1.	
2.	
	for degree conferment and target to be achieved in program)
The Molecular -	Togram and to endote stadents to acquire are caste movinedge, experies, and
_	henomena generated by organic molecule, cell, individual organisms, and population that
constitute the foundation of th	ne applied biology to develop human resources who are capable of working as a scientist in

such as a company, college, and public organization. \Box

- (8) Systematic and hierarchical knowledge and understanding regarding physiology of microorganisms, plants, and animals and functionality of living bodies from the level of molecule and cell to that of the individual organism and ecosystem;
- (9) Data collection and analysis capabilities and systematic skills for research in the academic fields regarding molecule, cell, functionality of living bodies, and ecosystem and ability to practically use and apply those fundamental skills; and
- (10) Capability of applying such as the knowledge, skills, and attitude that he/she has obtained in an integrated manner to solve problems that he/she identifies and logically present the conclusion orally or in writing and discuss with the other persons in the area that studies functionality of a cell and living body from the molecular point of view.

4.					
				-	
			-	-	

				[

(3) The "specialized subjects" provided in the specialized education in this Program are categorized in "base subjects" in which students study molecular biology regarding organic molecule, cell, individual organism, and population and "advanced subjects"" in which the molecule biology is applied and developed to provide systematic education with continuity. They aim to develop capabilities for understanding natural phenomena from the view point of molecular biology and developing the understanding for practical science. In addition to that, this Program provides subjects of "exercise and practicum" in which Problem-based Learning (PBL) is conducted for identifying and solving problems to allow students to acquire skills and attitudes that he/she can widely use and apply in areas of agricultural science. In addition to that, students develop general capabilities for problem solving including skills for communication, presentation, and practical foreign language capability while preparing his/her "graduation thesis."

5.					
				—	

Students study the fundamental subjects for one year after entering the university to acquire the basic knowledge required for studying the expertise. Then they mainly study the specialized fundamental subjects common for the all students of School of Applied Biological Science in the second semester of the second year. Particularly, they take the subjects of Laboratory Work in General Chemistry, Laboratory Work in General Physics, and Laboratory Work in General Biology I & II (including computer exercise) as those regarding experiments that are common for all students of the School of Applied Biological Science that consist of to get basic training for experiments in a wide area that is commonly required for the students of the School of Applied Biological Science, understanding for bioethics and ethics of science by the first semester of the second year to allow themselves to understand the aim and characteristics of each major program and select the most appropriate program.

			[

6. Available qualification
(1) Educational personnel certification: Type 1 License for High School Teacher (science)
7.
9

(1)(2)10. (2)(3) (4)(6) $\bigcirc \square \square$ (8) 9

(1) $2\square$

Table of Registration Standards (Liberal Arts Education Subjects)

Integrative Hydrospheric Science Program, Applied Animal and Plant Science Program,

Food Science Program, Molecular Agro-Life Science Program

										Year	in wh	ich th	e subje	ect is	taken								
Туре		Su	bject	type	Required No. of credits	Class subjects	No. of credits	Type of course registration	Springs	rade Lall	2 nd gg Springs	rade	Springs ^{2 pr}	rade Lall	Springs	rade							
	Pe	ace S	cience	e Courses	2		2	Required															
	ses in		for F	ory Seminar irst-Year idents	2	Introductory Seminar for First-Year Students	2	Required															
	Basic Courses in	Un		luction to ty Education	2	Introduction to University Education	2	Required															
		Development Seminar Basic English		-	0	(Note3)	1																
						Communication Basic I	1																
			English Usage Communic ation I		2	Communication Basic II	1	Required															
		Solution I Solution I Solution I Solution I Solution I Communic		2	Communication I A Communication I B	1	Required																
		es	Eng	Communic	2	Communication II A	1	Required															
		guag	Non-E Langu (Select	Non-	ation II	2	Communication II B	1	Kequirea								ļ						
ation		ign Lan			on-English	-		Basic Foreign Language I	1														
rts Educ	Liberal Arts Education subjects	Foreigr		oreign anguages		Basic Foreign Language II	1	Elective															
iberal A	abjects			ect one	4	Basic Foreign Language III	1	Required															
	Common Subjects		(Not	e2)		Basic Foreign Language IV	1																
	Col		Information and Data		4	Introduction to Information and Data Sciences(Note3)	2	Required															
			Science Courses	Science Courses	Science Courses	Science Courses	cience Courses	cience Courses	cience Courses				Fundamental Data Science(Note3)	2	Required								
			Area	Courses	12	(Note3)	1 or 2	Elective/ Required															
	Eng? Social Cooperation Courses		(Note3)	0																			
		H		and Sports ourses	2	(Note4)	1 or 2	Elective Required															
	Found	latior	ı Cour	ses	6	Organic Chemistry	2																
						Cell Science	2]															

		"Basic Laboratory Work in Chemistry" or "Experimental Methods and Laboratory Work in Chemistry I" (Note5)	1					
		"Experimental Methods and Laboratory Work in Biology I"	1	Required				
Total	40							

O Instruction regarding credits

- Note 1: The year indicated with a circle mark represents that in which students typically take the subject. The year with a double circle mark indicates the year in which students are highly recommended to take the subject. Students are allowed to take the subject in any year after that indicated with a circle or double circle mark. It is required to confirm the semester in which the subject is provided in the class schedule for liberal arts education subjects in the Students' Handbook because some subjects might be provided in different semester from that which is provided in this document.
- Note 2: The credit for "Field Research in the English-speaking World" that is earned through such as a short-term study abroad and that for "Online English Seminar I," "Online English Seminar II," and "Online English Seminar III" that is earned through a self-study, are accepted as the credit for English required for graduation. Achievement in a foreign language skill test and language training might be accepted as a credit. For further information, refer to the description regarding English subjects in the liberal arts education and the item "Credit based on Achievement in Foreign Language Skill Test" in the Students Handbook.

(PP. 30 - 31, Liberal Arts)

Note 3: It is required to earn 4 credits or more for the natural science subjects and 4 credits or more for the human & social science subjects.

However, "Fundamentals of Biology" of the natural science subjects is a subject for which students are requested to take if he/she did not take biology subjects in the entrance exam (including the University Testing Center Examination).

For the other students, the credit for the subject "Fundamentals of Biology" is not accepted as that for graduation.

It is allowed to include up to 4 credits for society-related subjects as credits for the Human & Social Science Subjects.

Note 4: For health & sports subjects, it is recommended to take a practicum in sports.

Note 5: It is required to take "Basic Laboratory Work in Chemis

Table of Registration Standards(Specialized Fundamental Subjects)

Integrative Hydrospheric Science Program, Applied Animal and Plant Science Program, Food

						Ye	ar in w	hich th	e subje	ct is tal	ken	
		Required	of Class subjects		1 st g	rade	2 nd g	rade	3 rd g	rade	4 th g	rade
Туре	Subject type	No. of credits	Class subjects	No. of credits	Springs	Fall	Springs	Fall	Springs	Fall	Springs	Fall
			Introduction to Applied	2								
			Biological Sciences									
			Introduction to	2								
			Microbiology									
			Introduction to Molecular	2								
			Biochemistry									
	~		Agricultural Production	2								
	ects		Resources									
S	ich		Physics for Applied	2								
ect	l S		Biological Science									
įduč	ent a		Ethics of Science and	2								
s þe	dame	24	Technology									
Special i zed Subjects	Fun	24	Statistics in Biology	2								
cia	jed		Environmental Sciences	2								
Spe	aliz		for Bioproduction									
	Special i zed Fundanærtal Subjects		Laboratory Work in	1								
	Sp		General Biology I									
			Laboratory Work in	1								
			General Biology II									
			Laboratory Work in	1								
			General Chemistry									
			Laboratory Work in	1								
			General Physics									
			Requi	red Subj	ects:	Tota	al 20 (credit	S			

Science Program, Molecular Agro-Life Science Program

Seminar in Field	Science 2						
Research Front	of 2						
Bioresource Sci	ences						
Research Front	of Food 2						
and AgriLife Sc	ience						
Introduction to	2						
Physiology							
Public Health	2						
	Elective	e Required	d Subject	S			
	Take 6 cred	its from a	bove sub	ojects			
(Redundant cre	edits over 6 credits	move t	o Electiv	e Subje	cts in eac	ch Progra	am)

Vcdng qh Tgikuvtcvkqp Uvcpfctfu*Urgekcnk|gf Uwdlgevu+

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V{rg	Uwdlgev v{ rg	qh etg flvu	Encuu uwdlgevu	etgfku	Urtkpiu	Hcm	Urtkpiu	Hcm	Urtkpiu	Hcm	Urtkpiu	Hcm
			I gpq o g Uekgpeg K	4								
			I gpq o g Uekgpeg KK	4								
			Dkqqticpke Ejgokuvt{	4								
			Ejgokuvt{ qh Pcvwtcn Qticpke	4								
			Eqorqwpfu									
			Oqngewnct Egnn Dkqnqi {	4								
			Dkq/Cpcn{vkecn Uekgpeg	4								
			Tgcfkpi qh Hqtgkip Nkvgtcvwtg	4								
			kp Oqngewnct Citq/Nkhg Uekgpeg									
M	n		Ncdqtcvqt{ Yqtm kp Oqngewnct	3								
vdlge	vdlge		Citq/nkhg Uekgpeg K									
Urgekcık gf Uwdlgevu	Urgekcik gf Uwdlgevu	78	Ncdqtcvqt{ Yqtm kp Oqngewnct	3								
conk g	ccik g	/0	Citq/nkhg Uekgpeg KK									
Jrgek	Jrgek		Ncdqtcvqt{ Yqtm kp Oqngewnct	3								
1	1		Citq/nkhg Uekgpeg KKK									
			U{uvg o ke Nkhg Uekgpeg	4								
			Rtqdngo Dcugf Ngctpkpi hqt	3								
			Oqngewnct Citq/Nkhg Uekgpeg K									
			Rtqdngo Dcugf Ngctpkpi hqt	3								
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			I tcfwcvkqp Vjguku K	4								
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			I tcfwcvkqp Vjguku KKK	4								
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		Egm Vgejpqnqi {	4				
		TgrtqfwevkxgDkqnqi {	4				
		Rncpv Oqngewnct Dkqnqi {	4				
		Hqqf Oketqdkqnqi {	4				
		Dkqtguqwteg Wvknk cvkqp Uekgpeg	4				
		Pwvtkvkqp	4				
		J { ftqurjgtke Dkqejgokuvt {	4				
		Rcvjqnqi{	4				
		Crrnkgf Gzvtgoqrjknke Nkhg	4				
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		Gngevkxg Uwdlgevu:	At least 1	9 etg fku o	o wuv dg qdw	ckpgf0	
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		Wr vq 34etgfkvu qdvckpgf htq o urgel	cnk gfuwdlge	vu cv cpqvjgt	t Uejqqn cpf	htq o uwdlgev	u qhhgtgf d{
		vjg CKOU Rtqitc o eq o rngvgf cv vj	g fkurcvej fg	uvkpevkqp eep	o dg kpenwfgi	f kp vjg etgfkv	u tgswktgf
		hqt itcfwcvkqp0					
		Etgfkvu qdvckpgf htq o Nkdgten Ctvu	Gfwecvkqp Uw	dlgevu cpf u	wdlgevu tgncvg	gf vq vjg vgce	jkpi
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Vqvcn	346						

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Results of study in Food Science Program

Relation between evaluation items and evaluation criteria

		Study achievement		Evaluation criteria	
		Evaluation items	Excellent	Very Good	Good
	(1)		Has superior ability for comprehensive and cross- disciplinary thinking and capability to see a phenomenon from a broad, top-down perspective and to take action for solving problems regarding the specialized area.	Has sufficient ability for comprehensive and cross- disciplinary thinking and capability to see a phenomenon from a broad, top-down perspective and to take action for solving problems regarding the specialized area.	Has basic ability for comprehensive and cross- disciplinary thinking and capability to see a phenomenon from a broad, top-down perspective and to take action for solving problems regarding the specialized area.
		Basic knowledge and understanding required for acquiring expertise	Has fundamental knowledge and profound understanding required for acquiring expertise, and is capable of explaining this knowledge while	Has fundamental knowledge and profound understanding required for acquiring expertise, and is capable of sufficiently explaining this knowledge	Has fundamental knowledge and profound understanding required for acquiring expertise, and is capable of providing basic explanation of this
	(3)				
-		Basic ability in communication, information processing, and physical activities required for acquiring expertise	Has superior ability in all the elements regarding communication, information processing, and physical activities required for acquiring expertise.	Has sufficient ability in all the elements regarding communication, information processing, and physical activities required for acquiring expertise.	Has basic ability in all the elements regarding communication, information processing, and physical activities required for acquiring expertise.
-		Basic experimentation abilities and skills required for acquiring expertise	Has sufficient basic experimentation abilities and skills required for acquiring expertise, and is capable of autonomously applying them.	Has sufficient basic experimentation abilities and skills required for acquiring expertise, and is capable of autonomously applying them under instruction.	Generally has sufficient basic experimentation abilities and skills required for acquiring expertise, and is capable of supporting their execution.
		Intellectual ability and techniques in study fields regarding organic molecule, cell, individual organism, and population	Has sufficiently acquired intellectual ability and techniques in areas regarding organic molecule, cell, individual organism, and population and is capable of applying them.	Has acquired intellectual ability and techniques in areas regarding organic molecule, cell, individual organism, and population and is capable of applying them.	Has intellectual ability and techniques in areas regarding organic molecule, cell, individual organism, and population.
		Ability regarding scientific English that is required as a basis for understanding technical English manuals	Has a basic ability for reading English texts and capable of sufficiently understanding technical manuals to explain to the others.	Has a basic ability for reading English texts and capable of understanding technical manuals to explain to the others.	Has a basic ability for reading English texts and capable of understanding technical manuals.
		Ability to collect information related to peripheral disciplines to complement the knowledge regarding the specialized area and comprehensively consider functions of organic molecule, cell, individual organism, and population from view points related to molecules	Capable of collecting information related to peripheral disciplines to complement the knowledge regarding the specialized area, comprehensively considering functions of organic molecule, cell, individual organism, and population from view points related to molecules, explaining to others, and applying the information.	Capable of collecting information related to peripheral disciplines to complement the knowledge regarding the specialized area, comprehensively considering functions of organic molecule, cell, individual organism, and population from view points related to molecules, and explaining to others.	Capable of collecting information related to peripheral disciplines to complement the knowledge regarding the specialized area and comprehensively considering functions of organic molecule, cell, individual organism, and population from view points related to molecules.

comprehension based on those ideas, logically represent own conclusion orally or representing own conclusion orally or in a in a document, and exchange ideas in areas in which themes regarding functions of organic molecule, cell, individual organism, and population are discussed from view points related to molecules.

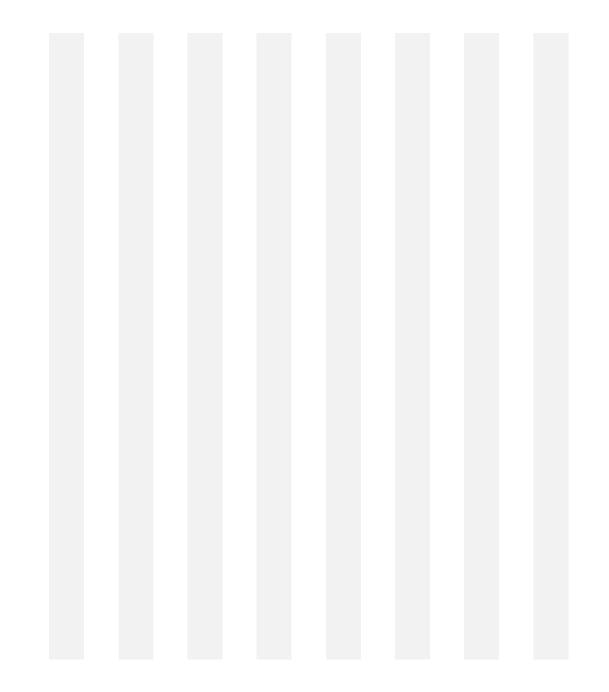
Ability to organize own ideas, demonstrate Capable of organizing own ideas, demonstrating comprehension based on those ideas, logically document, and exchanging advanced ideas in areas in which themes regarding functions of organic

					evaluati on item	Weighti ng for evaluati	evaluati on item	ng for evaluati	evaluati on item	Weighti ng for evaluati	evaluati on item	Weighti ng for evaluati	evaluati on item	Weighti ng for evaluati on item	evaluati on item	ng for evaluati	evaluati on item	ng for evaluati	evaluati on item	ng for evaluati	on item	ng for evaluati	
Liberal arts education subjects	Peace Science Courses	2	Required	1st - 4th semesters	100	1	-						-		-		-		-		-		100
Liberal arts education subjects	Introductory Seminar for First-Year Students	2	Required	1st semester	100	1																	100
Liberal arts education subjects	Introduction to University Education	2	Required	1st semester	100	1																	100
Liberal arts education subjects	Foreign Languages	10	Required / Elective required								100	1											100
Liberal arts education subjects	Information and Data Science Courses	4	Required	1st - 2th semesters							100	1											100

Liberal arts

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Specialized subjects	Introduction to Applied Biological Science	2	Required 1st semester			100	1										100
Specialized subjects	Introduction to Microbiology	2	Required 1st semester			100	1										100
Specialized subjects	Introduction to Molecular Biochemistry	2	Required 2nd semester	60	1			40	1								100
Specialized subjects	Agricultural Production Resources	2	Required 2nd semester\			100	1										100
Specialized subjects	Physics for Applied Biological Science	2	Required 2nd semester			100	1										100
Specialized subjects	Ethics of Science and Technology	2	Required 2nd semester			100	1										100
Specialized subjects	Statistics in Biology	2	Required 3rd semester			100	1										100
Specialized subjects	Environmental Sciences for Bioproduction	2	Required 3rd semester			100	1										100
Specialized subjects	Laboratory Work in General Biology I	1	Required 3rd semester							1	100	1					100
Specialized subjects	Laboratory Work in General Biology II	1	Required 3rd semester							1	100	1					100
Specialized subjects	Laboratory Work in General Chemistry	1	Required 3rd semester							1	100	1					100
Specialized subjects	Laboratory Work in General Physics	1	Required 3rd semester							1	100	1					100
Specialized subjects	Seminar in Field Science	2	Elective Øû d semester required			100	1										100
Specialized subjects	Research Front of Bioresource Sciences	2															



Attachment 4

Curriculum map for Food Science Program

ac	Study achievementStudy hievementStudy achievement	1st	year	2nd	year	3rd	year	4th year		
	Evaluation items	1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester	7th semester	8th semester	
	①Ability for comprehensive and	Seminar for developing intelligence (©)	Research Front of Food and AgriLife Science (O)							
	required to see a phenomena from a broad, top-down	(©)	Research Front of Bioresource Sciences (O)							
	erspective and to take action for olving problems regarding the pecialized area.	Peace Science	Introduction to Molecular Biochemistry(©)							
					subjects (O)					
K		Introduction to Applied Biological Science(©)	Organic Chemistry (©)	Environmental Sciences for Bioproduction(©)			Public Health(O)			
o w		Introduction to Microbiology (©)	Cell Science (⁽)	Statistics in Biology (©)						
l e d	②Basic knowledge and	Introduction to Applied Biological Science(©)	Agricultural Production Resources(©)							
g e	understanding required for acquiring expertise	Introduction to Microbiology (©)	Physics for Applied Biological Science(©)	Introduction to Physiology (O)						
&	&		Ethics of Science and Technology(©)							
u n d e r			Seminar in Field Science (O)							

s t a	Introduction to Molecular Biochemistry(©)	Genome Science I (©)	Cell Technology(O)	Animal Breeding and Genetics(O)	
d i n g		Genome Science II (⊚) Bioorganic Chemistry	Reproductive Biology (〇) Plant Molecular		
③Knowledge and understanding regarding organic molecule, cell, individual organism, and		(◎) Chemistry of natural organic compounds (◎)	Biology(O) Food Microbiology (O)		
population		Molecular Cell Biology (©)	Bioresource Utilization Science (O)		
		Bio-Analytical Science	Nutrition(O)		
		Systemic Life Science (©)	Hydrospheric Biochemistry(O) Pathology (O)		
			Applied extremophilic life science(O)		

①Basic ability in communication, information	Foreign Languages (C				
processing, and physical activities required for acquiring expertise	Health and Sports Cou	rses (O)			
A b			Laboratory Work in General Biology I & II (©)		
②Basic experimentation abilities and skills required for acquiring expertise	"Basic Laboratory Work in Chemistry"		Laboratory Work in General Chemistry (©)		
e s &		"Experimental Methods and Laboratory Work in Biology I"	Laboratory Work in General Physics (©)		
s k i I				Laboratory Work in Molecular Agro-life Science I(©)	Problem Based Learning for Molecular Agro-Life Science I(©)
 S ③Intellectual ability and techniques in study fields regarding organic molecule, cell, individual organism, and population 				Laboratory Work in Molecular Agro-life Science II(©)	Problem Based Learning for Molecular Agro-Life Science II(©)
				Laboratory Work in Molecular Agro-life Science III (©)	
④Ability regarding scientific English that is required as a basis for understanding technical English manuals				Reading of Foreign Literature in Molecular Agro-Life Science(©)	

 O ①Ability to collect information related to peripheral disciplines to complement the knowledge r regarding the specialized area and comprehensively consider h functions of organic molecule, cell, individual organism, and population from view points related to molecules 		Foo	od Biochemistry(O) od Hygiene(O) uaculture I(O)		
 QAbility to organize own ideas, demonstrate comprehension based on those ideas, logically represent own conclusion orally or in a document, and exchange ideas in areas in which themes regarding functions of organic molecule, cell, individual organism, and population are discussed from view points related to molecules. 		Grad (⊚)		Graduation Thesis II (⊚)	Graduation Thesis Ⅲ (ⓒ)

(Example) Liberal arts subjects Specialized fundament Specialized subjects Graduation thesis (⁽)) Required subjects (O) Elective required (Δ) Elective subjects

Name of faculty	Name of program and position	Extension number	Laboratory	Mail address
	Professor			@
				@
				@
				@
				@
				@
				atsukoikeda@hiroshima-u.ac.jp
		7961	B203	

List of Faculty Members of the Molecular Agro-Life Science Program