
		Experimental Methods and Laboratory Work in Chemistry II (O)	Marine Biological Course( $\Delta$ )					
	Marine course for marine biological education ( $\Delta$ )							
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 ( $\bigcirc$ )	Special Study for $Graduation(@)$
	,							
		Liberal Arts Education Subjects	Basic Specialized Subjects	Specialized Education Subjects	Graduation Thesis	(©)Required	(O)Elective/required	$(\Delta)$ Free elective