Ⅲ. RESEARCH AND EDUCATIONAL ACTIVITIES

1 . DEPARTMENTS

1.1 Department of Bioresource Sciences

1. Outline of the Department

The Department of Bioresource Sciences consists of 31 Research Laboratories organized into the following four groups;

Ⅰ. Plant Resources	:	11 Laboratories relating to agronomy and breeding
Ⅱ. Animal Resources	:	6 Laboratories relating to animal production science
Ⅲ. Marine Resources	:	6 Laboratories relating to marine production science
Ⅳ. Production Environment	:	8 Laboratories relating to the production environment and crop protection

Our department provides a broad agricultural education ranging from basic knowledge to applied techniques for students. They are trained as talented professionals ready to address contemporary and future problems of agricultural systems. The knowledge of graduates assists in generating stable high yields of agricultural commodities with excellent quality in harmony with the environment and natural ecosystems.

The bioresources, which include crop plants, livestock and marine organisms, are studied in various ways ranging from the molecular to the population levels. The research objectives include maintenance of favorable environments for bioresource production, protection from pests and diseases, high production levels particularly in unfavorable environments and the developments of new and improved varieties.

2. Number of Students

The annual quota of the Department is 94. In 2008, 96 students were enrolled.

3. Division and Laboratories consisting of the Department and Group

Ⅰ. Plant Resources : Division of Agronomy and Horticultural Science (Laboratory of Crop Science, Laboratory of Plant Breeding, Laboratory of Vegetable and Ornamental Horticulture, Laboratory of Pomology, Laboratory of Plant Production Systems, Laboratory of Plant Production Management, Laboratory of Food Quality Design and Development, Laboratory of Quality Analysis and Assessment), Division of Applied Biosciences (Laboratory of Plant Genetics, Laboratory of Crop Evolution), Graduate School of Life Sciences (Laboratory of Plant Physiology)
〔11 Laboratories〕

Ⅱ. Animal Resources : Division of Applied Biosciences (Laboratory of Animal Breeding and Genetics, Laboratory of Reproductive Physiology, Laboratory of Nutritional Science, Laboratory of Anatomy and Cell Biology, Laboratory of Animal Husbandry Resources), Graduate School of Informatics (Laboratory of Bioresource informatics)
〔6 Laboratories〕

Ⅲ. Marine Resources : Division of Applied Biosciences (Laboratory of Fisheries and

Environmental Oceanography, Laboratory of Marine Stock-Enhancement Biology, Laboratory of Marine Molecular Microbiology, Laboratory of Marine Environmental Microbiology, Laboratory of Technology of Marine Bio-products, Laboratory of Marine Biological Function)

〔6 Laboratories〕

Ⅳ. Production Environment：Division of Agronomy and Horticultural Science (Laboratory of Weed Science), Division of Applied Biosciences (Laboratory of Plant Pathology, Laboratory of Insect Ecology, Laboratory of Insect Physiology), Division of Environmental Science and Technology (Laboratory of Tropical Agriculture, Laboratory of Soil Science, Laboratory of Environmental Mycosciences, Laboratory of Ecological Information)

〔8 Laboratories〕

4. Subjects already opened for freshmen, sophomore and junior

Outline of Agricultural Science I, Outline of Agricultural Science II, Basic Bioresource Science and Cell Biology I were given to the freshmen in order to have them learn the general idea of agriculture and the basic knowledge for the specialized studies of this department. With the same objectives, Applied Meteorology, Biostatistics, Applied Bioresource Sciences I to Ⅳ and some basic biological subjects were given to the sophomore. Farm Practice, Theory and Practices of Plant Investigation, Marine Science Practice, and Livestock Production Techniques and Practice were also given as training courses at the experimental farms and stations. Most of the special subjects provided in this department were given to the junior.

1.2 Department of Applied Life Sciences

1. Scope

Department of Applied Life Sciences was newly established in April, 2001. Applied Life Science is a multidisciplinary field based on chemistry and biology, where biochemistry, organic chemistry, physical chemistry, microbiology, cell biology, molecular biology, plant nutrition are combined in their application to production and processing of biomaterials in microbial, food, biochemical and chemical industries, as well as to the bioremediation. In this department, therefore, students are scheduled in four years not only to acquire knowledge through lectures of these broad areas of disciplines, but also to master related methodologies through experimental courses together with preparing graduation thesis on chemical, biochemical, physiological, physicochemical and molecular biological aspects of life. In addition, the applied researches such as biotechnology of microorganisms, of plants, and of animals, and bioremediation of environment are ongoing.

The department consists of the eleven laboratories (see #3) for preparing graduation thesis.

2. Number of Students (as of 2008)

Freshmen, 51; sophomores, 49; juniors, 54; seniors, 63.

3. Chairs and Laboratories Constituting the Department

Chair of Applied Biochemistry: Laboratory of Biochemistry, Laboratory of Biomacromolecular Chemistry, Laboratory of Bioregulation Chemistry, Laboratory of Chemical Ecology

Chair of Molecular and Cellular Science: Laboratory of Plant Nutrition, Laboratory of Molecular Microbiology

Chair of Applied Microbiology: Laboratory of Fermentation Physiology and Applied Microbiology, Laboratory of Microbial Biotechnology

Chair of Bioorganic and Biophysical Chemistry: Laboratory of Bio-Analytical and Physical Chemistry, Laboratory of Biofunction Chemistry, Laboratory of Applied Structural Biology

(Cooperative Laboratories from Department of Applied Molecular Biology, Division of Integrated Life Science, Graduate School of Biostudies)

Laboratory of Molecular and Cellular Biology of Totipotency, Laboratory of Plant Molecular Biology

4. Orientation

Orientation for the freshmen was held on April 7, 2008 with the attendance of Faculty members and Staffs. Welcome addresses were briefly stated by the professors in charge of each laboratory, together with introduction of ongoing research subjects.

5. Classes given:

Introduction to Applied Life Sciences I-IV, Outline of Cell Biology, Biochemistry I & II, Spectroscopic Analyses of Organic Compounds, Biophysical Chemistry I & II, Analytical Chemistry Organic Reaction Mechanism I & II, Bioorganic Chemistry I-III, General Biomacromolecular Chemsitry, Structure and Function of Biomacromolecules, Chemistry of

Biological Catalysis, Applied Microbiology I-IV, Plant Nutrition, Plant Biochemistry, Molecular Biology I & II, Molecular Cellular Biology I & II, Outline of Food Fermentation, Fundamental Physiology

1.3 Department of Agricultural and Environmental Engineering

1. Scope

The educational program that the department undertakes is associated with engineering and technologies that could improve and/or develop the infrastructures for agricultural activities and rural livings that are expected in the 21st century, and also resolve the environmental, food and energy problems currently posed all over the world. The program thus includes the subjects related to the two major study areas; the irrigation, drainage and reclamation engineering (IDRE) and the bio-production engineering (BPE). IDRE-related subjects cover the engineering aspects of effective and beneficial use, preservation and restoration of regional resources such as water, soil and land, and also of construction of various structures and facilities that are needed for their implementations. BPE-related subjects widely range over the engineering topics such as energy saving and development, environmentally sound agricultural production, crop-storage and production of high-safety/quality foods. Through integrating these two areas, the teaching staff in the department is devoted to training specialists of good judgment who have wide and thorough knowledge of agricultural and environmental engineering.

2. Number of Students as of April 2008

1st	year student	40
2nd	year student	43
3rd	year student	35
4th	year student	37

3. Division and Laboratories in Charge of the Department

Division of Environmental Science and Technology: Laboratory of Agricultural Facilities Engineering, Laboratory of Water Resources Engineering, Laboratory of Irrigation, Drainage and Hydrological Environment Engineering, Laboratory of Rural Planning, Laboratories of Agricultural Systems Engineering, Laboratory of Field Robotics and Laboratory of Agricultural Process Engineering.

4. Remarks (2008)

General introduction and others: For the freshmen class, the faculty-level general introduction for the freshmen was held at Room W100 in April 6, followed by the department-level guidance with participation of the teaching staff of all from the related 7 laboratories.

The department-level guidances for the sophomore and junior classes were held in the forenoon and in the afternoon of April 5, respectively.

Subjects: Given to the freshmen and sophomore classes: Outline of Agricultural Science I and II, Introduction to Agricultural and Environmental Engineering I and II, Practices for Agricultural and Environmental Engineering, Fundamentals of Agricultural and Environmental Engineering, Applied Mathematics, Practice in Data Processing I and II, Applied Meteorology, Applied Mathematics, Applied Mechanics, Strength of Materials, Hydraulics.

Given to the junior class: Mathematics C, Environmental Dynamics, Land Surveying,

Geotechnical and Concrete Engineering, Structural Analysis, Soil Physics, Environmantal Hydrology, Irrigation Structures, Irrigation and Drainage and Environment, Rural Planning, Farm Land Consolidation Engineering, Water Resources Science, Water-Use System Engineering, National and Regional Planning, Instrumentaion and Measurement for Biological Objects, Vibration, Thermodynamics and Heat Transmission, Mathematical Programming, Field Robotics, Energy and Prime Movers in Agriculture, Farm Processing Machinery, Automatic Control, Design of Machine Elements, Electric Engineering and Electronics, Introduction to Foreign Literature on Agricultural Machinery, History of Agricultural Machinery Development, Laboratory Course in Soil Mechanics, Concrete Engineering and Environmental Geotechnics, Laboratory Course in Hydraulics, Laboratory Course of Soil Physics and Hydrological Environment Engineering, Practice in Surveying, Seminar in Rural Facilities Engineering, Seminar in Computational Hydraulics, Laboratory Course in Agricultural Machinery I and II, Practice in Drawing of Machine (CAD).

Given to the senior class: Practice in Irrigation and Drainage Planning, Practice in Rural Planning, Seminar in Agricultural Machinery, On-the-Job Training for Agricultural and Environmental Engineering (financially supported by the the university). All the students in the senior class implemented the research practice of optional course, and completed it as Graduation Thesis.

1.4 Department of Food and Environmental Economics

1. Overview of the Department

Among the difficulties human beings face today, the problems deeply related to our society are food problems and environmental problems. These problems have become more and more serious worldwide, regardless of political and economic regimes or development levels of the countries.

The department of Food and Environmental Economics strives to resolve these problems and find out the right conditions so that the results of other natural science researches in the agricultural faculty may appropriately meet needs of the society. It also aims at integrating those research results as the agricultural theory to provide a new paradigm of food and agriculture.

While most of the other departments in the agricultural faculty employ natural scientific methodology, this department is unique in the sense that it deals with social sciences and humanities. Human activities always involve the relationship between human beings and nature, and therefore social scientific and humanistic study is crucially important.

This department tries to highlight the issues which face the producers of the agriculture, forestry, and fisheries, and explore the ideal relationship between these primary industries, the food industry and consumers. Students in this department study about the linkage between the human activities related to food and agriculture, and the local or global environmental problems. They also learn the method to consider and figure out the way to develop rural areas in the cultural, social and economic sense, with its relationship to city areas and with other industries in perspective.

This department consists of 8 laboratories that are categorized into the following 3 groups. (i) micro analysis group; farm management, farm managerial information & accounting, (ii) macro analysis group; regional environmental economics, food & environmental policy, forest policy & economics, international rural development, (iii) historical & philosophical analysis group; comparative study of agricultural history, philosophy of agricultural science.

2. Number of student :

Freshmen: 34, Second year students: 35, Third year students: 34, Fourth year students: 48

3. Division and laboratories offering lectures

Division of Natural Resource Economics: Laboratories of Farm Management, Farm Managerial Information & Accounting, Regional Environmental Economics, Food & Environmental Policy, Forest Policy & Economics, International Rural Development, Comparative Study of Agricultural History, Philosophy of Agricultural Science.

4. Events in 2008

4, April: Guidance for 2nd and 3rd year students

7, April: Guidance for freshmen

10, April: Welcome party for freshmen

5. Subjects already opened in 200 7

For freshmen: Outline of Agricultural Science I, Outline of Agricultural Science II, Introduction of Food & Environmental Economics II, Basic Sociology & Economics for Food and Environment, Introduction of World Agriculture and Forestry; For 2nd year students: Economic Principle I, Economic Principle II, History of Economic Thought, Social Economic History, Agricultural Development, Theory of Agribusiness, Practice on Agricultural and Forestry Statistics, Fundamental Practice for Farm Accounting, Training of Research Method I, II.

1.5 Department of Forest and Biomaterials Science

1. Outline of the Department

Human activities were enlarged beyond the limitation of the Earth in the 20th Century, and an essential subject in the 21st Century must be the establishment of a sustainable social system on our planet. A clue for this subject is laid on how to develop uses of forest and biomaterials as a recycled resource and how to promote forest roles in the prevention of natural hazards and the conservation of global environment. Department of Forest and Biomaterials Science teaches on forest-environment interactions, efficient uses of sustainable forest resources and socio-economic perspectives on forest and forestry through laboratory courses and practices including field practices in Field Science Education and Research Center as well as the following lectures.

(1) Basic and applied natural sciences on forest and forest resources:
Forest Utilization, Tree Physiology, Silviculture, Forest Botany, Strategic Forest Management System and Applied Technology, Fundamentals of Glaciology, Forest Ecology, Community Ecology, Reproduction Ecology in Forest Trees, Wildlife Conservation Science, Tropical Forest Environment, Tropical Forest Resources, Theory of Erosion Control, Forest Hydrology, Interaction of Forest and Environment, Forest Biochemistry, and Bioresource and Environmental Informatics.

(2) Applied sciences and technologies on biomaterials:
Structural and Physiological Biology of Woody Plant Cells, Formation of Plant Cell Walls, Biomaterials, Properties of Biomaterials, Wood and Timber Construction, Architectural Design and Drawing, Environmental Engineering of Architecture, Wood Processing, Cellulose Chemistry, Biomass Chemistry, Polymer Synthetic Chemistry, Chemistry of Biomass-based Composite Materials, Biophysical Chemistry, Pulp and Paper Science, Forest Organic Chemistry, Physical Properties of Polymers, Biomass Energy, Wood Preservation, Wood Material Science, Environmental Engineering of Architecture, and Mushroom Science.

(3) Socio-economic perspectives on forest and forestry:
World Forest Resources, Forest Management Planning, Forest Tourism, Landscape Architecture, Revegetation and Planting Design, and Landscape Design.

2. Number of students : 60 (Freshmen), 60 (2nd year students), 55 (3rd year students) and 63 (4th year).

3. Divisions and laboratories offering lectures

Division of Forest and Biomaterials Science: Laboratories of Forest Resources and Society, Forest Environment Planning, Tropical Forest Resources and Environments, Forest Utilization, Forest Biology, Landscape Architecture, Erosion Control, Biomaterials Design, Wood Processing, Biofibrous Materials, Tree Cell Biology, Composite Materials Chemistry, and The Chemistry of Biomaterials.

Division of Environmental Science and Technology:
Laboratories of Forest Ecology, Forest Hydrology, and Wood Biochemistry

Field Science Education and Research Center:
Laboratories of Forest Species and Ecosystem Conservation, Forest Resource Management,

Forest Information and Environmental Risk Assessment Sciences, and Satoyama Resources Conservation

Graduate School of Energy Science:

Department of Socio-Environmental Energy Science; Laboratory of Energy Ecosystems

Graduate School of Informatics:

Department of Social Information; Laboratory of Biosphere Informatics

4. Events in 2008

The orientation course for freshmen on April 7 offered a curriculum-guidance and a brief introduction of laboratories. The course for 2nd year students on April 4 showed the outline of courses including practices and that for 3rd year students on April 4 explained the allocation process of students to the laboratories as well as the course outline. An introduction of the Kamigamo Experimental Station for freshmen was carried out on April 12, based on the collaboration of Field Science Education and Research Center. Students were invited to labolatories for seeing what was studied there on one day in April, May and September. This new event was named ‘Open laboratory’.

1.6 Department of Food Science and Biotechnology

Division of Food Science and Biotechnology established on April 2001 comprises three basic chairs; Food Life Sciences, Food and Health Science, and Food Production Technology. Food is the vital alimentary material for human to sustain life and to promote wellness, therefore, must be highly acceptable for human consumption. The challenges of this century are to overcome worldwide problems of food production and prevailing life style-related diseases.

To establish fundamental concept of foods for improving quality of life from various points of view, we take a multidisciplinary approach including sciences related to life sciences, natural resources, environment, culture, social, and information technology. We have the education and research programs to study food materials at chemical, biological and physiological level using the updated information and technology about rapidly-advancing bioscience. We are developing a new methodology for food production using bioengineering and gene technology.

Department of Food Science and Biotechnology consists of 8 laboratories, Enzyme Chemistry, Food Environmental Science, Organic Chemistry in Life Science, Nutrition Chemistry, Molecular Function of Food, Physiological Function of Food, Bioengineering, and Basic and Applied Molecular Biotechnology belong to the Graduate School of Agriculture and 3 laboratories, Applied Molecular Microbiology, Biosignals and Response, Biology of Bioresponse belong to the Graduate School of Biostudies.

In undergraduate program, 38 freshmen, 37 sophomores, 34 juniors, and 37 seniors are enrolled.

Orientation for the new comer students was held in the afternoon of April 7, 2008.

The lectures, Principles of Biochemistry in Food Science I, II, Organic Chemistry in Food Science I~III, Physical Chemistry in Food Science I, II, Food Biochemistry I, II, Food Safety I, II, Enzymes: Function and Application, Food Microbiology, Physiological Aspects in Food Sciences, Enzyme Chemistry, Organic Chemistry in Life Science, Physiological Aspects in Food Sciences, Food Engineering, Molecular Function of Food, Physiological Functions of Food, Basic and Applied Molecular Biotechnology, Biosignals and Response, Microbiological Technology, Food Chemistry, Food Science and Production Technology, Introduction and Practice in the Department of Food Science and Biotechnology, Laboratory Course in Organic Chemistry, Laboratory Course in Food and Nutrition Chemistry, Laboratory Course in Chemical Engineering, Laboratory Course in Enzyme Chemistry nad Biochemistry, Laboratory Course in Microbiology, Laboratory Course in Life Science, Seminar on Food Science and Biotechnology and Introduction to Research were given to the students by faculty members.

1.7 Department of Bio-production Science and Technology (4th year)

The Department of Bio-production Science and Technology was established in 1995 as a reorganized and consolidated department with objective to conduct education and research on basic principles and applied technologies for stable bio-production of food and efficient utilization of biomaterials for human living and activities. To fulfill the objective covering the broad discipline, the Department combined many departments formerly present and is divided into the two courses: Bioresource Science and Production System for Agriculture and Forestry.

The former Course is to study at levels from molecules to populations on characteristics and potential productivity of diverse biological resources of our agricultural primary production such as plants, animals and microorganisms for establishment of the technological systematization. The latter Course is to study fundamental principles and the application for technical development such as working systematization and automation in machinery and facilities used for our agricultural primary production and its product utilization.

The Course of Bioresource Science consists of laboratories of Crop Sciences, Plant Breeding, Vegetable and Ornamental Horticulture, Pomology, Weed Science, Tropical Agriculture, Crop Production Systems, Plant Pathology, Insect Ecology, Insect Physiology, Plant Genetics, Plant Physiology, Crop Evolution, Fisheries Environmental Oceanography, Stock-enhancement Biology, Physiology and Genetics of Marine Microbes, Marine Bioproducts Technology, Marine Biological Function, Marine Environmental Microbiology, Animal Breeding and Genetics, Reproductive Physiology, Nutritional Science, Anatomy and Cell Biology, Animal Husbandry Resources.

The Course of Production System for Agriculture and Forestry consists of laboratories of Agricultural Systems Engineering, Field Robotics, Agricultural Process Technology, Forest Utilization, Wood Processing.

The last student in this department graduated on March, 2009.

1.8 Department of Life and Biomaterials Science (4th year)

This department has two courses, Applied Life Science Course and Biomaterials Science Course. The Applied Life Science Course consists of seventeen laboratories; Cellular Biochemistry, Macromolecular Bioscience, Bioregulation Chemistry, Chemical Ecology, Plant Nutrition, Molecular and Cellular Biology, Plant Molecular Biology, Fermentation Physiology and Applied Microbiology, Microbial Biotechnology, Biophysical Chemistry, Biofunction Chemistry, Nutrition Chemistry, Biosignals and Response, Organic Chemistry in Life Science, Bioengineering, Industrial Microbiology, and Enzyme Chemistry. In this course the broad areas of education and research are actively performed such as on the basic chemical, biochemical, physiological, physicochemical and molecular biological aspects of life. In addition the applied research such as biotechnology and microorganisms, plants and animals is ongoing.

The Biomaterials Science Course consists of six laboratories: Biomaterials Design, Biofibrous Materials, Tree Cell Biology, Composite Materials Chemistry, Biomaterials Chemistry, and Recycling System of Biomass. The aim of this course is to teach the basic science and technology of biomaterials up to the macro level from the molecular level for advanced research works and highly efficient utilization of biomaterials containing mainly wood.