| 1 | | |
|---|--|--|

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

2.Overview

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 providÆ 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.

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.

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.

3. Diploma policy (policy for degree conferment and target to be achieved in the program)

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.

Through liberal arts education subjects:

- (1) The ability to study autonomously; the ability to collect, analyze, and criticize data; and putting these abilities into practice;
- (2) Insight, from a broad perspective, into the essentials and the background of phenomena, and the linguistic ability

lch ac

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

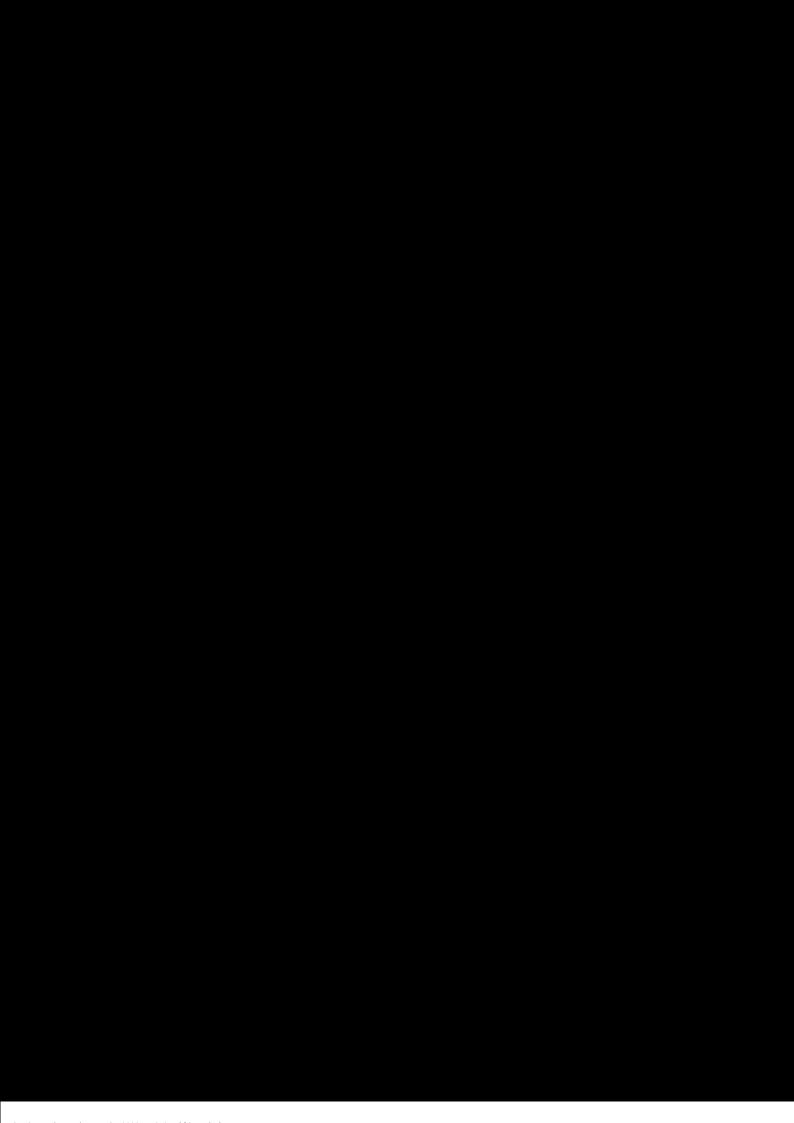
- (3) The ability to identify a problem based on broad knowledge, integrate findings to establish a "knowledge system" that is really useful for problem solving, and examine phenomena from a top-down perspective based on this integrated knowledge; and
- (4) General and basic knowledge of science that 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 aproximation airAn to dan P!p s (11) ed a y 1



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).
- 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.
- The faculty committee of the program that takes the responsibility for execution of the major program is engaged in the process of "act."
- 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.
- A tutor is designated for each program to provide direction regarding study and life.
- ① 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.

| | | | | | | | | | | Year | in wh | ich th | e subje | ect is t | aken | | | |
|------------------------|------------------|-------------------------------|-----------------|------------------------------------|----------------------------|---|----------------|-----------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------|------|--|--|
| | Subject type | | | Required | | | Type of | 1 st g | rade | 2 nd g | rade | 3 rd g | rade | 4 th g | rade | | | |
| Type | | Su | bject t | type | No. of credits | Class subjects | No. of credits | course registration | Springs | Fall | Springs | Fall | Springs | Fall | Springs | Fall | | |
| | Pea | ace S | cience | Courses | 2 | | 2 | Required | | | | | | | | | | |
| | Basic Courses in | | oduct for Fi | ory Seminar irst-Year idents | 2 | Introductory Seminar for First-Year Students | 2 | Required | | | | | | | | | | |
| | Basic | Uni | | uction to y Education | 2 | Introduction to University Education | 2 | Required | | | | | | | | | | |
| | | | | Basic | | Communication Basic I | 1 | | | | | | | | | | | |
| | | | te2) | English Usage | 2 | Communication Basic II | 1 | Required | | | | | | | | | | |
| | | | h(Nc | Communic | 2 | Communication I A | 1 | Required | | | | | | | | | | |
| | | | English(Note2) | ation I | 2 | Communication I B | 1 | Required | | | | | | | | | | |
| | | ses | Eı | Communic | 2 | Communication II A | 1 | Required | | | | | | | | | | |
| | | ıgnaş | | ation II | _ | Communication II B 1 | | | | | | | | | | | | |
| | cts | Foreign Languages | 3.7 | F 11.1 | | Basic Foreign Language I | 1 | | | | | | | | | | | |
| ıtion | Common Subjects | Non-English Foreign Languages | | | Basic Foreign Language II | 1 | Elective | | | | | | | | | | | |
| ts Educa | Commo | | (Sele | ct one | 4 | Basic Foreign Language III | 1 | Required | | | | | | | | | | |
| Liberal Arts Education | | | lar | iguage) | | Basic Foreign Language IV | 1 | | | | | | | | | | | |
| | | | | ation, Data e Courses | 2 | (Note3) | 2 | Required | | | | | | | | | | |
| | | | Area | Courses | 9 | (Note4) | 1 or 2 | Elective/ Required | | | | | | | | | | |
| | | Н | | and Sports | 2 | (Note5) | 1 or 2 | Elective Required | | | | | | | | | | |
| | | | Courses | | | Basic Calculus or Elements of Calculus (Note6) | 2 | | | | | | | | | | | |
| | | | | | Organic Chemistry | 2 | | | | | | | | | | | | |
| | 177 | Foundation Courses | 14 | Species Biology | 2 | Required | | | | | | | | | | | | |
| | F | | 14 | Cell Science | 2 | | | | | | | | | | | | | |
| | | | | General Chemistry or | | | | | | | | | | | | | | |
| | | | | Basic Concepts of | 2 | | | | | | | | | | | | | |
| | | | | | | | | Chemistry (Note7) | | | | | | | | | | |
| | | | | | | 4 subjects from | 1 for | Elective | | | | | | | | | | |

| | | "Experimental | each | Required | | | | |
|-------|----|--------------------|---------|----------|--|--|--|--|
| | | Methods and | subject | required | | | | |
| | | Laboratory Work in | subject | | | | | |
| | | 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) | | | | | | |
| 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 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 II" and "Experimental Methods and Laboratory Work in Biology II."

| | | | | | | Ye | ar in w | hich th | e subje | ct is tal | ken | |
|------|--------------|---|---------------------------|----------------|--------------------|------|-------------------|---------|-------------------|-----------|--------------------|------|
| | | Required | | | 1 st gr | rade | 2 nd g | rade | 3 rd g | rade | 4 th gr | 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 | | | | | | | | |
| | | | Resources | | | | | | | | | |
| | | | Physics for Applied | 2 | | | | | | | | |
| | | | Biological Science | | | | | | | | | ļ |
| | | | Ethics of Science and | 2 | | | | | | | | |
| | | 24 | Technology | | | | | | | | | ļ |
| | | | Statistics in Biology | 2 | | | | | | | | |
| | | | Environmental Sciences | 2 | | | | | | | | |
| | | | for Bioproduction | | | | | | | | | |
| | | | Laboratory Work in | 1 | | | | | | | | |
| | | | General Biology I | | | | | | | | | |
| | | | Laboratory Work in | 1 | | | | | | | | |
| | | | General Biology II | | | | | | | | | |
| | | | Laboratory Work in 1 | | | | | | | | | |
| | | General Chemistry Laboratory Work in 1 | | | | | | | | | ļ | |
| | | | | 1 | | | | | | | | |
| | | General Physics | | | | | _ | | | | | |
| | | Required | | | | | | credit | S | | | |

| | Seminar in Field Science | 2 | | | | | | | | |
|--|---------------------------|------------|---------|--------|---------|------|---------|-------|--------|-----|
| | Research Front of | | | | | | | | | |
| | Applied Biological | 2 | | | | | | | | |
| | Sciences | | | | | | | | | |
| | Introduction to | 2 | | | | | | | | |
| | Physiology | | | | | | | | | |
| | Public Health | 2 | | | | | | | | |
| | | Elective | Requi | red Su | ibjects | ; | | | | |
| | Ta | ke 4 credi | ts fron | n abov | e subj | ects | | | | |
| | (Redundant credits over 4 | credits | move | to E | lective | Subj | ects in | each] | Progra | ım) |

Table of Registration Standards(Specialized Subjects)

Food Science Program

| | | | | | | Ye | ar in v | which t | he subj | ect is ta | aken | |
|----------------------|----------------------|----------|---|----------------|--------------------|-------|-------------------|---------|---------|-----------|-------------------|------|
| | | Required | | | 1 st gr | ade | 2 nd § | grade | 3rd g | grade | 4 th g | rade |
| Type | Subject type | No. of | Class subjects | No. of credits | SS | | SS | | SS | | ss | |
| | | credits | | creation | Springs | Fall | Springs | Fall | Springs | Fall | Springs | Fall |
| | | | Food Biochemistry | 2 | | | | 0 | | | | |
| | | | Applied Biophysics | 2 | | | | 0 | | | | |
| | | | Food Engineering | 2 | | | | 0 | | | | |
| | | | Food Hygiene | 2 | | | | 0 | | | | |
| | | | Seafood Chemistry and Biochemistry | 2 | | | | 0 | | | | |
| | | | Food Production Management | 2 | | | | 0 | | | | |
| | | | Laboratory Work in Applied Biophysics | 1 | | | | 0 | | | | |
| | | | Laboratory Works in Food Engineering | 1 | | | | 0 | | | | |
| | | | Laboratory Work in Food Hygiene | 1 | | | | 0 | | | | |
| | | | Nutrition | 2 | | | | | 0 | | | |
| | | | Laboratory Work in Food Chemistry | 1 | | | | | 0 | | | |
| | | | Laboratory Work in Marine Bioresources | 1 | | | | | 0 | | | |
| | | | Chemistry | | | | | | | | | |
| | | | Laboratory work in Nutritional Biochemistry | 1 | | | | | 0 | | | |
| | | | Field Works of Food Production | 1 | | | | | 0 | | | |
| | | | Management | | | | | | | | | |
| cts | cts | | Reading of Foreign Literature in Food | 2 | | | | 0 | | | | |
| ubje | ejqn | | Science | | | | | | | | | |
| S pe | Spa | 56 | Graduation Thesis I | 2 | | | | | | 0 | | |
| ializ | ializ | | Graduation Thesis II | 2 | | | | | | | 0 | |
| Specialized Subjects | Specialized Subjects | | Graduation Thesis III | 2 | | | | | | | | 0 |
| | 51 | | | <u> </u> | 29 | 9 cre | dits | : | 1 | | | |
| | | | Science and Technology for Food | 2 | | | | 0 | | | | |
| | | | Development Final Function (Functional Food Science) | 2 | | | | | 0 | | | |
| | | | Food Function (Functional Food Science) | 2 | | | | | 0 | | | |
| | | | Food Physical Property Science Food Microbiology | 2 2 | | | | | 0 | | | |
| | | | Bioresource Utilization Science | 2 | | | | | 0 | | | |
| | | | Food System | 2 | | | | | 0 | | | |
| | | | Agricultural Products and Food Processing | 2 | | | | | 0 | | | |
| | | | Training for Marine Food Processing | 1 | | | | | 0 | | | |
| | | | Training for Animal Food Processing | 1 | | | | | 0 | | | |
| | | | Food Factor Inspection | 1 | | | | | 0 | | | |
| | | | Food Information Management | 1 | | | | | | | | |
| | | | Food Production Process Management | 1 | | | | | | | | |
| | | | | | | £ | - ol | | ioot- | | | |
| | | | Elective Required Subjects: | | | | | | - | | | |
| | | | (Redundant credits over 13 | credits in | iove to | Ele | cuve | subje | CIS) | | | |

| | Genome Science I | 2 | | | | |
|-----|--|-------------|-----------------|-----------------|---------------------|---------|
| | Genome Science II | 2 | | | | |
| | Molecular Cell Biology | 2 | | | | |
| | Animal Nutrition | 2 | | | | |
| | Plant Nutritional Physiology | 2 | | | | |
| | Elective Subjects | CI | edits must b | e obtained. | | |
| | Specialized subjects from other Applied Biologica | l Science | programs car | n be included | in the elective sub | jects. |
| | • Up to 12credits obtained from specialized subjects | at anothe | r School and | from subject | s offered by the A | IMS |
| | Program completed at the dispatch destination can | be includ | led in the cred | dits required t | for graduation. | |
| | Credits obtained from Liberal Arts Education Sub- | jects and s | subjects relate | ed to the teacl | hing profession car | nnot 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 Food Science Program

Relation between evaluation items and evaluation criteria

| | Excellent | Very Good | Good |
|---|--|---|---|
| Ability for comprehensive and cross- disciplinary thinking and knowledge / understandings required to see a phenomena | 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 | 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. |
| 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. |
| the mechanism of function expression in food and food material and for application of the function | function expression in food and food material and application of the function while associating it with | 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. | methods for identifying the mechanism of function |

| i n g | (6) | | 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. |
|----------------------------|-----|--|---|--|---|
| | | technologies and development of useful | 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. |
| | (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. | communication, information processing, and | Has basic ability in all the elements regarding communication, information processing, and physical activities required for acquiring expertise. |
| A b | (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. |
| i l i t | | 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 | techniques, methodologies, and understanding and | 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. |
| e s & | (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 | 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. |
| s k i 1 1 s | (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 | 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 |
|-----|--|---|---|--|
|-----|--|---|---|--|

```
Capabilicani barance capabilic
```

| Liberal arts education subjects Liberal arts education subjects Liberal arts education subjects | Peace Science Courses Introductory Seminar for First-Year Students Introduction to Un Tf1 0 0 1 1282 3695 | 2 | | evaluatio n item | Weighti ng for evaluatio n item | evaluatio n item | ng for evaluatio n item | evaluatio n item | Weighti ng for evaluatio n item | evaluatio n item | Weighti ng for evaluatio n item | evaluatio n item | Weighti ng for evaluatio | evaluatio n item | Weighti ng for evaluatio n item | Weighti ng for V evaluation n item e for the r subject | Weighti ng for evaluatio n item | evaluatio n item | Weighti ng for evaluatio | evaluatio n item | Weighti ng for evaluatio n item | evaluatio n item | ng for evaluatio |
|---|---|---|--|---------------------|--|---------------------|-------------------------------|---------------------|--|---------------------|--|---------------------|--------------------------------|---------------------|--|---|--|---------------------|--|---------------------|--|---------------------|--|---------------------|--|---------------------|--------------------------------|---------------------|--|---------------------|---------------------|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | , , | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|----------------------|------------------------|----|---|-----|---|----|---|----|---|----|---|----|---|----|---|------|-----|---|----|---|----|---|----|---|---|--|-----|
| Liberal arts education subjectsLiberal arts education subjects | "Experimental Methods and Laboratory Work in Biology I" and "Experimental Methods and Laboratory Work in Biology II" | 2 | Elective required | 1st - 3rd semesters | | | | | | | | | | | | | | | | 100 | 1 | | | | | | | | | 100 |
| 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 | | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Agricultural Production Resources | 2 | Required | 2nd semester\ | | | 50 | 1 | | | | | | | | | | | | | | | | | | 50 | 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 | 50 | 1 | 50 | 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 | | | | | | | | | | | | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized subjects | Laboratory Work in General Biology II | 1 | Required | 3rd semester | | | | | | | | | | | | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized subjects | Laboratory Work in General Chemistry | 1 | Required | 3rd semester | | | | | | | | | | | | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized subjects | Laboratory Work in General Physics | 1 | Required | 3rd semester | | | | | | | | | | | | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized subjects | Seminar in Field Science | 2 | Elective required | 2nd semester | | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Research Front of Applied Biological Sciences | 2 | Elective required | 2nd semester | | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Introduction to Physiology | 2 | Elective required | 3rd semester | | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Public Health | 2 | Elective required | 6th semester | | | 100 | 1 | | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Food Biochemistry | 2 | Required | 4th semester | | | | | 40 | 1 | 40 | 1 | | | | | | | | | | | | 20 | 1 | | | | | 100 |
| Specialized subjects | Applied Biophysics | 2 | Required | 4th semester | | | | | 40 | 1 | 40 | 1 | | | | | 20 | 1 | | | | | | | | | | | | 100 |
| Specialized subjects | Food Engineering | 2 | Required | 4th semester | | | | | | | | | 20 | 1 | | | 60 | 1 | | | | | | | | 20 | 1 | | | 100 |
| Specialized subjects | Food Hygiene | 2 | Required | 4th semester | | | | | 20 | 1 | | | 60 | 1 | | | | | | | | | | 20 | 1 | | | | | 100 |
| Specialized subjects | Seafood Chemistry and Biochemistry | 2 | Required | 4th semester | | | | | 60 | 1 | | | 20 | 1 | | | | | | | | | | 20 | 1 | | | | | 100 |
| Specialized subjects | Food Production Management | 2 | Required | 4th semester | | | | | | | | | 20 | 1 | 80 | 1 | | | | | | | | | | | | | | 100 |
| Specialized subjects | Laboratory Work in Applied Biophysics | 1 | Required | 4th semester | | | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | | | 100 |
| Specialized subjects | Laboratory Works in Food Engineering | 1 | Required | 4th semester | | | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | _ | | 100 |
| Specialized subjects | Laboratory Work in Food Hygiene | 1 | Required | 4th semester | | | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | | | 100 |
| Specialized subjects | Nutrition | 2 | Required | 5th semester | | | | | | | | | | | | | | | | | | | 1 | 20 | 1 | | 1 | | | 20 |
| Specialized subjects | Laboratory Work in Food Chemistry | 1 | Required | 5th semester | | | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | | | 100 |

| | 1 | | 1 | 1 | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | |
|-------------------------|--|---|----------------------|------------------|----|---|--|----|---|----|---|----|---|-----|---|----|---|--|--|----|---|----|---|-----|---|-----|---|-----|-----------------|-----|
| Specialized subjects | Laboratory Work in Marine Bioresources Chemistry | 1 | Required | 5th semester | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | | | | | 100 |
| Specialized subjects | Laboratory Work in Nutritional Biochemistry | 1 | Required | 5th semester | | | | | | | | | | | | | | | | 60 | 1 | 20 | 1 | 20 | 1 | | | | | 100 |
| Specialized subjects | Field Works of Food Production Management | 1 | Required | 5th semester | | | | | | | | | | | | | | | | 40 | 1 | | | 60 | 1 | | | | | 100 |
| Specialized subjects | Reading of Foreign Literature in Food Science | 2 | Required | 4th semester | | | | | | | | | | | | | | | | | | | | | | 100 | 1 | | | 100 |
| Specialized subjects | Science and Technology for Food Development | 2 | Elective required | 4th semester | | | | | | | | | | | | 60 | 1 | | | | | | | 40 | 1 | | | | | 100 |
| Specialized subjects | Food Function (Functional Food Science) | 2 | Elective required | 5th semester | | | | | | 80 | 1 | 20 | 1 | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Food Physical Property Science | 2 | Elective required | 5th semester | | | | 40 | 1 | 40 | 1 | | | | | 20 | 1 | | | | | | | | | | | | | 100 |
| Specialized subjects | Food Microbiology | 2 | Elective required | 5th semester | | | | 60 | 1 | | | 40 | 1 | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Bioresource Utilization Science | 2 | Elective required | 5th semester | | | | | | 40 | 1 | | | | | 40 | 1 | | | | | 20 | 1 | | | | | | | 100 |
| Specialized subjects | Food System | 2 | Elective required | 5th semester | | | | | | | | | | 80 | 1 | | | | | | | | | 20 | 1 | | | | | 100 |
| Specialized | Agricultural Products | 2 | Elective | 5th semester | | | | 40 | 1 | 20 | 1 | 20 | 1 | | | | | | | | | 20 | 1 | | | | | | | 100 |
| subjects Specialized | and Food Processing Training for Marine | 1 | required Elective | 5th semester | | | | | | | | | | | | 20 | 1 | | | | | 60 | 1 | 20 | 1 | | | | \vdash | 100 |
| subjects Specialized | Food Processing Training for Animal | 1 | required Elective | | | | | | | | | | | | | | 1 | | | | | | | | 1 | | | | $\vdash \vdash$ | |
| subjects | Food Processing | 1 | required | 5th semester | | | | | | | | | | | | 20 | 1 | | | | | 60 | 1 | 20 | 1 | | | | <u> </u> | 100 |
| Specialized subjects | Food Factory Inspection | 1 | Elective required | 5th semester | | | | | | | | | | | | | | | | | | | | 100 | 1 | | | | | 100 |
| Specialized subjects | Food Information Management | 1 | Elective required | 7th semester | | | | | | | | | | 100 | 1 | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Food Production | 1 | Elective required | 7th semester | | | | | | | | 40 | 1 | 60 | 1 | | | | | | | | | | | | | | | 100 |
| Specialized | Process Management Genome Science I | 2 | Elective | 6th semester | 50 | 1 | | 50 | 1 | | | | | | | | | | | | | | | | | | | | | 100 |
| subjects Specialized | Genome Science II | 2 | Elective | 6th semester | 50 | 1 | | 50 | 1 | | | | | | | | | | | | | | | | | | | | \vdash | 100 |
| Specialized subjects | Molecular Cell Biology | 2 | Elective | 6th semester | 50 | 1 | | 50 | 1 | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized subjects | Animal Nutrition | 2 | Elective | 6th semester | 50 | 1 | | 50 | 1 | | | | | | | | | | | | | | | | | | | | | 100 |
| Specialized | Plant Nutritional | 2 | Elective | 6th semester | 50 | 1 | | 50 | 1 | | | | | | | | | | | | | | | | | | | | | 100 |
| subjects Specialized | Physiology Graduation Thesis I-III | 6 | Required | 6th-8th semester | | | | | | | | | | | | | | | | | | | | | | | | 100 | 1 | 100 |
| subjects | | | . 4 | | | | | | | | | | | l | | | | | | | | | | | | | | | | |

Attachment 4

Curriculum map for Food Science Program

| ac | Study achievementStudy schievement | 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 | |
| | | Seminar for developing intelligence () | Ethics of Science and Technology() | | | | | | | |
| | | Introduction to University Education () | | | | | | | | |
| | | Peace Science Courses () | | | | | | | | |
| | | | | | subjects () | | | | | |
| | | Basic Calculus / Elements of Calculus () | Organic Chemistry | Environmental Sciences for Bioproduction() | | | Public Health() | | | |
| | | General Chemistry / Basic Concepts of Chemistry () | Cell Science () | Statistics in Biology () | | | | | | |
| | | Introduction to Applied Biological Science() | Species Biology () | | | | | | | |
| | Basic knowledge and | Introduction to Microbiology () | Agricultural Production Resources() | Introduction to Physiology () | | | | | | |
| | understanding required for acquiring expertise | | Physics for Applied Biological Science() | | | | | | | |
| | | | Ethics of Science and Technology() | | | | | | | |
| K | | | Seminar in Field Science () | | | | | | | |
| 0 W | | | Introduction to Molecular Biochemistry() | | | | | | | |
| e d g | | | Research Front of Applied Biological Sciences () | | | | | | | |
| e | | | | | | | | | | |

| u n d e e r s t a n d d i i n | Expertise regarding methods for identifying the mechanism of function expression in food and food material and for application of the function. | | | | |
|---|---|--|--|--|--|
| | 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. | | | | |
| | | | | |

| 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 Labo "Experimental Methods and Labo "Experimental Methods and Labo "Experimental Methods and I and "Experimental Methods and I ("Experimental Methods and Labo "Experimental Methods and Labo | aboratory Work in Physics II" aboratory Work in Physics I" and oratory Work in Physics II" () oratory Work in Chemistry I" and coratory Work in Chemistry II" Laboratory Work in Chemistry II" Laboratory Work in Chemistry II") oratory Work in Biology I" and aboratory Work in Biology II" aboratory 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 | | | | | |
| | | | | | |

s
k
i
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 consider 94 5621 002.w7())sET6()*()

| | | | - | | |
|--------|--|------|-------|--|------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | Ability to read and understand technical | | | | |
| | explanations and basic reading | | | | |
| | capabilities of scientific English | | | | |
| e n | | | | | |
| s | | | | | |
| i | | | | | |
| ٧ | | | | | |
| е | | | | | |
| | | | | | |
| c a | | | | | |
| p | | | | | |

(Example) Liberal arts subjects Specialized fundament 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 |
| 1 | 1 10168801 | | | |

* . 60 202,