

n in this program, the student is required to acquire:

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. Students acquire a wide range of intelligence, capability in foreign languages such as English, data processing skills, basic knowledge common 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)

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Type	Subject type			Required No. of credits	Class subjects	No. of credits	Type of course registration	Year in which the subject is taken							
								1 st grade		2 nd grade		3 rd grade		4 th grade	
								Springs	Fall	Springs	Fall	Springs	Fall	Springs	Fall
Liberal Arts Education	Peace Science Courses			2		2	Required								
	Basic Courses in University Education	Introductory Seminar for First-Year Students		2	Introductory Seminar for First-Year Students	2	Required								
		Introduction to University Education		2	Introduction to University Education	2	Required								
		Common Subjects	Foreign Languages	English(Note2)	Basic English Usage	2	Communication Basic I	1	Required						
	Communication Basic II						1								
	Communic ation I			2	Communication I A	1	Required								
					Communication I B	1									
	Communic ation II			2	Communication II A	1	Required								
					Communication II B	1									
	Non-English Foreign Languages (Select one language)		4	Basic Foreign Language I	1	Elective Required									
				Basic Foreign Language II	1										
				Basic Foreign Language III	1										
				Basic Foreign Language IV	1										
	Information, Data Science Courses		2	(Note3)	2	Required									
	Area Courses		9	(Note4)	1 or 2	Elective/ Required									
	Health and Sports Courses		2	(Note5)	1 or 2	Elective Required									
	Foundation Courses			14	Basic Calculus or Elements of Calculus (Note6)	2	Required								
					Organic Chemistry	2									
					Species Biology	2									
					Cell Science	2									
					General Chemistry or Basic Concepts of Chemistry (Note7)	2									
					4 subjects from	1 for	Elective								

		“Experimental Methods and Laboratory Work in Physics I”, “Experimental Methods and Laboratory Work in Physics II”, “Experimental Methods and Laboratory Work in Chemistry I”, “Experimental Methods and Laboratory Work in Chemistry II”, “Experimental Methods and Laboratory Work in Biology I”, “Experimental Methods and Laboratory Work in Biology II”(Note8)	each subject	Required									
Total	44												

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: For the information, Data Science subject, it is required to take the subject "Elements of Information Literacy" that is provided in the first semester in the first year. Only when failing to earn the credit for "Elements of Information Literacy," is it allowed to take the subject "Exercise in Information Literacy" that is provided in the second semester in the first year.

Note 4: 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 5: For health & sports subjects, it is recommended to take a practicum in sports.

Note 6: Students who studied Mathematics III in high school are required to take the subject "Basic Calculus." Students who did not study Mathematics III in high school are required to take the subject "Elements of Calculus."

Note 7: Students who did not take chemistry subjects in the entrance exam (including the University Testing Center Examination) are required to take the subject "Basic Concepts of Chemistry." For those students, the credit for the subject "General Chemistry" is not accepted for graduation.

For students who take chemistry subjects, the credit for the subject "Basic Concepts of Chemistry" is not

accepted for graduation.

Note 8: It is required to select two combinations of subjects from the following to earn credits for them: "Experimental Methods and Laboratory Work in Physics I" and "Experimental Methods and Laboratory Work in Physics II"; "Experimental Methods and Laboratory Work in Chemistry I" and "Experimental Methods and Laboratory Work in Chemistry II"; and "Experimental Methods and Laboratory Work in Biology I" and "Experimental Methods and Laboratory Work in Biology II."

Type	Subject type	Required No. of credits	Class subjects	No. of credits	Year in which the subject is taken								
					1 st grade		2 nd grade		3 rd grade		4 th grade		
					Springs	Fall	Springs	Fall	Springs	Fall	Springs	Fall	
		24	Introduction to Applied Biological Sciences	2									
			Introduction to Microbiology	2									
			Introduction to Molecular Biochemistry	2									
			Agricultural Production Resources	2									
			Physics for Applied Biological Science	2									
			Ethics of Science and Technology	2									
			Statistics in Biology	2									
			Environmental Sciences for Bioproduction	2									
			Laboratory Work in General Biology I	1									
			Laboratory Work in General Biology II	1									
			Laboratory Work in General Chemistry	1									
			Laboratory Work in General Physics	1									
			Required Subjects: Total 20 credits										

			Seminar in Field Science	2								
			Research Front of									
			Applied Biological	2								
			Sciences									
			Introduction to	2								
			Physiology									
			Public Health	2								
			Elective Required Subjects									
			Take 4 credits from above subjects									
			(Redundant credits over 4 credits move to Elective Subjects in each Program)									

Table of Registration Standards(Specialized Subjects)

Applied Animal and Plant Science Program

Type	Subject type	Required No. of credits	Class subjects	No. of credits	Year in which the subject is taken							
					1 st grade		2 nd grade		3 rd grade		4 th grade	
					Springs	Fall	Springs	Fall	Springs	Fall	Springs	Fall
Specialized Subjects	Specialized Subjects	56	Plant Nutritional Physiology	2								
			Agricultural Soil Science	2								
			Animal Breeding and Genetics	2								
			Animal Nutrition	2								
			Animal Functional Anatomy	2								
			Introduction to Applied Animal and Plant Science	2								
			Laboratory and Field Works in Applied Animal and Plant Science	1								
			Laboratory and Field Works in Animal Production I	1								
			Reading of Foreign Literature in Applied Animal and Plant Science	2								
			Reproductive Biology	2								
			Production System in Livestock	2								
			Laboratory and Field Works in Plant Production	1								
			Laboratory and Field Works in Animal Production II	1								
			Farm Practice	1								
			Graduation Thesis I	2								
			Graduation Thesis II	2								
			Graduation Thesis III	2								
			29credits									
			Agricultural Plant Production and Biotechnology	2								
			Animal Welfare	2								
			Animal Physiology and Production	2								
			Grassland and Feed Science	2								
			Plant Molecular Biology	1								
			Training for Animal Food Processing	2								
			Seminar in Dairy Field Science	1								
			Topics in Applied Animal and Plant Science I	2								
			Food Hygiene	2								
			Food Biochemistry	2								

			Environmental Animal Physiology Topics in Applied Animal and Plant Science II Topics in Applied Animal and Plant Science III								
			Elective Required Subjects: Take 14 credits from above subjects (Redundant credits over 14 credits move to Elective Subjects)								
			Elective Subjects At least 13 credits must be obtained. Specialized subjects from other Applied Biological Science programs can be included in the elective subjects. Up to 10 credits obtained from specialized subjects at another School and from subjects offered by the AIMS Program completed at the dispatch destination can be included in the credits required for graduation. Credits obtained from Liberal Arts Education Subjects and subjects related to the teaching progression <u>(?program?)</u> cannot be included in the credits required for graduation.								
		124									

[Credits required for graduation] 124 credits (44 credits for liberal arts education subjects + 24 credits for specialized fundamental subjects + 56 credits for specialized subjects)

Results of study in Applied Animal and Plant Science Program

Relation between evaluation items and evaluation criteria

Study achievement			Evaluation criteria			
Evaluation items			Excellent	Very Good	Good	
Knowledge & understanding	(1)	Ability for comprehensive and cross-disciplinary thinking and knowledge / understandings required to see a phenomena from a broad, top-down perspective and to take action for solving problems regarding the specialized area.	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.	
	(2)	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 associating it with items related to other areas.	Has fundamental knowledge and profound understanding required for acquiring expertise, and is capable of sufficiently explaining this knowledge while associating it with items related to other areas.	Has fundamental knowledge and profound understanding required for acquiring expertise, and is capable of providing basic explanation of this knowledge while associating it with items related to other areas.	
	(3)	Knowledge and understanding regarding natural phenomena related to animal and plant production in levels of molecule, cell, and individual organism and production environment that supports the phenomena	Capable of providing detailed explanation regarding natural phenomena related to animal and plant production in levels of molecule, cell, and individual organism and production environment that supports the phenomena.	Capable of providing explanation regarding natural phenomena related to animal and plant production in levels of molecule, cell, and individual organism and production environment that supports the phenomena.	Capable of providing basic explanation regarding natural phenomena related to animal and plant production in levels of molecule, cell, and individual organism and production environment that supports the phenomena.	
	(4)	Knowledge and understanding regarding the mechanism of animal and plant production in fields and relation between animals and the human society and natural environment.	Sufficiently understands the mechanism of animal and plant production in fields and relation between animals and the human society and natural environment.	Understands the mechanism of animal and plant production in fields and relation between animals and the human society and natural environment.	Substantially understands the mechanism of animal and plant production in fields and relation between animals and the human society and natural environment.	
	(1)	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.	

(2) 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.
(3) Ability for basic biological analysis and evaluation regarding production function of animals and plants in levels of molecule, cell, and individual organism			

c a p a b i l i	n s i v e (1)	Ability to identify issues that he/she should pursue for a specific phenomenon related to animal and plant production, organize his/her own opinion, logically publish them orally and/or in writing, and discuss the topic	Has advanced capabilities regarding elements of comprehensive ability and skills for such as identification of targeted issues, information processing, statistical analysis, and responsive communication.	Has capabilities regarding elements of comprehensive ability and skills for such as identification of targeted issues, information processing, statistical analysis, and responsive communication.	Has basic capabilities regarding elements of comprehensive ability and skills for such as identification of targeted issues, information processing, statistical analysis, and responsive communication.
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Role of liberal arts education in this program

The liberal arts education in this program aims to build both the language skills and the academic foundation required for the specialized education. It develops not only a capability for studying autonomously and a scientific intelligence based on the ability to collect, analyze and criticize data, but also language skills that allow the student to exchange ideas with others in English. Also, it enhances insight from a broad perspective for the essentials and the background of phenomena, and the linguistic ability and concern for peace which are required for a citizen of the world. It enables students to acquire the ability to integrate findings and establish a "knowledge system" that is really useful for problem solving, and to examine phenomena using a top-down perspective based on this integrated knowledge.

Relation between evaluation items and class subjects

[illegible]

[illegible]

Specialized subjects	Laboratory and Field Works in Applied Animal and Plant Science	1	Required	4th semester					10	1						30	1	30	1	30	1					100	
Specialized subjects	Laboratory and Field Works in Animal Production I	1	Required	4th semester					10	1				5	3	75	1							10	1	100	
Specialized subjects	Reading of Foreign Literature in Applied Animal and Plant Science	2	Required	5th semester								50	1									50	1			100	
Specialized subjects	Reproductive Biology	2	Required	5th semester					80	1	10	1												10	1	100	
Specialized subjects	Production System in Livestock	2	Required	5th semester					10	1	80	1												10	1	100	
Specialized subjects	Laboratory and Field Works in Plant Production	1	Required	5th semester					10	1						30	1	30	1	30	1					100	
Specialized subjects	Laboratory and Field Works in Animal Production II	1	Required	5th semester					10	1								75	1	5	3			10	1	100	
Specialized subjects	Farm Practice	1	Required	5th semester							10	1						10	3	70	1			10	1	100	
Specialized subjects	Agricultural Plant Production and Biotechnology	2	Elective required	5th semester					80	1	20	1														100	
Specialized subjects	Animal Welfare	2	Elective required	5th semester	10	3					80	1												10	1	100	
Specialized subjects	Animal Physiology and Production	2	Elective required	5th semester					20	1	70	1												10	1	100	
Specialized subjects	Grassland and Feed Science	2	Elective required	5th semester					10	1	80	1												10	1	100	
Specialized subjects	Plant Molecular Biology	2	Elective required	5th semester					90	1	10	1														100	
Specialized subjects	Training for Animal Food Processing	1	Elective required	5th semester							80	1		20	1											100	
Specialized subjects	Seminar in Dairy Field Science	2	Elective required	5th semester							10	1						10	3	70	1			10	1	100	
Specialized subjects	Topics in Applied Animal and Plant Science I	1	Elective required	5th semester					20	1	80	1														100	
Specialized subjects	Food Hygiene	2	Elective required	6th semester	10	1	10	1	10	1	70	1														100	
Specialized subjects	Food Biochemistry	2	Elective required	6th semester					80	1	10	1												10	1	100	
Specialized subjects	Environmental Animal Physiology	2	Elective required	6th semester					10	1	80	1												10	1	100	
Specialized subjects	Topics in Applied Animal and Plant Science II	1	Elective required	6th semester					20	1	80	1														100	
Specialized subjects	Topics in Applied Animal and Plant Science III	1	Elective required	6th semester					20	1	80	1														100	
Specialized subjects	Graduate Thesis I -III	6	Required	6th-8th semester	10	3	5	3					5	3	5	3							10	3	65	10	100

Attachment 4

Curriculum map for Applied Animal and Plant Science Program

Study achievementStudy achievement		1st year		2nd year		3rd year		4th year		
		1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester	7th semester	8th semester	
①Knowledge and understanding required to see a phenomenon from a broad, top-down perspective and for action based on comprehensive and cross-disciplinary thinking		Peace Science Courses (◎)	Research Front of Applied Biological Sciences (○)			Animal Welfare (○)	Graduate Thesis I (◎)	Graduate Thesis II (◎)	Graduate Thesis III (◎)	
		Seminar for developing intelligence (◎)	Ethics of Science and Technology(◎)		Introduction to Applied Animal and Plant Science (◎)		Public Health(○)			
		Introduction to University Education (◎)	Agricultural Production Resources(◎)				Food Hygiene (○)			
		Introduction to Applied Biological Science(◎)	Seminar in Field Science(○)							
		Area Courses subjects (○)								

Basic Calculus / Elements of Calculus (◎)	Organic Chemistry (◎)	Statistics in Biology (◎)	Introduction to Applied Animal and Plant Science (◎)
General Chemistry / Basic Concepts of Chemistry (◎)	Cell Science (◎)	Introduction to Physiology (○)	
Introduction to Applied Biological Science(◎)	Species Biology (◎)		
Introduction to Microbiology (◎)	Research Front of Applied Biological Sciences (○)	Environmental	

Graduate Thesis I (◎)	Graduate Thesis II (◎)	Graduate Thesis III (◎)
Public Health(○)		

Knowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understandingKnowledge & understanding	③Knowledge and understanding regarding natural phenomena related to animal and plant production in levels of molecule, cell, and individual organism and production environment that supports the phenomena	Introduction to Applied Biological Science(◎)	Research Front of Applied Biological Sciences (○)	Introduction to Physiology (○)	Plant Nutritional Physiology (◎)	Reproductive Biology (◎)	Food Hygiene (○)		
		Introduction to Microbiology (◎)	Physics for Applied Biological Science(◎)	Environmental Sciences for Bioproduction(◎)	Agricultural Soil Science (◎)	Production System in Livestock (◎)	Food Biochemistry (○)		
			Introduction to Molecular Biochemistry(◎)		Animal Breeding and Genetics (◎)	Laboratory and Field Works in Plant Production (◎)	Environmental Animal Physiology (○)		
					Animal Nutrition (◎)	Laboratory and Field Works in Animal Production II (◎)	Topics in Applied Animal and Plant Science II (○)		
					Animal Functional Anatomy (◎)	Agricultural Plant Production and Biotechnology (○)	Topics in Applied Animal and Plant Science III (○)		
					Introduction to Applied Animal and Plant Science (◎)	Animal Physiology and Production (○)			
					Laboratory and Field Works in Applied Animal and Plant Science (◎)	Grassland and Feed Science (○)			
						Plant Molecular Biology (○)			
						Topics in Applied Animal and Plant Science I (○)			

④Knowledge and understanding regarding the mechanism of animal and plant production in fields and relation between animals and the human society and natural environment.	Introduction to Applied Biological Science(◎)	Research Front of Applied Biological Sciences (○)	Introduction to Physiology (○)	Plant Nutritional Physiology (◎)	Reproductive Biology (◎)	Public Health(○)		
		Ethics of Science and Technology(◎)	Environmental Sciences for Bioproduction(◎)	Agricultural Soil Science (◎)	Production System in Livestock (◎)	Food Hygiene (○)		
		Agricultural Production Resources(◎)		Animal Breeding and Genetics (◎)	Farm Practice (◎)	Food Biochemistry (○)		
		Seminar in Field Science (○)		Animal Nutrition (◎)	Agricultural Plant Production and Biotechnology (○)	Environmental Animal Physiology (○)		
				Animal Functional Anatomy (◎)	Animal Welfare (○)	Topics in Applied Animal and Plant Science II (○)		
				Introduction to Applied Animal and Plant Science (◎)	Animal Physiology and Production (○)	Topics in Applied Animal and Plant Science III (○)		
					Grassland and Feed Science (○)			
					Plant Molecular Biology (○)			
					Topics in Applied Animal and Plant Science I (○)			

Ability & skills	①Basic communication, information processing, and physical activities	Foreign Languages (○)(◎)		Statistics in Biology (◎)		Seminar in Dairy Field Science (○)	Graduate Thesis I (◎)	Graduate Thesis II (◎)	Graduate Thesis III (◎)
		Information Courses (◎)							
		Health and Sports Courses (○)							
	②Basic experiment abilities and skills required for acquiring expertise	"Experimental Methods and Laboratory Work in Physics I" and "Experimental Methods and Laboratory Work in Physics II" (○)"Experimental Methods and Laboratory Work in Physics I" and "Experimental Methods and Laboratory Work in Physics II" (○)			Laboratory and Field Works in Animal Production I (◎)	Training for Animal Food Processing (○)	Graduate Thesis I (◎)	Graduate Thesis II (◎)	Graduate Thesis III (◎)
		"Experimental Methods and Laboratory Work in Chemistry I" and "Experimental Methods and Laboratory Work in Chemistry II" (○)"Experimental Methods and Laboratory Work in Chemistry I" and "Experimental Methods and Laboratory Work in Chemistry II" (○)							
		"Experimental Methods and Laboratory Work in Biology I" and "Experimental Methods and Laboratory Work in Biology II" (○)"Experimental Methods and Laboratory Work in Biology I" and "Experimental Methods and Laboratory Work in Biology II" (○)							
			Seminar in Field Science (○)	Statistics in Biology (◎)					
				Laboratory Work in General Biology I & II (◎)					
				Laboratory Work in General Chemistry (◎)					
				Laboratory Work in General Physics (◎)					
	③Ability for basic biological analysis and evaluation regarding production function of animals and plants in levels of molecule, cell, and individual organism				Laboratory and Field Works in Applied Animal and Plant Science (◎)	Laboratory and Field Works in Plant Production (◎)			
					Laboratory and Field Works in Animal Production I (◎)				

④Basic techniques for handling and testing of animals and plants and those for breeding, cultivation, and management				Laboratory and Field Works in Applied Animal and Plant Science (◎)	Laboratory and Field Works in Plant Production (◎)			
					Laboratory and Field Works in Animal Production II (◎)			
					Farm Practice (◎)			
					Seminar in Dairy Field Science (○)			
⑤Ability for basic evaluation of breeding environment in fields of animal and plant production				Laboratory and Field Works in Applied Animal and Plant Science (◎)	Laboratory and Field Works in Plant Production (◎)			
					Laboratory and Field Works in Animal Production II (◎)			
					Farm Practice (◎)			
					Seminar in Dairy Field Science (○)			
⑥Ability regarding scientific English that is required as a basis for understanding technical English manuals and international communication capabilities based on the acquired knowledge and approach method for the field					Reading of Foreign Literature in Applied Animal and Plant Science	Graduate Thesis I (◎)	Graduate Thesis II (◎)	Graduate Thesis III (◎)



List of Faculty Members of the Applied Animal and Plant Science Program

Name of faculty	Name of program and position	Extension number	Laboratory	Mail address
Taketo Obitsu	Professor	7955	B509	tobitsu@hiroshima-u.ac.jp
Hirofumi Saneoka	Professor	7917	B111	saneoka@hiroshima-u.ac.jp
Hajime Tanida	Professor	7974	Farm	htanida@hiroshima-u.ac.jp
Masaoki Tudzuki	Professor	7950	B416	tsudzuki@hiroshima-u.ac.jp
Rumi Tominaga	Professor	7966	B105-2	rtomi@hiroshima-u.ac.jp
Takashi Bungo	Professor	7957	B505	