

Program Overview (Development Studies Programs Offered by Various Universities)

Name of University	University of Tsukuba
Name of School	Graduate School of Life and Environmental Sciences Master's Program in Agro-Bioresources Science and Technology
Features of School	http://www.global.tsukuba.ac.jp/departments/life-and-environmental/prof-training-agro-research
Program Outline	The aim of this program is to develop capacity and leadership through on-the-job training (OJT). The University of Tsukuba seeks students who are interested to study in the area of agriculture, food processing, agricultural economics, applied biochemistry and aim to develop leading edge technology to solve the current problems of agricultural research throughout the world. To complete the course, a total of 30 credits from various subjects and a dissertation are required. Supervision for the Master's thesis is conducted by the members of the program who have experiences and research in relevant areas.
Outline of Subjects	<p>“Economics of Food Security and Agricultural Development”</p> <p>The course discusses Japan's experience on Agricultural Development and Food Economy Growth.</p> <ul style="list-style-type: none"> ● Household Model ● Two Sector Model ● Introduction of Impact Evaluation ● Ricardian Trap, Structural Change ● Agricultural Development Path ● Livelihood Improvement, Productivity ● Technological Diffusion and Technological Change ● Common Property Resources ● Social Capital and Rural Development ● Agricultural Development Policy <p>“Basic Plant Biotechnology”</p> <p>The course describes the plant biotechnology in various research fields, and explains the history and experience of Japan's growth and development in each research field.</p> <ul style="list-style-type: none"> ● Introduction and guidance ● New plant breeding techniques ● Metabolic engineering in plants Practical plant biotechnology ● Practical plant biotechnology

- Biotechnology in Plant Breeding
- Herbicides: Modes of action, herbicide-resistant weeds and transgenic herbicide-tolerant crops
- Useful metabolites production using plant cell cultures
- Utilization of Biotechnology on fruit production
- Microbiology for plant-biomass refinery technology
- Biotechnology in food production

“Appropriate Use of Genetic Resources”

In order to develop a sustainable farming system, the knowledge on appropriate use of the plant/animal/microbial genetic resources are essential. The present lecture covers the topics related to the methodology to explore, preserve and utilize genetic resources. Brief history and experiences in the development of the related research field in Japan are also introduced.

- Exploration Science for Food Functions
- New frontier of in situ and ex situ conservation of plant genetic resources
- Role of Botanical garden for conserving biodiversity
- Historical development of the animal genetic resources
- Problems and current status of the animal genetic resources
- Attempts of conserving animal genetic resources
- Plant genetic resources management and international cooperation
- Control of plant parasitic fungi
- Utilization of plant parasitic fungi
- Conservation of fungi
- Control of herbivorous insect pests by natural enemies

“Concept of Sustainability Index”

The brief histories and experiences in the development of the Agro-Bio research field in Japan are focused. An in depth discussion of "state-of-the-art" practices of sustainability and Japanese satoyama development practices is presented. The catalog description highlights: Sustainable indicators, evolution of sustainability, projects and systematic sustainability analysis. The focus of this course is on the sustainability aspects and brings this point more simple and pragmatics to the readers of the Japanese and overall world comparative assessments of indicators. Different debating issues and factors which influence site-specific management of agriculture and environment have been discussed. Furthermore, a range of systems approaches including system dynamics and system design is discussed for bioenergy production considering several scenarios to achieve the goal of

	<p>sustainability in the renewable energy. The ICT cutting edge development and its future trend in agriculture also put into attention. The next a half century, ICT will lead the agricultural production and play a significant role in food security for the 7-10 billion populations all over the world. Overall the examples are given from the Japanese agricultural and environmental developments.</p> <ul style="list-style-type: none"> ● Introduction: Sustainability, Sustainable Development and Sustainability Indicators ● Sustainability and Sustainability Indicators ● Sustainability Indicators in Practice ● Paradigms and Professionals ● Projects and Sustainability Indicators ● Systematic Sustainability Analysis ● Environmental Sustainability Index ● Environmental Performance Index and Food Security Index ● Sustainability and Agricultural Informatics ● Project Presentation/Book Presentation
Related URL	https://www.bres.tsukuba.ac.jp/
Program's appeal	