



Attachment Form 1

Description of Major Program

Name of Faculty (Department) [School of Applied Biological Science (Department of Applied Biological Science)]

Name of Program	Food Science Program
1. Degree to be obtained: Bachelor of Agriculture	
<p>2. Overview</p> <p>The School of Applied Biological Science aims to educate students to acquire a wide range of knowledge and understanding in the realms of the natural and social sciences related to applied biology. Specifically, we provide food material such as production management and distribution, manufacture and processing, food safety, nutrition, living body control function, palatability, physical characteristics, and new effective use. Students are allowed to study food science from the basics to the application while experiencing the cutting edge of findings through this program.</p> <p>From the viewpoint described above, this program aims to provide general education regarding the fundamental knowledge and technologies related to the production management and distribution of food, function evaluation and advanced use of food material, and production and development of safe food with high quality and functionality to develop human resources who can contribute to the creation of rich and healthy dietary life from a wide point of view.</p> <p>This Program educates students to become an expert who have acquired higher level of expertise in the graduate school after this program or a research worker and a specialist with an international point of view in such as a public office for agriculture and fisheries or in business fields related to agriculture, foods, and chemical and pharmaceutical products.</p>	
<p>3. Diploma policy (policy for degree conferment and target to be achieved in the program)</p> <p>The Food Science Program aims to provide general education regarding the fundamental knowledge and technologies related to the production management and distribution of food, function evaluation and advanced use of food material, and production and development of safe food with high quality and functionality to develop human resources who can be engaged in the creation of rich and healthy dietary life from a wide point of view. Therefore, in this program, the degree of Bachelor of Agriculture will be awarded to students who acquire the capabilities described below, earn the required credits and to satisfy the specified achievement level, and pass the examination that is administered by the School of Applied Biological Science.</p> <p>Through liberal arts education subjects:</p> <p>(1) The ability to study autonomously; the ability to collect, analyze, and criticize data; and putting these abilities into practice;</p> <p>(2) Insight, from a broad perspective, into the essentials and the background of phenomena, and the linguistic ability</p>	

and concern about peace which are required for a citizen of the world;

- (3) The ability to identify a problem based on broad knowledge, integrate findings to establish a "knowledge system" that is really useful for problem solving, and examine phenomena from a top-down perspective based on this integrated knowledge; and
- (4) General and basic knowledge of science that enables the student to develop the knowledge and skills required for application in any of the specialty fields of applied biological science.

Through the specialized fundamental subjects for specialized education, the student is required to acquire:

- (5) The ability to understand cutting-edge topics, as well as the basic ideas related to organisms and the biosphere;
- (6) The ability to understand the value orientation and relevance to a globalized society of applied biology, and the importance of communication and consensus building in relation to the application of scientific results; and
- (7) Understanding of problems regarding research misconduct and the importance of research and engineering ethics.

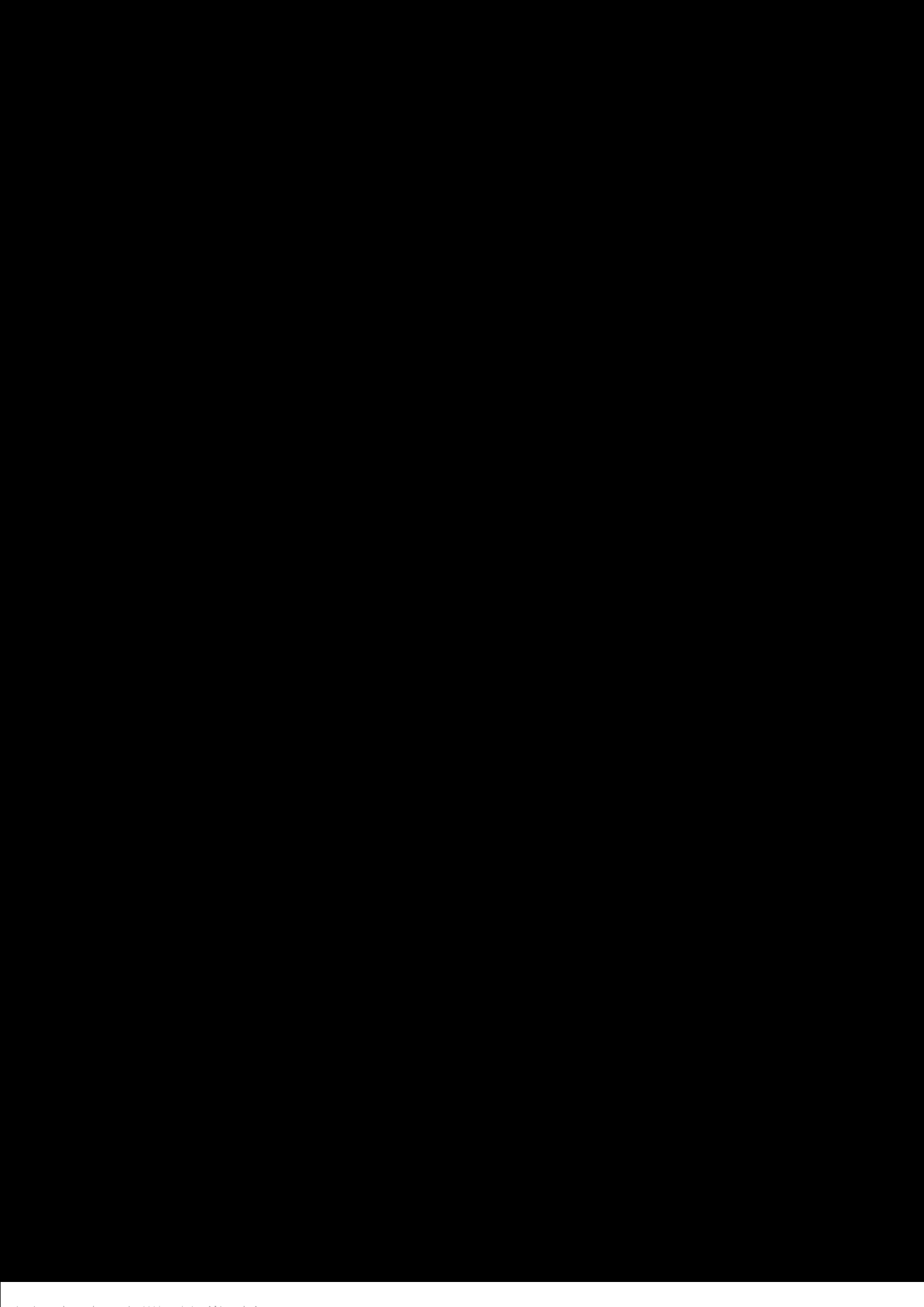
Through the specialized education in this program, the student is required to acquire:

- (8) Has acquired professional knowledge regarding production management and distribution of food and be capable of generally considering measures for ensuring stable supply of safe food.
- (9) Has acquired professional knowledge and general skills regarding manufacture and processing of food and be capable of understanding practical measures for converting food material to safe food with high quality and functionality.
- (10) Has acquired basic and professional knowledge and skills regarding evaluation and regulation of safety, nutrition, palatability, living body control function, and physical characteristics and new effective use and be capable of exercising them.
- (11) Has comprehensively learned the flow from the production of food to the consumption by consumers to understand it as a unified system. The student is also acquired to become capable 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 other persons.

#### 4. Curriculum policy (policy for arranging and executing the educational courses)

To enable students to achieve the targets that are defined for the Food Science Program, the educational courses are organized and executed according to the following policies:

- (1) Courses in the liberal arts education aim to develop a



## 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

The evaluation criteria are specified for each academic achievement evaluation item, and the achievement level against the criteria is determined at the end of the semester.

The evaluation score for each evaluation item is converted to a numerical value (S = 4, A = 3, B = 2, and C = 1), and the evaluation standard for academic achievement, from when the student entered the university to the end of the semester, is determined using these values while applying weightings. The evaluation standards consist of three

levels, i.e. Excellent, Very Good, and Good.

Study achievement	Evaluation standard
Excellent	3.00 - 4.00
Very Good	2.00 - 2.99
Good	1.00 - 1.99

Students are evaluated in the thesis examination.

(3) Timing and method for determining the supervisor

- ① The supervisor is determined in the 2nd semester of the 3rd academic year.
- ② The supervisor is determined under the guidance of the tutor. The tutor holds a guidance seminar for students to explain the specialties of each member of faculty. The tutor also instructs students to attend the presentation assembly for graduation theses and Masters theses in order to understand the details of research done by faculty members. Students visit a faculty member who he/she wants to choose as supervisor, and learn about the details of the graduation thesis and environment of the laboratory. Supervisors are designated after the tutor considers students' wishes and makes adjustments. Then the faculty committee of the program approves the designated supervisors.

10 Responsibility

(1) Responsibility for PDCA (plan, do, check, and act) cycle

- ① The education affairs committee of school and the faculty members who provide the lectures are engaged in the processes of "plan" and "do"
- ② The faculty committee of the program plans and executes the major program on their own responsibility. A chief faculty member is designated as the supervisor of the program.
- ③ The education affairs committee of the school exercises control over the major programs provided in the school.
- ④ The education affairs committee of the department consists of members who are elected for each program, a chairman who is chosen by the school, and another member.
- ⑤ The education reform promotion committee is engaged in the process of "check."
- ⑥ The education reform promotion committee consists of members who are elected in each program, a chairman who is chosen by the school, the chairman of the education affairs committee of the school, an assistant chief of the graduate course, and the other member(s).
- ⑦ The education reform promotion committee reviews and evaluates the major programs provided in each program, reports the results to the education affairs committee of the school and the programs, and provides advice and recommendations.
- ⑧ The faculty committee of the program that takes the responsibility for execution of the major program is engaged in the process of "act."
- ⑨ The faculty committee of the program and the education affairs committee of the school prepare and execute a plan for improvement taking the report, advice, and recommendations that are provided by the education reform promotion committee after the check process into consideration.
- ⑩ A tutor is designated for each program to provide direction regarding study and life.
- ⑪ A supervisor is designated in to each student in the program to provide guidance regarding the graduation thesis. The mentor guides the students through the process of the graduation research until they graduate. The faculty committee of the program, the education affairs committee of the school, and the education reform promotion committee cooperate with each other to execute their roles with responsibility in the cycle of "plan", "do", "check", and "act" to improve the education provided at the school.

(2) Evaluation of program

① Viewpoints for evaluation of program

The Food Program is evaluated from the viewpoints of "educational effectiveness" and "social effectiveness."

The "educational effectiveness" is evaluated by effects of the program execution on educational achievement in students.

The "social effectiveness" is evaluated by effects of the educational achievement in the program on the society.

② Evaluation method

In this program, the achievement in the program is evaluated from the viewpoints described above for students in the second semester of the fourth year. For the "educational effectiveness", the results and achievement of the students who took the program are evaluated comprehensively by the group of faculty members who are engaged in the execution of the program. Also, the level of achievement of all the students is evaluated and reviewed. The "social effectiveness" is evaluated based on such things as the rate of employment in corporations that have a close connection with the contents of this program and the pass rate in public servant examinations. We regularly request a human resources staff member of a company that employs mainly students of this program to evaluate this program. In addition to that, we request graduates of this program to evaluate both their own achievement and that of the program. The staff in the company and graduates are requested to provide evaluation and advice regarding whether the class subjects and their contents in this program were effective for social activities, whether the contents of class appropriately corresponded to the changes in science, technology, and society, and any class subjects that would be required for the future.

③ Policy and method for feedback to students

The education reform promotion committee regularly conducts inquiries and interviews for students to review and evaluate the program, improve the contents of the program, and provide advice and recommendations for improvement.



		“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 <sup>st</sup> grade		2 <sup>nd</sup> grade		3 <sup>rd</sup> grade		4 <sup>th</sup> 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 Sciences	2								
			Introduction to Physiology	2								
			Public Health	2								
			Elective Required Subjects Take 4 credits from above subjects (Redundant credits over 4 credits move to Elective Subjects in each Program)									



			Genome Science I	2				<input type="radio"/>	
			Genome Science II	2				<input type="radio"/>	
			Molecular Cell Biology	2				<input type="radio"/>	
			Animal Nutrition	2				<input type="radio"/>	
			Plant Nutritional Physiology	2				<input type="radio"/>	
			<p style="text-align: center;">Elective Subjects                      credits must be obtained.</p> <ul style="list-style-type: none"> <li>• Specialized subjects from other Applied Biological Science programs can be included in the elective subjects.</li> <li>• Up to 12credits 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.</li> <li>• Credits obtained from Liberal Arts Education Subjects and subjects related to the teaching profession cannot be included in the credits required for graduation.</li> </ul>						
		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 Food Science Program

## Relation between evaluation items and evaluation criteria

	Excellent	Very Good	Good
(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) Basic knowledge of such as chemistry, biology, biochemistry, microbiology, physics, and mathematics required for understanding food science.	Capable of sufficiently applying the basic knowledge of such as chemistry, biology, biochemistry, microbiology, physics, and mathematics required for understanding food science.	Capable of applying the basic knowledge of such as chemistry, biology, biochemistry, microbiology, physics, and mathematics required for understanding food science.	Capable of generally applying the basic knowledge of such as chemistry, biology, biochemistry, microbiology, physics, and mathematics required for understanding food science.
(4) Expertise regarding methods for identifying the mechanism of function expression in food and food material and for application of the function.	Capable of providing practical explanation regarding methods for identifying the mechanism of function expression in food and food material and application of the function while associating it with knowledge of the other items.	Capable of providing explanation regarding methods for identifying the mechanism of function expression in food and food material and application of the function while associating it with knowledge of the other items.	Capable of providing basic explanation regarding methods for identifying the mechanism of function expression in food and food material and application of the function while associating it with knowledge of the other items.

u i n g	(6)	Expertise regarding production management and distribution of foods	Capable of providing practical explanation regarding production management and distribution of foods while associating it with knowledge of the other items.	Capable of providing explanation regarding production management and distribution of foods while associating it with knowledge of the other items.	Capable of providing explanation regarding production management and distribution of foods.
	(7)	Expertise regarding food processing technologies and development of useful materials.	Capable of providing practical explanation regarding food processing technologies and development of useful materials while associating it with knowledge of the other items.	Capable of providing explanation regarding food processing technologies and development of useful materials while associating it with knowledge in other fields.	Capable of providing basic explanation regarding food processing technologies and development of useful materials.
A b i l i t i e s &	(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.
S k i l l s	(3)	Basic techniques and methodologies for handling foods and food materials, ability to understand various phenomena regarding foods from scientific points of view, and capability of organizing the study result in a report	Has sufficiently and profoundly acquired basic techniques, methodologies, and understanding and is capable of sufficiently applying them. Also capable of logically organizing the result of research in a report and discussing it with others.	Has sufficiently acquired basic techniques, methodologies, and understanding and is capable of sufficiently applying them. Also capable of logically organizing the result of research in a report.	Has substantially acquired basic techniques, methodologies, and understanding and is capable of generally applying them. Also capable of organizing the result of research in a report.
	(4)	Acquisition of techniques for production of foods from marine and animal resources and capability of consideration of practical measures for conversion to safe and highly functional foods	Has sufficiently acquired techniques and knowledge regarding production of foods from marine and animal resources and is capable of fully considering practical measures.	Has acquired techniques and knowledge regarding production of foods from marine and animal resources and is capable of considering practical measures.	Has generally acquired techniques and knowledge regarding production of foods from marine and animal resources and is capable of considering practical measures.
	(5)	Capable of organizing and considering own issues to explore in the fields of food science from a social point of view based on experience of such as observation of a food manufacturing scene	Capable of applying findings and knowledge obtained in the observation of a food factory, lecture, and experiment to be conscious of the connection to the society and organizing and considering own issues to explore in the fields of food science by actively comparing the experience to that in the lecture and experiment in the university.	Capable of applying findings and knowledge obtained in the observation of a food factory, lecture, and experiment to be conscious of the connection to the society and organizing and considering own issues to explore in the fields of food science based on the experience.	Capable of applying findings and knowledge obtained in the observation of a food factory, lecture, and experiment to be conscious of the connection to the society and identifying own issues to explore in the fields of food science.



(6)	Ability to read and understand technical explanations and basic reading capabilities of scientific English	Capable of reading English texts and understanding technical explanations	Has a basic ability for reading English texts and capable of understanding technical explanations to some extent.	Has a basic ability for reading English texts and capable of partly understanding technical explanations
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& u n d e r s t a n d i n g							
	Expertise regarding methods for identifying the mechanism of function expression in food and food material and for application of the function.						

Expertise and ethics of science and technology regarding analysis and evaluation methods for safety of food and food material.							
Expertise regarding production management and distribution of foods							
Expertise regarding food processing technologies and development of useful materials.							



A b i l i t i e	Basic ability in communication, information processing, and physical activities required for acquiring expertise						
	Basic experimentation 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" ( )					
		"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" ( )					
			Laboratory Work in General Biology I & II ( )				
			Laboratory Work in General Chemistry ( )				
			Laboratory Work in General Physics ( )				
	Basic techniques and methodologies for handling foods and food materials, ability to understand various phenomena regarding foods from scientific points of view, and capability of organizing the study result in a report						

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Acquisition of techniques for production of foods from marine and animal resources and capability of consideration of practical measures for conversion to safe and highly functional foods

Agricultural  
Production  
Resources( )

Capable of organizing and  
consideration of resources



	Ability to read and understand technical explanations and basic reading capabilities of scientific English							
e n s i v e  c a p								

(Example) Liberal arts subjects Specialized fundamental Specialized subjects Graduation thesis ( ) Required subjects ( ) Elective required ( ) Elective subjects

## List of Faculty Members of the Food Science Program

Name of faculty	Name of program and position	Extension number	Laboratory	Mail address
Manabu Asakawa	Professor	571.	A804	asakawa@hiroshima-u.ac.jp
Satoru Ueno	Professor	5712	A118	sueno@hiroshima-u.ac.jp
Tadashi Shimamoto	Professor	5675	A505	tadashis@hiroshima-u.ac.jp
Takuya Suzuki	Professor	5762	A808	takuya@hiroshima-u.ac.jp
Hiroyuki Nakano	Professor	570.	A514	hnakano@hiroshima-u.ac.jp
Yoshio Hagura	Professor	5716	A123	hagura@hiroshima-u.ac.jp
Kiyoshi Kawai	Professor	2144	A122	kawai@hiroshima-u.ac.jp
Kenji Hosono	Associate Professor	5737	B215	kjhosono@hiroshima-u.ac.jp
Makoto Hirayama	Associate Professor	5707	A805	hirayama@hiroshima-u.ac.jp
Hajime Kobayashi	Assistant Professor	574	B217	yount@hiroshima-u.ac.jp
Yoshinari Yamamoto	Assistant Professor	5710	A807	yamamo59@hiroshima-u.ac.jp
Thanutchaporn Kumrungsee	Associate Professor	2. 21	A617	kumrung@hiroshima-u.ac.jp
Yoko Tsurunaga	Visiting Professor			Class : Agricultural Products and Food Processing
Yagabe Takafumi	Visiting Professor			Class : Science and Technology for Food Development
	Visiting Professor			Class : Science and Technology for Food Development
	Visiting Professor			Class : Food Information Management, Food Production Process Management
	Visiting Associate Professor			Class : A

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