DOCTOR OF PHILOSOPHY PROGRAM IN AGRICULTURAL SCIENCE

- FACULTY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT

DOCTOR OF PHILOSOPHY PROGRAM IN AGRICULTURAL SCIENCE

Agricultural Science's mission is to promote welfare of human communities through basic and advanced research findings regarding conservation of natural and agro-ecosystems, as well as food production, management, utilization, and development of bioresources to support daily living and health.

Outcomes accrued overtime from this program are research reports, dissertations, and innovations, which are widely accepted and referred to both at the national and international levels. Basically, our academic accomplishments are applicable to the society as a whole; therefore, they are well received.

Our renowned faculty members are trained and experienced with expertise in diverse areas. The emphasis is placed on disseminating analytical thinking for practical professional usage. Consequently, our doctoral graduates are keen in research skills, equipped in carrying out in-depth research for top-up discoveries in agricultural science and vicariously support national developments.

Objectives

Our doctoral graduates will demonstrably possess:

- A coherent and disciplined body of research skills, capable of in-depth inquiries in acquiring new knowledge within the field of Agricultural Science.
- The ability to combine and integrate practical Agricultural Science for appropriate application in ASEAN geosocial contexts.
- A high level of academic and professional ethics.

Admission

In accordance with the Graduate School Rules and Regulations. The program committee reserves the rights to require more qualifications as deemed appropriate.

Medium of Instruction

Thai and English

Research Focus

- Genetically Modified Crops
- Postharvest Physiology and Technology
- Insect Pest Management
- Technology for Biofertilizer Production

Requirement for Graduation

In accordance with the Graduate School Rules and Regulations with the following additional requirements.

- Participate and present a paper in a seminar every semester throughout the program (at least 3 semesters).
- Present at least one paper at an academic conference in the national or international areas.
- Recipients of scholarships or research grants are to comply with the funder's requirements.
- As for publications,

Option 1.1 : One publication in a national journal and one in an international journal.

Option 2.2 : One publication in an international journal.

Doctor of Philosophy Program in **Agricultural Science**

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Structure of the Program

1. Credit Requirements. *

Requirements	Option 1.1	Option 2.1
Coursework	-	12
Core Courses	-	6
Electives	-	6
Required Non-credit Courses	3	3
Dissertation	48	36
Total	**48**	**48**

* Minimum credits required.

2. Core Courses

Requirements	Option 1.1		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Essential Tools for Advanced Agricultural Science Research	-	-	107611	3
Sustainable Agricultural Production System	-	-	107612	3
Total	**0**	**0**	**2**	**6**

3. Electives

Requirements	Option 1.1		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Genetically Modified Crops	-	-	107621	3
Essential Molecular Biology	-	-	107622	3
Postharvest Physiology and Technology of Perishable Crops	-	-	107623	3
Agricultural Nanotechnology	-	-	107624	3
Epidemioloy and Plant Disease Management	-	-	107631	3
Insect and Plant Relationship	-	-	107632	3
Advanced Insect Pest Management	-	-	107633	3
Plant Pathogen and Host Relationships	-	-	107634	3
Ecological Soil Microbiology	-	-	107635	3
Biological Nitrogen Fixation	-	-	107636	3
Soil Water and Plant Management	-	-	107637	3
Technology for Biofertilizer Production	-	-	107638	3
Total	**0**	**0**	**12**	**≥6**

4. Required Non-credit Courses.

Requirements	Option 1.1		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Seminar in Agricultural Science 1	107601	1	107601	1
Seminar in Agricultural Science 2	107602	1	107602	1
Seminar in Agricultural Science ต 3	107603	1	107603	1
Total	**3**	**3**	**3**	**3**

5. Dissertation Credit Requirements.

Requirements	Option 1.1		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Dissertation 1 Option 1.1	107691	8	-	-
Dissertation 2 Option 1.1	107692	8	-	-
Dissertation 3 Option 1.1	107693	8	-	-
Dissertation 4 Option 1.1	107694	8	-	-
Dissertation 5 Option 1.1	107695	8	-	-
Dissertation 6 Option 1.1	107696	8	-	-
Dissertation 1 Option 2.1	-	-	107697	3
Dissertation 2 Option 2.1	-	-	107698	6
Dissertation 3 Option 2.1	-	-	107699	6
Dissertation 4 Option 2.1	-	-	107791	6
Dissertation 5 Option 2.1	-	-	107792	6
Dissertation 6 Option 2.1	-	-	107793	9
Total	**6**	**48**	**6**	**36**

Course Descriptions

107601 Seminar in Agricultural Science 1 1(0-2-1)

Searching, analyzing, and criticising national and international scientific publications related to agricultural sciences, developing research topics, preparing a thesis proposal, and presenting it by way of oral presentation.

107602 Seminar in Agricultural Science 2 1(0-2-1)

Searching, analyzing, and criticising national and international scientific publications related to agricultural science, preparing a progress report of the thesis research, and delivering it by oral presentation.

107603 Seminar in Agricultural Science 3 1(0-2-1)

Searching, analyzing, and criticising national and international scientific publications related to agricultural science, preparing a research publication, and delivering it by oral presentation.

107611 Essential Tools for Advanced Agricultural Science Research 3(2-3-5)

Learning the use of conceptual tools to analyse agricultural science problems and the factors affecting the research process, employing appropriate computer tools for the required topics, and studying case studies.

107612 Sustainable Agricultural Production Systems 3(2-3-5)

A study of sustainable agricultural production systems, clean technologies, environmentally friendly materials selection, good agricultural practices, the reduction of chemical usage, low input agriculture, and sustainable pest management.

107621 Genetically Modified Crops 3(2-3-5)

Plant genetic engineering techniques, genetically modified crops that are grown commercially around the world and new varieties that are being developed, the safety record of genetically modified crops and the legislation that has been developed to cover their use, the concern of consumers, the genetically modified crop debate, and the prospects for genetically modified crops.

107622 Essential Molecular Biology 3(2-3-5)

A study of the following topics: essential molecular biology techniques for research; gene cloning; sequencing and PCR techniques for culturing Escherichia coli; purification of DNA, RNA, and cytoplasmic RNA; electrophoresis of DNA and RNA; restriction enzymes; preparation of vectors for molecular cloning experiments; construction of recombinant molecules; introduction of DNA into E coli cells; and recombinant selection.

107623 Postharvest Physiology and Technology of Perishable Crops 3(2-3-5)

A study of the biochemical, biophysical, and physiological changes that take place in harvested perishable crops; the consideration of methods and techniques to prolong product life and maintain the quality of perishable commodities; the use of storage facilities and techniques; quality evaluation and physiological mechanisms; and the control of maturation, ripening, and senescence of perishable commodities.

107624 Agricultural Nanotechnology 3(2-3-5)

This course examines the following topics: the potential applications of nanotechnology in the science of agriculture, including plant disease and animal health, for prevention and treatment systems; nanobiotechnology for crop and livestock production; use of nanotechnology in modern agriculture; the magnitude of effects on agriculture and related knowledge

fields; nanotechnology and natural resources; farming, fisheries, and livestock management; and nanomaterial and nanoparticles use in agricultural industries.

107631 Epidemiology and Plant Disease Management 3(2-3-5)

A study of the following: epidemiological concepts of plant pathology, plant disease diagnosis, assessment of plant disease severity, plant disease variations in virulence and fungicide resistance and their application to disease control, infection strategies of plant parasites, the dispersal of foliar plant pathogens, soil borne and seed borne diseases, and patterns of disease epidemics.

107632 Insect and Plant Relationships 3(2-3-5)

Examination of co-evolution between insects and plants, causes and types of relationships, host plant selection and interactions between insects and plants, applications, and case studies.

107633 Advanced Insect Pest Management 3(2-3-5)

A study of the following topics: major insect pests in economic crops focusing on their biology, ecology, and economy; conventional control methods and their environmental impacts; statistical methods and modeling for insect pest management; systems approaches to insect pest management programs to control the insect pests of economic crops; the evaluation of control efficiency; cost/benefit analysis; environmental impacts; public acceptance; and field trials of insect pest management on economic crops.

107634 Plant Pathogen and Host Relationships 3(2-3-5)

Topics for study include: the relationships between pathogens and host plants and disease appearance, steps of infection and interaction leading to disease development, genetic variations in plant pathogens, genetic

interactions between resistant and non-resistant plants with pathogens, and plant disease resistance selection theories.

107635 Ecological Soil Microbiology 3(2-3-5)

Examination of the importance of soil microbes on soil ecology, the roles and activities of soil microbes, the influences of different land use on soil microbial activities, and soil properties and the environment including case studies and field excursions.

106736 Biological Nitrogen Fixation 3(2-3-5)

A study of the roles, importance, and types of biological nitrogen fixation (BNF) and nitrogen fixation involving microorganisms; the processes of BNF by nitrogenase; the biochemistry of nitrogenase and factors affecting its activity; and methods of determining nitrogen fixation effectiveness.

107637 Soil Water and Plant Management 3(2-3-5)

The management of soil, water, and plants that affects their growth and yields; relationships amongst soil, water, and plants; water holding capacities of soils; transportation of nutrients and water in soil; nutrients and water absorption of plant roots; mechanisms of water translocation in plants; and loss of water from plants and soil.

107638 Technology for Biofertiliser Production 3(2-3-5)

Types of biofertilser, yields, improvements by the use of biofertilisers and environmental conservation considerations, material selection for biofertiliser production, materials and technology for granular organic fertiliser production, efficient liquid biofertiliser production, types of crops and good agricultural practices (GAP) in using biofertilisers, and granular organic fertilizer production plants on an industrial scale.

107691 Dissertation 1, Option 1.1 8Credits

Conducting an extensive literature review related to the proposed research; preparing a draft research proposal which includes the research topic, a statement of the research problem, justification for the research, the research objectives, and procedures in brief; and submitting the proposal to the dissertation advisor.

107692 Dissertation 2, Option 1.1 8Credits

Preparing and submitting a completed dissertation proposal comprising details of the research components, nominating a prospective dissertation advisor to the Graduate School, taking a dissertation defense, and submitting a progress report to the dissertation advisor.

107693 Dissertation 3, Option 1.1 8Credits

Designing and conducting experiments, collecting and analysing data, and submitting a progress report to the dissertation advisor.

107694 Dissertation 4, Option 1.1 8Credits

Conducting experiments, collecting and analysing additional data, and submitting a progress report to the dissertation advisor.

107695 Dissertation 5, Option 1.2 8Credits

Finalising experiments, completing the analysis of the data, and preparing and submitting a final progress report to the dissertation supervisor.

107696 Dissertation 6, Option 1.1 8Credits

Preparing a dissertation, taking a final dissertation defense, making any rectifications necessary, and submitting the completed dissertation to the Graduate School.

107697 Dissertation I, Option 2.1 3Credits

Conducting an extensive literature review of topics related to the proposed research; preparing a draft research proposal which includes a research topic, the research problem statement, research objectives, justification for the research, and research procedures in brief; and submitting the proposal to the dissertation advisor.

107698 Dissertation 2, Option 2.1 6Credits

Preparing and submitting a completed dissertation proposal comprising details of the research components, nominating a prospective dissertation advisor to the Graduate School, taking a dissertation defense, and submitting a progress report to the dissertation advisor.

107699 Dissertation 3, Option 2.1 6Credits

Preparing and submitting a completed dissertation proposal comprising details of the research components, nominating a prospective dissertation advisor to the Graduate School, taking a dissertation defense, and submitting a progress report to the dissertation advisor.

107791 Dissertation 4, Option 2.1 6Credits

Conducting experiments, collecting and analysing additional data, and submitting a progress report to the dissertation advisor.

107792 Dissertation 5, Option 2.1 6Credits

Finalising experiments, collecting and analysing data, preparing, and submitting a final progress report to the dissertation advisor.

107793 Dissertation 6, Option 2.1 9Credits

Preparing a dissertation, taking a final dissertation defense, and making any necessary rectifications or modifications before submitting a completed dissertation to the Graduate School.