Course Detail

Master of Science Program in Agriculture

Course Title: Master of Science Program in Agriculture (International Program)

Master Degree: Master of Science (Agriculture)

Academic Institution: Faculty of Agriculture, Khon Kaen University

Duration: 2 years July 2022 – May 2024

Background and Rational:

As the number of world populations has been increasing, it is a major challenge for an agricultural researcher or scientist to produce enough food to meet the needs of the world population. The production area expansion to increase production is also limited due to the expansion of urbanization and the industrial sector. Therefore, productivity improving is the only way to produce sufficient food to meet the growing global demand. However, today's productivity must be done under complex global changes both in terms of climate change such as hot weather, drought or flood, the emergence of new pests or the return of pest outbreaks as well as the degradation of natural resources due to intensive use.

According to the contexts mentioned above, the United Nations has adopted it as 1 of the 17 Sustainable Development Goals in order to develop sustainable world economy. The goals that are important and directly aligned with agriculture such as Goal 1, Elimination of Poverty (no poverty) and Goal 2, Zero Hunger, by ensuring everyone, especially the poor and the vulnerable, that they will be able to have safe, nutritious and sufficient food. Therefore, in order to improve agricultural productivity, we must have sustainable food production system and a good agricultural practice that protects ecosystems and improves the ability to adapt to climate change, drought, flood and other disasters. Moreover, land and soil must be developed continually and the genetic diversity of plants and animals must also be maintained. Besides, it is also aligned with Goal 12 Sustainable Consumption and Production.

Therefore, body of knowledge, research and innovation are required to achieve sustainable management and efficient use of natural resources, halve the world's food waste at retail and consumer levels, and reduce the loss from the production process and supply chain, including post-harvest losses, all chemicals and waste management using environmentally friendly process, and the reduction of waste emissions into the air, water and soil to minimize the negative impacts that will have on human health and the environment as much as possible.

Objectives:

To encourage the graduate to increase their research ability, develop new knowledge, increase knowledge management and application ability for agricultural development and/or solve agricultural problems efficiently and effectively as well as leading to the development of innovation.

Course Synopsis and Methodology:

Master of Science Program in Agriculture (International Program) (Curriculum revised in 2018) focuses on Research Based Learning (RBL) in order to encourage the graduate to increase their research ability, develop new knowledge, increase knowledge management and application ability for agricultural development and/or solve agricultural problems efficiently and effectively as well as leading to the development of innovation.

1. **Study plan**

Course Structure	Number of Credit	
	Plan A Type 1	**Plan A Type 2**
1. Required Courses	5 (non-credit)	5
2. Elective Courses	-	15
3. Thesis	38	18
Total Credit	38	38

Study Plan

1st semester		**Credit**	
		Plan A Type 1	**Plan A Type 2**
AG 207 001	Statistical Methods in Agriculture	3(2-3-5) (non-credit)	3(2-3-5)
AG 207 891	Seminar in Agriculture I	1(1-0-2) (non-credit)	1(1-0-2)
AG 207 898	Thesis	9	-
xxx xxx	Elective Course		6
	Semester credits	**13**	**10**
	Cumulative credits	**9**	**10**

Thesis activities: Plan A Type 1; Thesis proposal examination Plan A Type 2; Thesis proposal preparation

2nd semester		**Credit**	
		Plan A Type 1	**Plan A Type 2**
AG 207 898	Thesis	10	
AG 207 899	Thesis		6
xxx xxx	Elective Course	-	6
	Semester credits	**10**	**12**
	Cumulative credits	**19**	**22**

Thesis activities: Plan A Type 1; carrying out research
Plan A Type 2; Thesis proposal examination and carrying out research

3rd semester		**Credit**	
		Plan A Type 1	**Plan A Type 2**
AG 207 892	Seminar in Agriculture II	1(1-0-2) (non-credit)	1 (1-0-2)
AG 207 898	Thesis	10	
AG 207 899	Thesis		6
xxx xxx	Elective Course	-	3
	Semester credits	**10**	**10**
	Cumulative credits	**29**	**32**

Thesis activities: Plan A Type 1; carrying out research and writing manuscript
Plan A Type 2; carrying out research

4th semester		Credit	
		Plan A Type 1	**Plan A Type 2**
AG 207 898	Thesis	9	-
AG 207 899	Thesis	-	6
	Semester credits	**9**	**6**
	Cumulative credits	**38**	**38**

Thesis activities: Plan A Type 1; Writing manuscript and Thesis defense examination
Plan A Type 2; Writing manuscript and Thesis defense examination

2. Course Content

Required Courses

AG 2 07 0 0 1 Statistical Methods in Agriculture Research protocol and techniques in Agriculture and related disciplines, basic statistical analysis, experimental designs, regression analysis, correlation, nonparametric statistics, and computer application in agricultural research

AG 207 891 Seminar in Agriculture I Literature review on topics relating to agriculture, scientific report writing, presentation, discussion and conclusion of seminar

AG 207 892 Seminar in Agriculture II Writing research article, thesis, and presenting of the progress of the thesis work

Elective Courses

AG 207 101 Biological Control of Insect Pests Principles of biological control of insect pests, organisms as natural enemies, and use of natural enemies in biological control, conservation and augmentation of natural enemy, application of biological control with other control strategies

AG 20 7 1 0 2 Biological Control of Plant Diseases Basic knowledge in plant pathology, principle for plant disease management and strategies for biological control of plant diseases in major economic crops, species of antagonistic and plant growth enhancement microbes, screening for high potential antagonistic microbes, research and development for biological control commercial products, using antagonistic microbes in various cropping systems, mass production of antagonistic fungi and bacteria for self-sufficiency, bio-safety concerning used of beneficial microbes including antagonistic, growth enhancer microbes

AG 20 7 1 0 3 Organic Agriculture Principles, concepts, and techniques of organic agriculture including organic crop production covering soil, fertilizer and water management, cultural practices, pest control, harvest and postharvest handling, marketing of organic products, analysis of agricultural inputs in organic production system, principle and standard of organic animal, organic animal production such as beef cattle, dairy, pig and poultry, and organic bee keeping, and other animals, animal welfare, processing and marketing, policy, regulations and organic certification schemes and case study

AG 20 7 1 0 4 Ecosystem Management in Organic Agriculture Components of organic agricultural ecosystem, relationships between the components, energy flow and material cycle, management of factors related to sustainable organic agriculture and case study

AG 207 201 Fish Breeding and Production Planning Introduction, brood stock management, fish breeding methods, natural fish breeding, semi-natural fish breeding, hormonal induced fish breeding, examples of three breeding methods, equipment of fish breeding, egg incubating, fish embryo development, nursing methods, hatchery designs, production planning of fish fry

AG 207 202 Sustainable Aquaculture Introduction, aquaculture in various models, feed and adjustment to utilize local resources, effect of climate change and adaptation of environmentally friendly aquaculture practices, farm standard, quantity and quality of products, production planning, marketing and sustainable aquaculture management for strengthening community

AG 207 203 Fish Diseases and Diagnosis History on fish diseases; factors involving disease outbreak, economic impact of diseases pathogenic diseases, non-pathogenic diseases, global climate change and disease outbreak, disease diagnosis in aquatic animals, analysis and assessment on fish disease outbreak

AG 207 204 Fish Disease Control and Health Management Treatment methods for fish diseases, chemicals and chemotherapy, antibiotics and application methods, protocols on fish health management, immune modulation, utilization of herbal medicine for disease outbreak prevention and treatment

AG 207 205 Fish Nutrition Feed and nutrients for fish, nutrient uptake and metabolism of feed, determination of nutrient requirement of fish, problem related to nutrient, effect of global climate change on feed utilization and metabolism of fish, biotechnologies for fish feed development

AG 207 206 Fish Feed and Alternatives Situation of world fish feed production, factors related to fish feed production, nutrient in feed materials, alternative feed materials, limitations of feed material and alternative feed material, formulation and production of fish feed suitable for fish stages, biotechnologies for development of feed and minimizing problems related to feed nutrition and feed production, determination of fish feed requirement, utilization of local resources for feed production, fish feed production by local community

AG 207 207 Post-harvest Technology for Aquatic Animal Groups of commercial aquaculture, nutritive values of aquatic animals, deterioration of aquatic animals, preparation of aquatic animals before being transported and used for production of fresh aquatic animal, transporting live aquatic with water and without water, production and preservation of fresh aquatic animal, and utilization of local resources for increasing survival of live- aquatic animal, using local resources for preserving fresh aquatic animal

AG 207 208 Preservation and Value-addition Technology for Aquatic Animal Value-adding process and its principles such as salting, drying, chilling and freezing, irradiation, smoking, fermentation, canning and chemical preservation, packaging for fish product, selection of suitable preservation and value-addition technology for community, hygiene in processing aquatic animal, using local resources for processing aquatic animal

AG 207 301 Sustainable Agricultural and Rural Development Concepts relating to sustainable agricultural and rural development (SARD), its situation and dynamics leading to current important development issues such as population, climate, technology, pollution, goals and activities of world organizations influencing sustainable agricultural, rural development and policy, cases reflecting sustainable agricultural and rural development, evolution of technology and innovation for sustainable agricultural and rural development, green development, corporate social responsibility and relating issues for agricultural and rural development, application of biotechnology for propagations, resistance and tolerance to biotic and abiotic constraints

AG 207 302 Analysis of Agro-ecosystems, Resource Systems and Community Systems System theories, area-based research and development, methods of agro-ecosystem analysis, Rapid Rural Appraisal (RRA), conceptual framework building, source of data, methods of data collection, Participatory Rural Appraisal (PRA), data management and analysis, descriptive statistics, indicator analysis, marginal analysis and sensitivity analysis and synthesis of the findings

AG 207 303 Development of Project Planning and Management Concepts and process of project planning, development and management covering from need assessment, project planning and development, project management, project monitoring, project adjustment, project evaluation, design and implement alternative development project, program evaluation and data analysis, interpretation and presentation, tools, field testing for tools and evaluation methods

AG 207 304 Agricultural Systems under the Changing Environments Global change and its dynamics, agricultural systems under social and economic changes, technological changes, changing marketing systems, climate change, natural resources degradation, changes in labor in agriculture, aging society, health problems of the population, adaption of agriculture, adaptive agricultural systems of crop production, livestock production and aquaculture, smallholder adaptation, innovation process under changes, sustainable adaptive approaches

AG 207 305 Agricultural and Rural Sociology Background of rural sociology, structures of rural societies, differences between urban and rural societies, changes of rural societies, factors influencing changes of rural societies such as population, urbanization, technology, impacts of changes of rural societies on agriculture, social capitals and rural development, case studies

AG 207 306 Sustainable Crop Production Concepts and importance of cropping systems, cropping patterns and related production conditions, plant interactions and competition in multiple cropping, water and nutrients management approaches to increase water and nutrient use efficiency in sustainable crop production system, principles and environmental friendly methods of integrated plant pest management, maintaining soil fertility and crop production, indigenous knowledge and varietal conservation, indigenous knowledge and its limitations

AG 207 307 Communication in Agrarian Development Introduction to verbal and nonverbal aspects of communication, concept of culture and cultural values, landscape, rural and urban culture, economic and legal context, cultural and spiritual context, cultural heritage, aesthetics and quality of life, alternative communities and re-ruralization, case studies

AG 207 401 Introduction to Precision Agriculture Scope and overview of the agricultural technologies and their applications, record keeping, software, analysis and decision making, implementation

AG 207 402 Introduction to Agricultural GIS Fundamental processes of Geographic Information Systems (GIS), data base management, spatial analysis, mapping software

AG 207 403 Global Positioning System and Remote Sensing Fundamental of Global Positioning System (GPS), application in agriculture, general technical aspects of the GPS satellites such as mapping, navigation, introduction to remote sensing

AG207 404 Precision Farming Hardware Scope and overview of the agricultural technologies and their applications, record keeping, software, analysis and decision making, implementation, solar operated precision spraying and water irrigation, soil moisture sensing and automatic irrigating control, drone assisted in agriculture and robotic equipment

AG207 405 Soil, Water, Nutrient and Yield Variability Soil formation and catena, soil mapping, utilization of maps of different scales and details, investigation of field-scale spatial variability of soil properties and water availability, precision land management, irrigation and drainage, agricultural zoning, nutrient-specific crops, yield map interpretation, yield stability, crop quality sensor, variable rate technology (VRT)

AG 207 501 Essentials in Molecular Biology Comparative cell structure and function, central dogma in genetics, prokaryotic and eukaryotic DNA replications, RNA synthesis and regulation, protein synthesis and regulation, protein sorting, molecular biology applications in agriculture

AG 207 502 Agricultural Biotechnology Applications of biotechnology in agro-industry, horticulture, plant protection, livestock and aquatic animals and future food, ethics in genetically modified organisms (GMOs) and agricultural biotechnology

AG 207 503 Applied Plant Breeding Introduction to plant breeding, breeding program in self-pollinated and cross-pollinated plants, rice breeding technique for commercial and for community, breeding technique for industrial crops and horticultural crops, future trends in plant breeding

AG 207 504 Applied Animal Breeding Introduction to animal breeding, animal selection, mating system, breeding program in domestic animals, breeding techniques for native animals, beef and dairy cattle, poultry and swine, future trends in animal breeding

AG 207 505 Population Structure and Quantitative Genetics Genotypic and gene frequencies in population, factors affecting gene frequencies, genetic structure and subdivision, genetic clustering and classification, genetic variations and causal components, heritability, genetic resemblance, inbreeding depression and heterosis, genetic x environment interaction

AG 207 506 Gene Mapping Principle and application of gene mapping, basic linkage analysis, gene mapping function, genetic markers in animal and plant breeding, genetic mapping, physical mapping, quantitative trait locus (QTL) and expression quantitative trait loci (eQTLs), mapping, genome-wide association study (GWAS)

AG 207 507 Fundamental of OMICS Evolution of omics in agriculture, microbial, plant and animal genomics, basic of transcriptomics, proteomics and metabolomics in agriculture, current and future applications

AG 207 508 Agriculture Bioinformatics Single sequence analysis, multiple sequence comparisons, RNA and protein sequence analysis, phylogenetics and comparative genomics, applications of genome and proteome sequences, microarray, system biology

AG 207 509 Animal Cell Biotechnology Equipment and tools for animal cell culture, somatic cell culture, embryonic cell culture, Oocyte culture and fertilization, IVF (In-vitro Fertilization), cryopreservation, animal gene transfer

AG 207 510 Plant Cell Biotechnology Equipment and tools for plant cell culture, plant tissue culture, nuclear culture, embryo rescue, plant gene transfer, current topics in plant cell biotechnology

AG 207 601 Soil Resources and Sustainable Agriculture Role of soil in the environment its importance as a natural resource in agricultural and environment, fundamental of soil science such as soil composition, soil formation, soil physical, chemical and biological characteristics, land resource degradation and management approaches on soil pollution and their effects on soil

due to mismanagement, role of soil in maintaining environmental integrity; forest and sustainable agriculture, soil, water and environment relationship, sustaining soil resources

AG 127 712 Soil Water and Plant Relationships Principle of plant physiology, important plant organ, water movement from soil to root, stem and leaves, transpiration to atmosphere, irrigation water management for crops water requirement, plant response to water deficit, interaction models of soil-water and plant relationship

AG 127 763 Ecological Risk Assessment and Remediation of Contaminated Land Awareness of the risks posed by contaminants in contaminated land, monitoring, ecological evaluations and risk assessment, biomonitoring in aquatic and terrestrial ecosystem, bio indicator, solution and appropriated techniques in remediation and restoration of contaminated land

AG 127 765 Water Security and Climate Change Definitions of water security and climate change, hydrological process, water demand and supply in socio-economic and environmental activities in watershed, water resource policy, cooperation or conflict of water uses, climate change impacts are altering hydrological systems and water resource in mitigations of quality, quality and timing, dealing with uncertainties of climate situations for securing water, case studies

AG 129 743 Agricultural Pollution and Management Principles of pollution and environmental study, agricultural pollution contamination in ecosystem and environments, principles of toxicology, environmental pollution, environmental pollution control and management, case study on agricultural pollutants, integrated technique for optimizing agricultural pollution from agro-ecosystem

AG 129 762 Soil Biotechnology Principles of soil biotechnology, soil microorganisms, soil microorganism's product, application of soil biotechnology for agriculture and environment

AG 157 711 Advanced Agribusiness Management Concept of agribusiness, structure of agribusiness system, agribusiness management process, role of agribusiness manager in problem solving and decision making, agribusiness marketing management and consumer behavior, agro industrial economics, strategic management process in agribusiness, environmental scanning and strategy formulation process, sources of risk and risk management strategies in agribusiness

AG 157 721 Advanced Marketing Management in Agribusiness Concept and applied marketing in agribusiness, analyzing consumer market, identifying market segments and targets, product and brand equity strategies, developing pricing strategies, managing distribution channel strategies, marketing communication strategies, digital marketing

AG 157 731 Financial Management and Project Analysis in Agribusiness Concepts of financial management concept for agribusiness enterprises, money and capital markets, financing acquisition for agribusiness, financial report and analysis, time value of money, investment project concept, project cycle, and feasibility analysis of project

Thesis

AG 207 898 Thesis Conducting research and using research process to improve learning skill; critical thinking skill; identify and formulate research problem; advance knowledge, and apply knowledge to solve problem in agriculture and related fields, including writing research proposal, conducting research, writing research progress report; research article; and thesis under the supervision of thesis advisory committee (For Plan A Type 1)

AG 207 899 Thesis Conducting research to improve knowledge; research skill; critical thinking skill; identify and formulate research problem; advance knowledge; and apply knowledge to solve problem in agriculture and related fields, including writing research proposal, conducting research, writing research progress report; research article and thesis under the supervision of thesis advisory committee (For Plan A Type 2)

Graduation Conditions:

- Earning the total number of credits mentioned in curriculum regulation
- Average of cumulative GPA of coursework is not less than 3.00.
- Passed the standards English skills announced by the KKU Graduate School
- Thesis work or a part of thesis work must be published or accepted for publication in a quality academic journal (listed in TCI or SCOPUS or ISI)

At least 2 papers for Plan A Type 1
At least 1 paper for Plan A Type 2

Applicant Qualifications:

- Graduates with a bachelor's degree or equivalent
- Additional properties:

Plan A Type 1 There are agriculture work experience /or approved by the curriculum committee.

Plan A Type 2 Average of bachelor's degrees GPA is not less than 2.50 out of 4.00 or equivalent /or approved by the curriculum committee.

Document Required:

- TIPP Application Form and Medical Report (The form could be found at: https://tica-thaigov.mfa.go.th/en/page/75500-tipp-application-form?menu=605b13dbb6f1b76ed31778b3)
- Transcript
- Recommendation Letter
- English Test

Contact:

1. Assoc. Prof. Dr. Nakorn JONGRUNGKLANG (Program Chairman)
Tel: 098-2255598 E-mail: nuntawootjrk@gmail.com

2. Miss Sununtha Tinpana (International Relations Officer)
Tel: 063-6346520 E-mail: sunuti@kku.ac.th

For more information:

Human Resources Development Cooperation Division
Thailand International Cooperation Agency (TICA)
Government Complex, Building B (South Zone), 8th Floor,
Chaengwattana Rd. Laksi District, Bangkok 10210 THAILAND
Tel. +66 (2) 203 5000 ext. 43305, 43306 Fax: +66 (2) 143 8451
E-mail: tipp@mfa.mail.go.th

***The application procedure will complete when TICA has received the hard copy of the application form and other related documents through the Royal Thai Embassy/Permanent Mission of Thailand to the United Nations/Royal Thai Consulate – General accredited to eligible countries/territories.