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Participatory and Integrative Support for Agricultural Initiative

Double Degree Master Programme in the field of Sustainable Agriculture

Structure Subjects and Accreditation Process

Collaboration of

Prince of Songkla University, Kasetsart University,
Chiang Mai University, and Khon Kaen University



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Structure of Double Master's Degree Program in Sustainable Agriculture

1. Introduction

Double Master's Degree Program in Sustainable Agriculture is developed with the support of ERASMUS+ Capacity Building Program of the European Union by the project entitled Participatory and Integrative Support for Agricultural Initiative – PISAI. The project was proposed for a support in February 2017 and received positive results.

The project involves 4 main Thai universities situated in key agricultural production areas that cover different geographical parts of the country, Kasetsart University in Bangkok, the center of country development, Prince of Songkla University, the hub of higher education in the South of Thailand, Chiangmai University, the Northern education hub and Khon Kaen University, the educational hub in the Northeast. The four Thai consortium universities have had a large impact on agricultural science with high quality education, and have long term experience in EU project management and participation.

Double degree arrangements between Thai universities are not common or rarely implemented. However, there are a number of double degree programs between one Thai HEI with overseas institutes, particularly in Europe. The initiative in creating double degrees at the master's degree level between the key agricultural institutes (PSU, KU, CMU and KKU) under this project is a breakthrough in Thailand. Active cooperation with participation of practical entrepreneurs under supervision of academics and practitioners will bring about the outputs and outcomes applicable to the actual production situations which are the most important element in a successful education project goal. An innovative approach will be ensured by external assessment and a self-monitoring process.

2. Background on development of double master degree program

Development of the double degree program initiated by PISAI project with the support from Erasmus+ is based on the existing approved master programs in agriculture at PSU, KU, CMU and KKU. This is due to the fact that a creation of a new double degree between partners is a long process of more than 3 years while the project duration is only 3 years.

The development of the double degree master program is composed of three key components, as shown in Figure 1, which are 1) the existing master programmes at faculty of agriculture/natural resources 2) development of formal collaboration of the four Thai partners on double degree master programmes and 3) creation of modules to be added on/integrated into student study plan to serve the aims in laying foundation in sustainable agriculture.

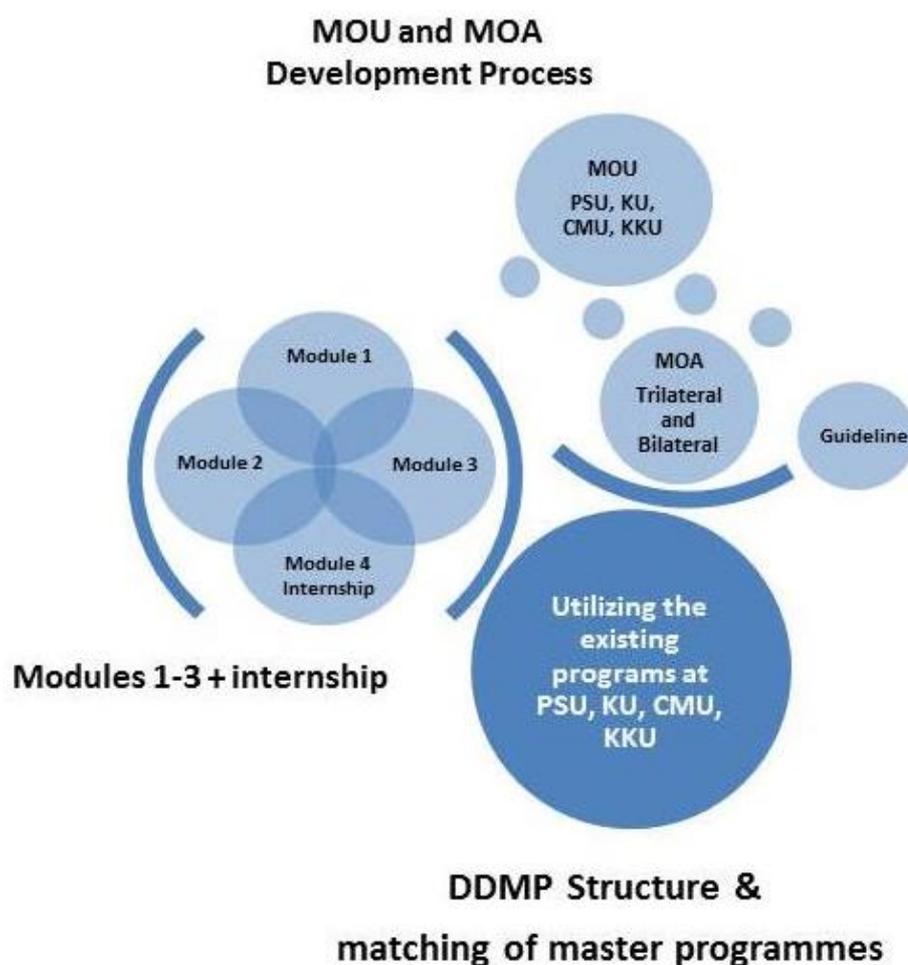


Figure 1 Development of the double degree master programme in sustainable agriculture

2.1 Development of Memorandum of Understanding (MoU) and Memorandum of Agreement (MOA)

Under the scope of this collaboration, Memorandum of Understanding (MoU) and Memorandum of Agreement (MoA) has been developed and signed between Thai partner universities to enable the endorsement process at each university. These MOU and MOA will ensure and facilitate continuation of the cooperation that has been started by this project and will provide opportunity for creation of such cooperation with interested new partners both in Thailand and ASEAN.

The signed MOU of the four Thai universities and MoA (Trilateral and Bilateral Agreement) for double master degree programme collaboration are in the **Appendix A and B**.

2.2 Development of four modules

The Modules 1-3 were developed as an add-on to the regular programme, as compulsory which were co-created by Thai responsible universities and the EU counterparts as discussed and agreed during the kick-off meeting in January 2018. Each module is 21 days and offered by Thai partner universities with guest lectures from EU partners.

Every student is required to participate in the Modules 1-3 at the responsible university. For the Module 4 which is practical field attachment, students can choose at his/her own choice as agreed by the advisor. The four modules are listed below in Table 1.

Table 1. The four modules developed for students enrolling in the DDMP

Modules
Module 1 – Value Chain Management
Students will be taking this module at Chiang Mai University in August
Module 2 – Ecosystems/Environment in Agricultural Production
Students will be taking this module at Khon Kaen University in November
Module 3 – Challenges and Opportunities for Sustainable Agricultural Production
Students will be taking this module at Kasetsart University in February-March
Module 4 –Internship (Field Attachment at a Farm/Production Site)
Students will be taking this module that organized through Prince of Songkla University

2.3 Preparation for the DDMP

- Introduction of the concept and possible structure of DDMP to consortium partners at kick-off meeting of the PISAI Project was on January 9-10, 2018.

- Thai partners and the development of the DDMP
Each Thai partner university introduced the concept and structure of DDMP to different programs at the faculty level and program level. Regulations and rules at each university were prepared and discussed at the workshop held at CMU in March 2018. To prepare for student recruitment, general qualifications and criteria were discussed and agreed by all partners. However, each specific qualifications issued by each home university is respected.
- Roles of EU partners
EU partners are involved from the beginning at the brainstorming of the DDMP development and formulation of modules at kick-off meeting and over the duration of the development process through e-mail communication and several Skype meetings.

3. Structure of DDMP in Sustainable Agriculture

In Thailand, every higher educational programme including a master degree programme has to follow national regulations for programme development, management and quality assurance. In this regard, only the master programme will be described for the structure of a single degree which serves as a basis for the double degree programme between Thai partners under PISAI project.

3.1 Regular Master's Degree Programme Structure

A program of study with the emphasis on academic and research development in various areas at a level higher than a bachelor's degree or a graduate diploma, the program consists of at least 36 credits of study with 2 study plans to choose from:

Plan A – Research oriented plan which has two options:

Plan A1 - Thesis of 36 credits. Students may be assigned for additional audit coursework.

Plan A2 - Combined coursework and thesis with at least 18 thesis credits and 18 coursework credits.

Plan B - Coursework oriented plan

Students take coursework with a minor thesis (independent study) of at least 6 credits.

3.2 Structure of Double Degree Master's Programme in Sustainable Agriculture

At the four Thai partner universities, the master degree's programmes being offered cover both Plan A (A1 and A2) and Plan B. Utilizing the existing programmes governed and approved by national policy, there are four options of the double master degrees that each student together with their advisors at home and host university can design for study plan as shown in Figures 2. The three modules are added on to the study plan at the suitable period for both Thai and EU partners to jointly organize the teaching and learning activities.

Plan A 1		
Year 1	Subject	Credit
Semester 1	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Semester 2	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Year 2		
Semester 1	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Semester 2	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Total		36 credits

Advisors and students will plan for registration at home and host university for the total of 36 credits at each university.

Option 1: 100% Thesis

Year 1 - at home university
(100% of research, seminar if required)

Modules 1-3 compulsory

Year 2 - at host university
(100% of research, seminar if required)

Conditions for graduation:

minimum 1 national/international paper depending on home/host university regulations

Plan A 2		
Year 1	Subject	Credit
Semester 1	XXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXX	x (x-x-x)
Semester 2	XXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXX	x (x-x-x)
	Thesis	x (x-x-x)
Year 2		
Semester 1	Thesis	x (x-x-x)
Semester 2	Thesis	x (x-x-x)
Total		36 credits

Advisors and students will plan for registration at home and host university for the total of 36 credits at each university.

Option 2: Courses+Thesis

Year 1 - at home university
(coursework, research proposal Preparation, research)

Modules 1-3 compulsory

Year 2 - at host university
(100% of research, seminar if required and credit transfer of courses from home univ.)

Conditions for graduation:

minimum 1 national/international paper depending on home/host university regulations

Figures 2-1 Structure and options 3 and 4 (Plan A1+A2 and B+A1) for students to undertake double master degree program under in sustainable agriculture PISAI consortium.

Plan A1 and A2		
Year 1	Subject	Credit
Semester 1	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Semester 2	Thesis	x (x-x-x)
	Seminar	x (x-x-x)
Year 2		
Semester 1	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
Semester 2	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
	Thesis	x (x-x-x)
	Total	36 credits

Advisors and students will plan for registration at home and host university for the total of 36 credits at each university.

Plan B and A1		
Year 1	Subject	Credit
Semester 1	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
Semester 2	XXXXXXXXXXXXX	x (x-x-x)
	XXXXXXXXXXXXX	x (x-x-x)
	Independent	x (x-x-x)
Year 2		
Semester 1	Thesis	x (x-x-x)
Semester 2	Thesis	x (x-x-x)
	Total	36 credits

Advisors and students will plan for registration at home and host university for the total of 36 credits at each university.

Option 3: Plan A1 and A2

Year 1 - at home university
Plan A1 - (100% of research, seminar if required)

Year 2 - at host university
Plan A2- (coursework and thesis research)

Modules 1-3 compulsory

Conditions for graduation:
minimum 1 national/international paper depending on home/host university regulations

Option 4: Plan B and A1

Year 1 - at home university
Plan B (coursework independent study and research plan for study at host)

Year 2 - at host university
Plan A1 (100% of research, seminar if required)

Modules 1-3 compulsory

Conditions for graduation:
minimum 1 national/international paper depending on home/host university regulations

Figures 2-2 Structure and options 3 and 4 (Plan A1+A2 and B+A1) for students to undertake double master degree program in sustainable agriculture under PISA1 consortium.

4. Matching of master’s programmes in agriculture at four Thai partner universities

The matching of double degrees is confined to the master programmes offered by the Faculty of Natural Resources at PSU, Faculty of Agriculture at KU, Faculty of Agriculture at CMU and Faculty of Agriculture at KKU. The eligible programmes as listed in Table 3 are approved, accredited and endorsed by each partner university mechanisms and the Ministry of Education, Government of Thailand.

Table 2. Existing master programmes for students enrolling in the DDMP at four participating Thai universities.

Prince of Songkla University	Kasetsart University	Chiang Mai University	Khon Kaen University
Faculty of Natural Resources	Faculty of Agriculture	Faculty of Agriculture	Faculty of Agriculture
<ol style="list-style-type: none"> 1. Agricultural Development 2. Animal Science 3. Entomology 4. Plant Pathology 5. Plant Science 6. Soil Science 7. Aquatic Science 	<ol style="list-style-type: none"> 1. Agricultural Extension 2. Agronomy 3. Agricultural System technology 4. Animal Science 5. Entomology 6. Plant Health 7. Plant Pathology 8. Horticulture 9. Soil Science 10. Tropical Agriculture 	<ol style="list-style-type: none"> 1. Agricultural Extension 2. Agronomy 3. Agribusiness 4. Agricultural Economics 5. Animal Science 6. Entomology 7. Plant Pathology 8. Horticulture 9. Soil Science and Natural Resource Management 10. Agricultural System Management (international program) 	<ol style="list-style-type: none"> 1. Agricultural Extension And Development 2. Agronomy 3. Agribusiness 4. Agricultures 5. Animal Science 6. Entomology 7. Plant Pathology 8. Horticulture 9. Soil Science and Environment 10. System Approaches in Agriculture for Sustainable Development 11. Fisheries

A student may be enrolled in Plant Sci. at PSU, the home institute, and in Horticulture at KU, the host institute, for the second degree. However, students may be in two related fields of study such as Aquatic Sci. at PSU and Agricultural Extension at CMU conducting thesis research in relation to farmers. Therefore, there is flexibility for students and the advisors at involving universities to plan for the most beneficial research for all parties. Coordinators of both home and host universities will coordinate with professors/teaching staff of the identified programmes for a student. The preparation of the mentioned tasks for the in-coming students begins from application and interview process where students are co-interviewed by consortium partners. During the interview, applicants are informed of study plan and steps to proceed at home and host universities.

A better picture of the DDMP coordination is simplified in examples given as follows.

Example Case 1:**Miss A**

Home university: Prince of Songkla University (M.Sc. Entomology)
 Host University: Kasetsart University (M.Sc. Entomology)

Option 1: Plan A1

Year 1 – PSU (M. Sc. Entomology)

PSU	Subject	Credit
Semester 1	Thesis	18
Semester 2	Thesis	18

Year 2 - KU (M. Sc. Entomology)

KU and PSU	Subject	Credit
Semester 1	Thesis	18
Semester 2	Thesis	18
Semester 1 (Maintaining student status at PSU)	-	-
Semester 2 (Maintaining student status at PSU)	-	-

1. Operation of the DDMP and activity for students

Example Case 2:**Miss B**

Home university: Prince of Songkla University (M.Sc. Plant Sci.)
 Host University: Kasetsart University (M.Sc. Agronomy)

Option 2: Plan A2

Year 1 – PSU

PSU	Subject	Credit
Semester 1	Compulsory courses	9
	Thesis	9
Semester 2	Elective courses	9
	Thesis	9

Year 2 - KU

KU and PSU	Subject	Credit
Semester 1	Compulsory courses	9
	Elective course	6
	Seminar	1
	Thesis	18 (transfer)
Semester 2	Elective course	7 (transfer)
	Seminar	1
	Thesis	18
Semester 1 (Maintaining student status at PSU)	-	-
Semester 2 (Maintaining student status at PSU)	-	-

Example Case 3:**Miss C**

Home university:

Prince of Songkla University (M.Sc. Plant Sci.)

Host University

Kasetsart University (M.Sc. Agronomy)

Option 3: Plan A1 and A2

Year 1 – PSU

PSU	Subject	Credit
Semester 1	Thesis	18
Semester 2	Thesis	18

Year 2 - KU

KU and PSU	Subject	Credit
Semester 1	Compulsory courses	9
	Elective course	6
	Seminar	1
	Thesis	18 (transfer)
Semester 2	Elective course	7
	Seminar	1
	Thesis	18
Semester 1 (Maintaining student status at PSU)	-	-
Semester 2 (Maintaining student status at PSU)	-	-

Example Case 4:**Miss D**

Home university:

Chiang Mai University (M.Sc. Agricultural Business)

Host University

Prince of Songkla University (M.Sc. Agricultural Development)

Option 4: Plan B and A1

Year 1 – CMU

PSU	Subject	Credit
Semester 1	Compulsory courses	9
	Elective course	6
	Elective course in other programme	3
	Seminar	1
Semester 2	Compulsory courses	7
	Elective course	3
	Elective course in other programme	3
	Seminar	1

Year 2 - PSU

PSU and CMU	Subject	Credit
Semester 1	Thesis	18 (Transfer to CMU 6 credit for independent study)
Semester 2	Thesis	18
Semester 1 & 2 (Maintaining student status at CMU)	-	-

5. Subjects at Four Thai Partner Universities

Compulsory and Elective Courses/Subjects of M.Sc. Programmes (PSU, KU, CMU and KKU)

PLANT SCIENCE

PSU		KU		CMU		KKU	
Plant Science		Horticulture		Horticulture		Horticulture	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Research Methods in Agriculture	3(2-3-4)	Research Methods in Horticulture	3(2-3-6)	Seminar 1	1(1-0-2)	Advanced Environmental Physiology of Horticultural Crop Production	3(2-3-5)
Advanced Crop Physiology	3(3-0-6)	Advanced Physiology of Horticultural Crop Production	3(3-0-6)			Seminar in Horticulture I	1(1-0-2)
Current Topics in Plant Science	1(0-2-1)	Advanced Horticultural Breeding	3(2-2-5)			Seminar in Horticulture II	1(1-0-2)
Graduate Plant Science Seminar I	1(0-2-1)					Research Methods in Plant Science	3(2-3-5)
Graduate Plant Science Seminar II	1(0-2-1)						
Elective		Elective		Elective		Elective	
Crop Biotechnology	3(2-3-4)	Medicinal Plant Production	3(2-3-6)	Use of Plant Growth Regulators in Agriculture	3(2-3-4)	Postharvest Physiology of Horticultural Crops	3(3-0-6)
Advanced Crop Biotechnology	3(2-3-4)	Physiology of Vegetable Production	3(2-2-5)	Plant Tissue Culture in Agriculture	3(2-3-4)	Nutrition of Horticultural Crops	3(2-3-5)
Crop Genetic Engineering	3(2-3-4)	Vegetable Production in Soilless Culture	3(2-2-5)	Cytogenetics in Agriculture	3(2-3-4)	Physiology of Flower	3(3-0-6)
Crop Molecular Genetics	3(2-3-4)	Physiology of Ornamental Plant Production	3(2-2-5)	Postharvest Physiology of 3(2-3-4) Mineral Nutrition in Horticultural	3(2-3-4)	Advanced Plant Growth Regulators in Horticulture	
Plant Cell Technology	3(2-3-4)	Commercial Production of Ornamental Plants	3(2-2-5)	Crop Production	3(3-0-6)	Horticultural Crop Breeding	3(3-0-6)
Agroecosystems	3(3-0-6)	Commercial Orchid Production	3(2-2-5)	Plant Microtechnique in Horticulture	3(1-6-2)	Horticultural Crop Improvement for Resistance to Biotic and Abiotic Stress	3(2-3-5)
Ecological Agricultural Systems	3(3-0-6)	Ornamental Bulb Science	3(2-2-5)	Breeding and Advanced Horticultural Crop Improvement	3(3-0-6)	Horticultural Crop Breeding Techniques	1(0-3-1)
Advanced Weed Science	3(3-0-6)	Industrial Fruit Crops I	3(2-2-5)	Systematics of Horticultural Crops	4(3-3-6)	Biotechnology and Molecular Biology for Horticultural Crop Production and Breeding	3(2-3-5)
Precision Agriculture Technology for Crop Production and Management	3(2-3-4)	Industrial Fruit Crops II	3(2-2-5)	Physiology of Flower Bulbs	3(3-0-6)	Physiology of Horticultural Seed and Propagules and Quality Control	3(3-0-6)
Crop Ecophysiology and Adaptation	3(3-0-6)	Physiology of Fruit crops	3(2-3-6)	Advanced Orchidology	3(3-0-6)	Special Problems in Horticulture	3(0-9-5)
Applied Plant Nutrition	3(2-3-4)	Subtropical and Temperate Fruits	3(2-2-5)	Advanced Postharvest Physiology	3(3-0-6)	Precision Agriculture and Smart Farming	3(3-0-6)
Advanced Physiology in Horticulture	3(3-0-6)	Tropical Economic Fruit Crops	3(2-2-5)	Vegetable Crop Improvement	3(3-0-6)	Quantitative Genetics and Advanced Crop Improvement	3(3-0-6)
Advanced Post-Harvest Physiology of Horticult. Crops	3(3-0-6)	Physiology of Horticultural Plants under Stress	3(3-0-6)	Physiology of Vegetable Crops	3(3-0-6)		
Physiology of Growth and Development in Tropical Fruit Crops	3(3-0-6)	Advanced Plant Growth Regulators in Horticulture	3(3-0-6)	Physiology Economic Fruit Crops	3(3-0-6)		
Precision in Crop Growth Analysis	3(3-0-6)	Plant Tissue Culture in Agriculture	3(2-2-5)	Selected Topics in Horticulture 1	1(1-0-2)		
Plant Climate	3(3-0-6)	Landscape Planning Studio	3(2-3-6)	Selected Topics in Horticulture 2	2(2-0-4)		
Advanced Plant Growth Regulators in Horticulture	3(3-0-6)	Urban Plaza	3(3-0-6)	Selected Topics in Horticulture 3	3(3-0-6)		
Modeling in Crop Production	3(3-0-6)	Floricultural Crop Improvement	3(2-2-5)				
Carbon and Water Footprints of Crop Production	3(2-3-4)	Ornamental Plant Cultivar Development	3(2-3-6)				
Analysis of Plant Growth Regulators	3(2-3-4)	Methods in Fruit Breeding	3(1-6-5)				

Remark: PSU = Prince of Songkla University, Ku = Kasetsart University, CMU = Chiang Mai University, KKU = Khon Kaen University

PSU		KU	
Plant Science		Horticulture	
Elective		Elective	
Subject	Credit	Subject	Credit
Improvement of Horticultural Crops	3(2-3-4)	Molecular Genetics for Horticultural Crops	3(3-0-6)
Advanced Plant Breeding I	3(3-0-6)	Horticultural Seed Production	3(2-2-5)
Advanced Plant Breeding II	3(3-0-6)	Postharvest Physiology of Fruits, Vegetables and Flowers	3(3-0-6)
Cytogenetics in Plant Breeding	3(3-0-6)	Statistical Applications in Horticultural Research	3(2-3-6)
Crop Evolution	3(3-0-6)	Selected Topics in Horticulture	3(3-0-6)
Crop Improvement for Tolerance to Abiotic Stress	3(2-3-4)	Special Problems	1-3
Seed Technology	3(2-3-4)		
Seed Production	3(2-3-4)		
Seed and Grain Conditioning and Storage	3(2-3-4)		
Seed Physiology	3(3-0-6)		

PSU	KU		CMU		KKU	
Agronomy is within Plant Sci. programme	Agronomy		Agronomy		Agronomy	
	Compulsory		Compulsory		Compulsory	
	Subject	Credit	Subject	Credit	Subject	Credit
	Field Crop Production and Natural Resource Management	3(3-0-6)	Seminar in Agronomy 1	1(1-0-2)	Research Methods in Plant Science	3(2-3-5)
	Advanced Physiology of Crop Production	3(3-0-6)	Seminar in Agronomy 2	1(1-0-2)	Field Plot and Greenhouse Experimental Techniques	1(0-3-1)
	Research Methods in Agronomy	3(3-0-6)	Communications in Agricultural Science	1(1-0-2)	Measurement Techniques in Advanced Research	1(0-3-1)
			Techniques in Crop Improvement	1(0-3-1)		
			Agronomy Seminar I	1(1-0-2)		
			Agronomy Seminar II	1(1-0-2)		
	Elective		Elective		Elective	
	Advanced Forage Crops	3(3-0-6)	Physiology of Crop Production	3(3-0-6)	Physiological Response of Crop to Environment	3(3-0-6)
	Production of Industrial Field Crops	3(3-0-6)	Storage of Field Crop Products	3(3-0-6)	Plant Nutrition and Metabolism	3(3-0-6)
	Crop Microclimate	3(3-0-6)	Crop Production in Environmental Stress	3(3-0-6)	Application of Physiology in Crop Production	3(3-0-6)
	Crop Adaptation	3(3-0-6)	Ecology of Agronomic Crop	3(3-0-6)	Agricultural Systems	3(3-0-6)
	Plant Nutrition in Field Crops	3(3-0-6)	Experimental Design and Analysis in Agriculture	3(3-0-6)	Decision Supporting System for Crop Production and Managements	3(2-3-5)
	Herbicide Physiology	3(3-0-6)	Crop Adaptation	3(3-0-6)	ASEAN Agriculture	3(3-0-6)
	Herbicide Physiology Laboratory	2(0-4-2)	Quantitative Genetics in Plant Breeding	3(3-0-6)	Precision Agriculture and Smart Farming	3(3-0-6)
	Crop Physiology under Environmental Stress	3(3-0-6)	Advanced Plant Breeding	3(3-0-6)	Sustainable Crop Production for Food Security and Food Safety	3(3-0-6)
	Pasture Management	3(3-0-6)	Seed Physiology	3(3-0-6)	Physiology and Biochemistry of Herbicides	3(3-0-6)
	Crop Evolution and Genetic Resources	3(3-0-6)	Seed Conditioning and Storage	3(2-3-4)	Plant cell Physiology and Environment	3(3-0-6)
	Quantitative Genetics in Plant Breeding	3(3-0-6)	Selected Topics in Agronomy 1	1(1-0-2)	Grain and Seed Quality Management and Control	3(3-0-6)
	Biometrical Procedures in Plant Breeding	3(3-0-6)	Selected Topics in Agronomy 2	2(2-0-4)	Seed Physiology	3(3-0-6)
	Biotechnology in Plant Breeding	3(3-0-6)	Weed Ecology	3(3-0-6)	Special Problems in Agronomy	3(0-9-4)
	Advanced Plant Breeding I	3(3-0-6)	Herbicides	3(3-0-6)	Crop Adaptation	3(3-0-6)
	Advanced Plant Breeding II	3(3-0-6)			Biotechnology for Crop Improvement	3(3-0-6)
	Breeding for Resistance to Diseases and Insects	3(3-0-6)			Crop Improvement for Tolerance to Biotic and Abiotic Stress	3(2-3-5)
	Breeding for Environmental Stresses	3(3-0-6)			Quantitative Genetics and Advanced Crop Improvement	3(3-0-6)
	Molecular Biology in Plan Breeding	3(2-3-6)			Molecular Techniques in Crop Improvement	3(1-3-3)
	Seed Physiology	3(3-0-6)			Plant Nutrition and Metabolism	3(3-0-6)
	Postharvest Management and Storage of Field Crops	3(3-0-6)			Special Problems in Agronomy	3(0-9-4)
	Research Techniques in Crop Production	3(2-3-6)				
Statistics and Computer Packages in Agronomic Research	3(3-0-6)					
Analytical Methods for Quantitative Genetics in Plant Breeding	3(2-2-5)					
Selected Topics in Agronomy	3(3-0-6)					
Special Problems	1-3					

PLANT HEALTH AND PEST MANAGEMENT

PSU		KU		CMU		KKU	
Plant Pathology		Plant Pathology		Plant Pathology		Plant Pathology	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Plant-Microbe Interaction	3(3-0-6)	Research Methods in Plant Pathology	3(2-3-6)	Research Techniques in Plant Pathology	3(2-3-5)	Research Methodology in Plant Pathology	3(2-3-5)
Molecular Diagnosis of Plant Diseases	3(2-3-4)			Seminar 1	1(1-0-2)	Seminar in Plant Pathology I	1(1-0-2)
Field Observation of Plant Disease	1(0-3-0)			Seminar 2	1(1-0-2)	Seminar in Plant Pathology II	1(1-0-2)
Seminar I	1(0-2-1)					Plant Pathogenesis and Epidemiology	3(3-0-6)
Seminar II	1(0-2-1)					Diseases of Economic Crops and Management	3(2-3-5)
Elective		Elective		Elective		Elective	
Principles of Plant Pathology	3(2-3-4)	Advanced Bacterial Diseases of Plants	3(1-6-5)	Genetics of Host-Parasite Interaction	3(3-0-6)	Selected Topics in Plant Pathology	3(3-0-6)
Resistance of Plant to Diseases	3(2-3-4)	Analyzing Phytopathogenic-Bacterial Researches	3(3-0-6)	Plant Histopathology	3(2-3-5)	Biotechnology in Plant Pathology	3(3-0-6)
Advanced Phytobacteriology	3(2-3-4)	Advanced Mycology	3(2-3-6)	Advanced Plant Pathology	3(2-3-5)	Phytopathology	3(2-3-5)
Taxonomy of Phytopathogenic Fungi	3(2-3-4)	Taxonomy of Basidiomycetes	3(2-3-6)	Ecology of Plant Pathogens	3(2-3-5)	Phytopathology	3(2-3-5)
Taxonomy of Basidiomycetes	3(2-3-4)	Physiology of Fungi	3(2-3-6)	Advanced Plant Pathogenic Bacteria	3(2-3-5)	Plant Virology	3(2-3-5)
Taxonomy of Basidiomycetes	3(2-3-4)	Genetics of Fungi	3(2-3-6)	Advanced Plant Pathogenic Fungi	3(2-3-5)	Phytopathology	3(2-3-5)
Physiology of Phytopathogenic Fungi	3(2-3-4)	Storage Molds and Mycotoxins	3(2-3-6)	Storage Molds and Mycotoxins	3(2-3-5)	Genetics and Physiology of Fungi	3(2-3-5)
Aquatic and Soil Fungi	3(2-3-4)	Phytopathogenic Microorganism Contaminant in Agricultural Product	3(2-3-6)	Applied Mycology in Agriculture	3(2-3-5)	Post-harvest Pathology of Vegetables and Fruits	3(2-3-5)
Algal Plant Diseases	3(2-3-4)	Advanced Nematology	3(2-3-6)	The Powdery Mildews	3(2-3-5)	Seed Pathology	3(2-3-5)
Molecular Plant Virology	3(3-0-6)	Advanced Plant Virology	3(3-0-6)	Taxonomy of Plant Parasitic Nematodes	3(2-3-5)	Microbiology in Crop Production	3(2-3-5)
Vector Transmission of Plant Viruses	3(2-3-4)	Physiological Plant Pathology	3(3-0-6)	Advanced Plant Nematology	3(2-3-5)	Special Problems in Plant Pathology	3(0-9-4)
Advanced Phytonematology	3(2-3-4)	Genetics of Host-Parasite Interaction	3(2-3-6)	Advanced Plant Virology	3(3-0-6)	Phytopathology and Agricultural Standards	3(3-0-6)
Chemicals in Plant Disease Control	3(2-3-4)	Genetic Data of Plant Pathogens and Bioinformatics	3(3-0-6)	Plant Virus Epidemiology	3(2-3-5)	Horticultural Crop Improvement for Resistance to Biotic and Abiotic	3(2-3-5)
Biological Control of Plant Pathogens	3(2-3-4)	Advanced Plant Pathology I	3(3-0-6)	Seed Pathology	3(2-3-5)		
Epidemiology and Plant Disease Management)	3(2-3-4)	Ecology of Plant Pathogens	3(2-3-6)	Serological Techniques in Plant Pathology	3(2-3-5)		
Special Problems	3(0-6-3)	Advanced Plant Disease Control	3(3-0-6)	Molecular Plant Pathology	3(2-3-5)		
Selected Topics in Plant Pathology I	3(3-0-6)	Natural and Synthetic Chemicals in Plant Disease Control	3(2-3-6)	Biotechnology for Plant Protection	3(3-0-6)		
Selected Topics in Plant Pathology II	3(3-0-6)	Biological Control of Plant Pathogens	3(2-3-6)	Biological Control of Plant Diseases	3(2-3-5)		
		Plant Disease Epidemiology	3(2-3-6)	Chemical Control of Plant Diseases	3(2-3-5)		
		Sustainable Plant Disease Control	3(2-3-6)	Special Problem	1(0-9-0)		
		Plant Disease Biosecurity	3(3-0-6)	Selected Topic in Plant Pathology	1(1-0-2)		
		Advanced Seed Pathology	3(2-3-6)				
		Postharvest Diseases of Perishable Crops	3(2-3-6)				
		Post-Harvest Plant Health and Quarantine	3(3-0-6)				
		Plant Disease Diagnosis by Serology-Based Techniques	3(2-3-6)				
		Recombinant Protein of Plant Pathogens and Application of Aptamer for Disease Diagnosis	3(2-3-6)				
		Plant genetic Engineering for Disease Resistance	3(1-6-5)				
		Selected Topics in Plant Pathology	1-3				
		Special Problems	1-3				

KU	
Plant Health	
Compulsory	
Subject	Credit
Professional Ethic of Plant Doctor	2(1-3-4)
Research Methods in Plant Health	3(3-0-6)
Elective	
(Pest Incursion of Economic Crops	3(3-0-6)
Plant Pest Bioinformatics	3(3-0-6)
Seed Health	3(2-3-6)
Herbal Medicines for Plant Health	3(3-0-6)
Microbes in Plant Health Management	3(2-3-6)
Bacteriology in Plant Health	3(3-0-6)
International Standard for Safe Fruit and Vegetable Production	3(3-0-6)
Management of Plant Production for Food Safety	3(3-0-6)
Plant Response to Stress	3(3-0-6)
Ecology and Epidemiology of Plant Disease	3(3-0-6)
Techniques for Plant Pest Identification	3(2-3-6)
Diagnostic Clinics	3(2-3-6)
Immuno-diagnosis for Plant Health	3(3-0-6)
Selected Topics in Plant Health	1-3
Special Problems	1-3

PSU		KU		CMU		KKU	
Entomology		Entomology		Entomology		Entomology	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Research Methodology in Entomology	3(2-3-4)	Insect Physiology	3(2-3-6)	Entomological Research and Publication	1(1-0-2)	Insect Physiology	3(2-3-5)
Current Topics in Entomological Research	1(1-0-2)	Systematic Entomology	3(2-3-6)	Insect Structure and Function	3(3-0-6)	Research Techniques in Entomology	3(1-6-5)
Seminar I	1(0-2-1)	Research Methods in Entomology	3(2-3-6)	Entomological Seminar 1	1(1-0-2)	Seminar in Entomology I	1(1-0-2)
Seminar II	1(0-2-1)			Entomological Seminar 2	1(1-0-2)	Seminar in Entomology II	1(1-0-2)
Insect Structure and Functions	3(2-3-4)						
Insect Taxonomy	3(2-3-4)						
Entomological Biotechnology	3(2-3-4)						
Insecticide Toxicology	3(2-3-4)						
Elective		Elective		Elective		Elective	
Insect Structure and Function	3(2-3-4)	Application of Radiation in Entomology	3 (3-0-6)	Environmental Entomology	3(3-0-6)	Principles of Systematic Entomology	3(3-0-6)
Insect Taxonomy	3(2-3-4)	Ecology of Aquatic Insects	3 (2-3-6)	Insect Behavior Mechanisms	3(3-0-6)	Insect Classification	3 (2-3-5)
Insect-Plant Interactions	3(2-3-4)	Acarology	3 (2-3-6)	Insect Toxicology	3(3-0-6)	Insect and Host Plant Relationships	3(3-0-6)
Environmental Entomology	3(2-3-4)	Insect Pollinator Management	3 (2-3-6)	Insect Population Ecology	3(3-0-6)	Comprehension in Entomology	3 (2-3-5)
Ecology of Forest Insects	3(2-3-4)	Medical and Veterinary Entomology	3 (2-3-6)	Urban Entomology	3(2-3-4)	Toxicology and Management of Insecticide	3 (2-3-5)
Advanced Ecology for Pest Management	3(2-3-4)	Insect Vector Control	3 (2-3-6)	Forest Entomology	3(2-3-4)	Acarology	3 (2-3-5)
Insect Biodiversity	3(2-3-4)	Household and Urban Insect Pests	3 (2-3-6)	Soil Insects	3(3-0-6)	Insect Pest Management	3 (2-3-5)
Insect Pollinators	3(2-3-4)	Insect Transmission of Plant Pathogens	3 (2-3-6)	Aquatic Insects	3(2-3-4)	Insect Vector of Plant Diseases	3 (2-3-5)
Resistance of Plant to Insects	3(2-3-4)	Stored-Product Entomology	3 (2-3-6)	Principles of Insect Taxonomy	3(3-0-6)	Host Plant Resistance to Insects	3 (2-3-5)
Entomological Biotechnology	3(2-3-4)	Classification of Immature Insects	3 (2-3-6)	Mature Insect Systematics	3(2-3-4)		
Insect Transmission of Plant Pathogens	3(2-3-4)	Insect Taxonomy	3 (3-0-6)	Immature Insect Systematics	3(2-3-4)		
Insecticide Toxicology	3(2-3-4)	Environmental Entomology	3 (3-0-6)	Insect Pathology	3(3-0-6)		
Insecticide Resistance and Managements	3(2-3-4)	Biodiversity of Insects	3 (3-0-6)	Entomopathogens for Insect Control	3(3-0-6)		
Biological Control of Insect Pests and Weeds	3(2-3-4)	Applied Insect Ethology	3 (3-0-6)	Acarology	3(2-3-4)		
Natural Enemy Insects of Insect	3(2-3-4)	Biological Control of Insect Pests and Weeds	3 (2-3-6)	Apiology	3(3-0-6)		
Insect Pathology	3(2-3-4)	Pest Management Systems	3 (2-3-6)	Selected Topics in Entomology 1	1(1-0-2)		
Biocontrol Control Agents Technology for Insect Control	3(2-3-4)	Plant Resistance to Insects	3 (2-3-6)	Selected Topics in Entomology 2	2(2-0-4)		
Behavior and Its Management in Insects	3(2-3-4)	Insect Pathology	3 (2-3-6)	Selected Topics in Entomology 3	3(3-0-6)		
Social Insects	3(2-3-4)	Entomophagous Insects	3 (2-3-6)	Pest Management 1 : Insect Pests	3(2-3-4)		
Medical Entomology	3(2-3-4)	Pest Risk Assessment and Pathway Analysis	3 (2-3-6)	Principles of Insect Pest Management	3(3-0-6)		
Veterinary Entomology	3(2-3-4)	Advanced Insecticide Toxicology I	3 (2-3-6)	Postharvest Insect Pest Management	3(2-6-4)		
Management and Control of Insect-borne Diseases	3(2-3-4)	Phytochemicals in Entomology	3 (3-0-6)	Entomological Seminar 1	1(1-0-2)		
Global Public Health Entomology	3(2-3-4)	Selected Topics in Entomology	1-3	Entomological Seminar 2	1(1-0-2)		
(Special Problems)	3(0-9-0)	Special Problems	1-3	Special Problems in Entomology 1	1(1-0-2)		
Selected Topics in Entomology I	3(3-0-6)			Special Problems in Entomology 2	2(2-0-4)		
Selected Topics in Entomology II	3(3-0-6)			Special Problems in Entomology 3	3(3-0-6)		

SOIL SCIENCE AND ENVIRONMENT

PSU		KU		CMU		KKU	
Soil Resources Management		Soil Science		Environmental Soil Science		Soil Science and Environment	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Research Methods in Soil Science	3(2-3-4)	Research Methods in Soil Science	3(3-0-6)	Seminar 1	1(1-0-2)	Seminar in Soil Science and Environment I	1(1-0-2)
Sustainable Tropical Soils Management	4(4-0-8)			Seminar 2	1(1-0-2)	Seminar in Soil Science and Environment II	1(1-0-2)
Seminar I	1(0-2-1)					Research Methods in Soil Science and Environment	3(3-0-6)
Seminar II	1(0-2-1)						
Elective		Elective		Elective		Elective	
Soil Fertility Management	3(3-0-6)	Soil in Urban Environment	3(3-0-6)	Climatic and Edaphic Resources of Agricultural Systems	3(3-0-6)	Principles of Environment Science	3(3-0-6)
Plant Nutrition and Management	3(2-3-4)	Advanced Soil Fertility	3(3-0-6)	Chemical Equilibrium in Soil	3(3-0-6)	Advanced Soil Fertility	3(3-0-6)
Chemistry of Soil Nutrients	3(3-0-6)	Mineral Nutrition of Plants	3(3-0-6)	Submerged Soils and Greenhouse Gases	3(3-0-6)	Advanced Soil Chemistry	3(3-0-6)
Soil Biotechnology	3(2-3-4)	Plant Nutrient Management Innovation	3(3-0-6)	Soil Organic Matter and Environmental Quality	3(3-0-6)	Advanced Soil Physics	3(3-0-6)
Integrated management of Soil, Plant, Fertilizer and Environment	3(3-0-6)	Advanced Soil Chemistry	3(3-0-6)	Beneficial Microbes for Sustainable Agriculture	3(3-0-6)	Advanced Soil Microbiology	3 (2-3-5)
Advanced Soil Chemistry	3(3-0-6)	Soil Mineralogy	3(2-3-6)	Production Technology for Organic Fertilizer and Biofertilizer	1(0-2-1)	Agricultural Pollution and Management	3(3-0-6)
Soil Information and Utilization	3(3-0-6)	Advanced Techniques in Soil Analysis	3(2-3-6)	Ecosystem, Soil Genesis and Classification	3(3-0-6)	Advanced Land Evaluation and Land Use Planning	3(3-0-6)
Information System for soil Resources Management	3(2-3-4)	Paddy Soils	3(3-0-6)	Land Resource Survey and Environmental Management	3(3-0-6)	Soil Water and Plant Relationships	3(3-0-6)
Remote sensing Data Interpretation and Analysis	3(2-3-4)	Chemical Analysis of Contaminants in Soils and Plant	3(2-3-6)	Climate Change and Tropical Soils	3(3-0-6)	Rice Soils and Greenhouse Gases	3(3-0-6)
Land Resources Development Planning and Management	3(3-0-6)	Organic Matter in Tropical Soils	3(3-0-6)	Decision Support Systems for Agricultural Resource Management	3(2-3-6)	Problem Soils and Integrated Management	3(3-0-6)
Land Resources Assessment	3(3-0-6)	Geomorphology for Agriculture	3(3-0-6)	Advanced Soil Fertility)	3(3-0-6)	Soils of Thailand	3(3-0-6)
Sustainable Soil Management	3(3-0-6)	Soil Genesis and Classification	3(3-0-6)	Soil Erosion and Sustainable Land Management	3(3-0-6)	Advanced Soil Mineralogy	3(3-0-6)
Advanced Soil Physics	3(2-3-4)	Tropical Soils	3(3-0-6)	Selected Topics in Soil Science 1	1(1-0-2)	Agroforestry	3(3-0-6)
Applied Watershed Management	3(3-0-6)	Geological Information System in Soil Science	3(3-0-6)	Environmental Soil Physics	3(3-0-6)	Ecological Risk Assessment and Remediation of Contaminated Land	3(3-0-6)
Applied Agroforestry	3(3-0-6)	Advanced Soil Microbiology	3(3-0-6)	Soil Water and Plant Relationships	3(3-0-6)	Water Security and Climate Change	3(3-0-6)
Development and Reclamation of Land Resources	3(3-0-6)	Soil Plant and Microbial Interaction	3(3-0-6)	Selected Topics in Environmental Soil Science 2	2(2-0-4)	Soil Biotechnology	3(3-0-6)
Advanced Soil Conservation and Management	3(3-0-6)	Soil Hydrology for Agriculture and Environment	3(3-0-6)	Selected Topics in Environmental Soil Science 3	3(3-0-6)	Remote Sensing and Image Processing	3(3-0-6)
Physics of Soil Water	3(2-3-4)	Water Relations of Soil and Plant	3(3-0-6)			Selected Topics in Soil Science and Environment	
Sustainable Land Development according to His Majesty the King's Wishes	3(3-0-6)	Advanced Soil Physics	3(3-0-6)			Special Problem in Soil Science and Environment	3 (0-9-5)
		Soil Management for Food Safety	3(3-0-6)			Research Methods in Plant Science	3 (2-3-5)
		Advanced Soil and Water Conservation	3(3-0-6)			Plant Nutrition and Metabolism	3 (3-0-6)
		Land Degradation	3(3-0-6)			Integrated Environmental Management	3 (2-3-6)
		Advanced Soil Pollution	3(3-0-6)				
		Soil Resources and Land Uses	3(3-0-6)				
		Selected Topics in Soil Science	1-3				
		Special Problems	1-3				

ANIMAL SCIENCE AND AQUATIC SCIENCE

PSU		KU		CMU		KKU	
Animal Science		Animal Science		Animal Science		Animal Science (Thai Program)	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Statistics and Research Techniques in Animal Science	4(4-0-8)	Ethics of Animal Use in Research	1(1-0-2)	Experimental Designs and Statistical Analysis in Animal and Aquatic Sciences	3(3-0-6)	Statistical Methods in Animal Science	3(2-3-5)
Biochemistry in Animal Science	3(3-0-6)	Research Techniques in Animal Science	3(3-0-6)	Seminar on Animal and Aquatic Science	1(1-0-2)	Seminar in Animal Science I	1(1-0-2)
Seminar I	1(0-2-1)					Seminar in Animal Science II	1(1-0-2)
Seminar II	1(0-2-1)						
Elective		Elective		Elective		Elective	
International Animal Production Trade	3(3-0-6)	Cellular Metabolism in Animal Production	3(3-0-6)	Animal Endocrinology	3(3-0-6)	Endocrinology in Domestic Animals	3(3-0-6)
Innovation of Animal Production	4(4-0-8)	Improvement of Livestock Production in the Tropics	3(3-0-6)	Advanced in Aquatic Animal Immunology	3(2-3-4)	Environmental Physiology of Animal	3(3-0-6)
Advanced Meat Science	3(3-0-6)	Industrial Poultry Production	3(3-0-6)	Animal Population Genetics	3(3-0-6)	Digestive Physiology	3(3-0-6)
Animal Growth and Development	3(3-0-6)	Industrial Swine Production	3(3-0-6)	Advanced Animal Breeding	3(3-0-6)	Advanced Reproductive Physiology	3(3-0-6)
Reproductive Physiology of Domestic Animals	3(3-0-6)	Development in Livestock Production	3(3-0-6)	Molecular Genetics in Farm Animals	3(3-0-6)	Biotechnology for Animal Reproduction	3(3-0-6)
Digestive Physiology of Domestic Animals	3(3-0-6)	Animal Waste Management	3(3-0-6)	Advanced Biotechnology in Aquaculture	3(2-3-4)	Biotechnology for Animal Reproduction	3(3-2-5)
Environmental Physiology of Domestic Animals	3(3-0-6)	Analytical Laboratory Techniques in Animal Science	2(2-3-6)	Drugs Uses in Farm Animals		Advanced Animal Physiology	3(3-0-6)
Physiology of Egg Formation	3(3-0-6)	Non-ruminant Nutrition	3(3-0-6)	Advanced of Aquatic Animal Diseases	3(2-3-4)	Advanced Ruminant Nutritional Science	3(3-0-6)
Physiology of Lactation	3(3-0-6)	Ruminant Nutrition	3(3-0-6)	Advanced of Aquatic Animal Pathology	3(2-3-4)	Advanced Non-ruminant Nutritional Science	3(3-0-6)
Biotechnology in Animal Reproduction	3(3-0-6)	Comparative Animal Nutrition	3(3-0-6)	Advanced of Aquatic Animal Ectoparasite Biology	3(2-3-4)	Biotechnology in Animal Nutrition	3(3-0-6)
Endocrinology of Domestic Animals	3(3-0-6)	Toxic Substances in Feed	3(3-0-6)	Aquatic Animal Pharmacology	3(3-0-6)	Advanced Animal Nutrition	3(3-0-6)
Nutrients Metabolism	3(3-0-6)	Feed Evaluation	3(3-0-6)	Integration of Livestock Production in Agricultural Systems	3(3-0-6)	Feed Microscopy and Quality Control	3(2-3-5)
Research Techniques in Animal Nutrition	3(2-3-4)	Applied Animal Nutrition in Digestive System	3(3-0-6)	Adaptation of Livestock in Hot Climates	3(3-0-6)	Tropical Feed Resources and Feed Manufacturing Technology	3(3-0-6)
Animal Feed Additive	3(3-0-6)	Animal Population Genetics	3(3-0-6)	Physiology of Lactation	3(3-0-6)	Population Genetics and Conservation	3(3-0-6)
Tropical Feed Resources for Ruminants and Their Utilization	3(3-0-6)	Statistical Genetics	3(3-0-6)	Advanced Swine Production	3(3-0-6)	Biometrical Genetics	3(3-0-6)
Advanced Non-ruminant Nutrition	3(3-0-6)	Animal Genetic Evaluation	3(3-0-6)	Advanced Poultry Production	3(3-0-6)	Animal Genetic Evaluation	3(3-0-6)
Advanced Ruminant Nutrition	3(3-0-6)	Poultry Breeding System	3(3-0-6)	Advanced Meat Science)	3(3-0-6)	Biotechnology in Animal Breeding	3(2-3-5)
Nutritional and Metabolic Disorder in Animals	3(3-0-6)	Dairy Breeding System	3(3-0-6)	Aquatic Animal Seed Production	3(2-3-4)	Animal Production System	3(3-0-6)
Population Genetics in Animal Breeding	3(3-0-6)	Beef Breeding System	3(3-0-6)	Commercial Ornamental Aquatic Animals Production	3(3-0-6)	Planning and Development for Sustainable Livestock Production	3(3-0-6)
Biotechnology in Animal Breeding	3(3-0-6)	Swine Breeding System	3(3-0-6)	Commercial Planktonology and Phycology for Fisheries	3(2-3-4)	General Medicine and Herd Health Management in Animal Production	3(3-0-6)
Biometrical Genetics	3(3-0-6)	Molecular Biology in Animal Breeding	3(2-3-6)	Advanced Animal Nutrition	3(3-0-6)	Advanced Meat Science	3(3-0-6)
Bioinformatics in Animal Breeding	3(3-0-6)	Reproductive Physiology of Animals	3(3-0-6)	Ruminant Nutrition	3(3-0-6)	Carcass Composition and Quality	3(3-0-6)
Animal Molecular Genetics	3(3-0-6)	Avian Physiology	3(3-0-6)	Monogastric Animal Nutrition	3(3-0-6)	Advanced Tropical Pasture	3(3-0-6)
Special Topics in Animal Science	1(1-0-2)	Physiology of Lactation	3(3-0-6)	Advanced in Aquatic Animal Nutrition	3(2-3-4)	Advanced Forage Crops Preservation	3(3-0-6)
Special Problems	3(0-9-0)	Animal Growth and Development	3(3-0-6)	Selected Topic in Animal and Aquatic Science 1	1(1-0-2)	Animal Science Research Techniques	3(3-0-6)
		Livestock and Poultry Behavior	3(3-0-6)	Selected Topic in Animal and Aquatic Science 2	2(2-0-4)		
		Animal Reproductive Management in the Tropics	3(3-0-6)	Selected Topic in Animal and Aquatic Science 3	3(3-0-6)		

KU		CMU	
Animal Science		Animal Science	
Elective		Elective	
Subject	Credit	Subject	Credit
Current Topics in Animal Physiology	3(3-0-6)	Highland Fisheries	3 (2-3-4)
Advanced Meat Science	3(3-0-6)	Sustainable Aquaculture and Fisheries	3(3-0-6)
Egg Science	3(3-0-6)	Advanced of Aquatic Ecology	3 (2-3-4)
Selected Topics in Animal Science	1-3	Agricultural Animal Ethics for Scientific Work	3 (2-3-4)
Special Problems	1-3	Seminar on Animal and Aquatic Science 2	1 (1-0-2)

KKU	
Animal Science (International Program)	
Compulsory	
Subject	Credit
Statistical Methods in Animal Science	3(2-3-5)
Seminar in Animal Science I	1(1-0-2)
Seminar in Animal Science II	1(1-0-2)
Elective	
Subject	Credit
Biotechnology for Reproduction in Domestic Animals	3(3-0-6)
Digestive Physiology	3(3-0-6)
Advanced Animal Reproductive Physiology	3(3-0-6)
Advanced Animal Physiology	3(3-0-6)
Animal Nutrition and Feed Technology	3(3-0-6)
Advanced Ruminant Nutritional Science	3(3-0-6)
Advanced Non-ruminant Nutritional Science	3(3-0-6)
Microbial Ecology of Rumen	3(3-0-6)
Mineral Nutritional Science	3(3-0-6)
Applied Biochemistry in Nutritional Science	3(3-0-6)
Feed Manufacturing Technology	3(3-0-6)
Population Genetics	3(3-0-6)
Animal Genetic Evaluation	3(3-0-6)
Biotechnology in Animal Breeding	3(3-0-6)
Integrated Animal Production in Farming Systems	3 (2-3-5)
Animal Production System	3(3-0-6)
Planning and Development for Sustainable Livestock Production	3(3-0-6)
Advanced Meat Science	3(3-0-6)
Tropical Feed Resources and Feeding Technology	3(3-0-6)
Advanced Tropical Pasture	3(3-0-6)
Techniques in Forage Crops Research	3 (2-3-5)
Forage Crops and Livestock Production in the Tropic	3(3-0-6)
Animal Science Research Techniques	3(3-0-6)

AQUATIC SCIENCE/ FISHERIES

PSU		KU	CMU	KKU	
Aquatic Science				Fisheries	
Compulsory				Compulsory	
Subject	Credit			Subject	Credit
Biological Statistics and Research Methodology	4(3-2-7)			Seminar in Fisheries I	1(1-0-2)
Advanced Aquatic Resources Management	3(3-0-6)			Seminar in Fisheries II	1(1-0-2)
Seminar I	1(0-2-1)			Statistics and Research Methods in Fisheries	3(2-3-5)
Seminar II	1(0-2-1)				
Elective				Elective	
Subject	Credit			Subject	Credit
Aquatic Science	3 (3-0-6)			Endocrinology in Aquatic Animals	3(2-3-5)
Aquatic Ecology	3 (3-0-6)			Molecular Biology of Aquatic Animals	3(2-3-5)
Lotic Ecology	3 (2-3-4)			Applied Planktonology	3(2-3-5)
Coastal Benthic Fauna and Applications	3 (1-6-2)			Management of Aquatic Animal Hatchery	3(3-0-6)
Fishery Science	3 (2-3-4)			Fish Immunology	3(2-3-5)
Fish Population Dynamics	3 (2-3-4)			Aquatic Animal Toxicology	3(2-3-5)
Chemical Oceanography	3 (2-3-4)			Application of Drugs and Chemicals in Aquaculture	3(3-0-6)
Estuarine Oceanography	3 (3-0-6)			Aquatic Animal Feed Technology	3(3-0-6)
Coastal Process and Impact	3 (3-0-6)			Feed Additive in Aquatic Animal Feed	3(3-0-6)
Air-Sea Interaction	3 (3-0-6)			Fishery Processing Industry	3(3-0-6)
Advanced Technology in Aquaculture	3 (3-0-6)			Water Quality Management in Aquaculture	3(3-0-6)
Advanced Aquatic Animal Diseases	3 (2-3-4)			Waste Utilization Management for Aquaculture	3(3-0-6)
Shrimp Pathology	3 (2-3-4)			Special Problems in Fisheries I	3(0-9-4)
Advanced Aquatic Animal Nutrition	3 (2-3-4)			Selected Topics in Fisheries I	3(3-0-6)
Quantitative Genetics for Fish Improvement	3 (3-0-6)				
Fisheries Production and Aquatic Environment	3 (3-0-6)				
Freshwater Resources Management	3 (3-0-6)				
Coastal Resources Management	3 (3-0-6)				
Selected Topics in Aquatic Science	3 (0-9-0)				
Special Problems	3 (0-9-0)				

AGRICULTURAL DEVELOPMENT AND EXTENSION

PSU		KU		CMU		KKU	
Agricultural Development		Agricultural Extension		Agricultural Extension and Rural Development		Agricultural Extension and Development	
Compulsory		Compulsory		Compulsory		Compulsory	
Subject	Credit	Subject	Credit	Subject	Credit	Subject	Credit
Agricultural and Economic Development	3(3-0-6)	Agricultural Extension Administration	3(3-0-6)	Research Methodology in Agricultural Extension	3(3-0-6)	Research Methodology in Agricultural Extension and Development	3(3-0-6)
Communication for Agricultural Development	3(2-3-4)	Development of Agriculture and Agricultural Society	3(3-0-6)	Planning and Evaluation in Agricultural Extension	3(3-0-6)	Agricultural Extension Methodology	3(3-0-6)
Human Ecology for Sustainable Agricultural Development	3(3-0-6)	Communication and Agricultural Information Technology	3(3-0-6)	Supervision in Agricultural Extension	3(3-0-6)	Agricultural Development Policies and Strategies	3(3-0-6)
Research in Agricultural Development	3(3-0-6)	Research Methods in Agricultural Extension	3(3-0-6)	Agricultural Extension and Rural Development	3(3-0-6)	Seminar in Agricultural Extension and Development I	1(1-0-2)
Seminar I	1(0-2-1)			Agricultural Systems for Rural Development	3(3-0-6)	Seminar in Agricultural Extension and Development II	1(1-0-2)
Seminar II	1(0-2-1)			Seminar on Agricultural Extension I	1(1-0-2)		
Seminar III	1(0-2-1)			Seminar on Agricultural Extension II	1(1-0-2)		
				Agricultural Extension Study Tour	1(0-6-0)		
Elective		Elective		Elective		Elective	
Information Technology for Data Management in Agricultural Development	3(3-0-6)	Human Resource Development in Agriculture	3(3-0-6)	Comparative Agricultural Extension	3(3-0-6)	Statistics and Quantitative Data Analysis in Agricultural Extension and Development	3(2-3-5)
Agrarian System Analysis	3(3-0-6)	Participatory Development in Extension	3(3-0-6)	Agricultural Extension and Agricultural Business	3(3-0-6)	Adult Education for Agricultural Development	3(3-0-6)
Project Planning and Appraisal Methods	3(3-0-6)	Agricultural Intellectual for Extension	3(3-0-6)	Supervision in Agricultural Extension (Plan A2 Only)	3(3-0-6)	Knowledge Management for Agricultural Development	3(3-0-6)
Computer Application for Agricultural Development Research	3(2-3-4)	Psychology in Agricultural Extension	3(3-0-6)	Psychology for Agricultural Extension	3(3-0-6)	Human Resource Development in Agriculture	3(3-0-6)
Natural Resources Management	3(3-0-6)	Agricultural Economics for Extension	3(3-0-6)	Agricultural Communication and Information Technology	3(3-0-6)	Community Study for Agricultural Development	3(2-3-5)
Agricultural Development and Sustainable Natural Resources	3(3-0-6)	Agribusiness Management in Extension	3(3-0-6)	Agricultural Community Study	3(3-0-6)	Utilization of Indigenous Knowledge in Agricultural Development	3(3-0-6)
Organization Development and Leadership in Agriculture	3(3-0-6)	Value-added in Agricultural Resources	3(3-0-6)	Selected Topics in Agricultural Extension and Rural Development	1(1-0-2)	Extension and Development of Community Agribusiness	3(3-0-6)
Psychology in Agricultural Development	3(3-0-6)	Electronic Marketing in Extension	3(3-0-6)	Modern Management for Agricultural Extension and Rural Development Work and Organization	3(3-0-6)	Farmer Group and Institution in Agricultural Extension and Development	3(3-0-6)
Sufficiency Economy and Agricultural Development	3(3-0-6)	Media Strategies for Technology Transfer	3(3-0-6)			Organizational Management in Agriculture	3(3-0-6)
Analysis of Agricultural Policies	3(3-0-6)	Multimedia for Extension	3(2-2-5)			Strategic Management in Agricultural Extension and Development Organization	3(3-0-6)
Methodology in Agricultural Extension	3(3-0-6)	Digital Media Production	3(2-2-5)			Planning and Evaluation in Agricultural Extension and Development	3(3-0-6)
Admin. & Supervision of Agricultural Development	3(3-0-6)	Academic Presentation Technique for Graduate Student	3(3-0-6)			Communication for Agricultural Development	3(3-0-6)
Decision Support Systems in Agricultural Development	3(2-3-4)	Diffusion of Innovation and Technology in Agricultural	3(3-0-6)			Utilization of Information Technology in Agricultural Extension	3(2-3-5)
Multicultural and Agricultural Development	3(3-0-6)	Television Documentary Production for Extension	3(2-2-5)			Geographic Information System for Agricultural Extension and Development	3(2-3-5)
Participatory Agricultural Development	3(3-0-6)	Statistics in Agricultural Extension Research	3(3-0-6)			Current Topics in Agricultural Extension and Development	3(1-2-5)
Food Security and Agricultural Development	3(3-0-6)	Qualitative Research Methods in Agricultural Extension	3(3-0-6)				
Indigenous Knowledge in Agrarian Society	3(3-0-6)	Application of Statistical Program for Agricultural Extension and Development	3(2-2-5)				
Gender and Agricultural Development	3(3-0-6)	Selected Topics in Agricultural Extension	3(3-0-6)				
Social and Cultural Changes	3(3-0-6)	Special Problems	1-3				
Selected Topics in Agricultural Development	1-3						

PSU	KU	CMU		KKU	
		Agribusiness		Agribusiness	
		Compulsory		Compulsory	
		Subject	Credit	Subject	Credit
		Managerial Economics	3(3-0-6)	Agribusiness Economics	3(3-0-6)
		Applied Quantitative Methods for Managers	3(3-0-6)	Research Methods in Agribusiness	3(3-0-6)
		Management of Agribusiness Organization	3(3-0-6)	Seminar in Agribusiness I	1(1-0-2)
		Agribusiness Research and Creative Planning	3(3-0-6)	Seminar in Agribusiness I	1(1-0-2)
		Marketing Management in Agribusiness	3(3-0-6)		
		Financial Management for Agribusiness	3(3-0-6)		
		Elective		Elective	
		Community and Small Agribusiness Management	3(3-0-6)	Advanced Agribusiness Management	3(3-0-6)
		Agribusiness Policy and Strategic Planning	3(3-0-6)	Agricultural Production Business Management	3(3-0-6)
		International Agribusiness Marketing and Export Management	3(3-0-6)	Small and Medium Agribusiness Strategic Management	3(3-0-6)
		Information System Management for Agribusiness	3(3-0-6)	Advanced Marketing Management in Agribusiness	3(3-0-6)
		Agribusiness Risk Analysis and Management	3(3-0-6)	Agricultural Futures Market and Price Analysis	3(3-0-6)
		Production and Marketing Management in Food Business	3(3-0-6)	International Trade for Agricultural Commodities	3(3-0-6)
		Logistics Management for Agribusiness	3(3-0-6)	Financial Management and Agribusiness Project Analysis	3(3-0-6)
		Selected Topics in Agribusiness Management 1	1(1-0-2)	Advanced Quantitative Analysis for Agribusiness Decision Making	3(3-0-6)
		Selected Topics in Agribusiness Management 2	2(2-0-4)	Statistics for Agribusiness	3(3-0-6)
		Selected Topics in Agribusiness Management 3	3(3-0-6)		
		International Agribusiness Experience Enhancement	1(1-0-0)		

PSU	KU	CMU	KKU
		Agricultural Economics	
		Compulsory	
		Subject	Credit
		Microeconomic Theory	3(3-0-6)
		Macroeconomic Theory	3(3-0-6)
		Applied Economics for Agriculture, Food and Resources	3(3-0-6)
		Econometric Methods and Applications in Agriculture	3(3-0-6)
		Agricultural Economics 1	1(1-0-2)
		Agricultural Economics 1	1(1-0-2)
		Elective	
		Advanced Agricultural Marketing	3(3-0-6)
		Agricultural Marketing Management	3(3-0-6)
		Advanced Agribusiness Management	3(3-0-6)
		Financial Management for Agribusiness	3(3-0-6)
		International Agricultural Commodities Trade	3(3-0-6)
		Effectiveness of Agricultural Organizations	3(3-0-6)
		Quantitative Methods in Agricultural Systems Management	3(3-0-6)
		Operations Research for Agricultural Planning	3(3-0-6)
		Strategic Management for Agriculture and Agricultural Economics	3(3-0-6)
		Economics for Agricultural Management and Development	3(3-0-6)
		Economics of Land and Water Resource Management	3(3-0-6)
		Agricultural Development Project Planning and Management	3(3-0-6)
		Economics of Forestry and Agro Forestry Management	3(3-0-6)
		Farm System Resource Planning and Management	3(3-0-6)
		Agricultural Policy Analysis	3(3-0-6)
		Selected Topics in Agricultural Economics 1	1(1-0-2)
		Selected Topics in Agricultural Economics 2	2(2-0-4)
		Selected Topics in Agricultural Economics 3	3(3-0-6)

PSU	KU	CMU	KKU
	Tropical Agriculture		System Approaches in Agriculture for Sustainable Development
	Compulsory		Compulsory
	Subject		Subject
	Credit		Credit
	Research Methods in Tropical Agriculture		Analysis of Agro-ecosystems, Resource Systems and Community Systems
	3(3-0-6)		4(1-6-5)
	Research Methods in Sustainable Agriculture		Sustainable Agricultural and Rural Development
	3(3-0-6)		3(2-3-5)
	Research Methods in Bioenergy		Research Methods in System Approaches in Agriculture for Sustainable Development
	3(3-0-6)		3(2-3-5)
	Agricultural Systems Technology		Integrated Community Development and Planning
	3(3-0-6)		3(2-3-5)
	Agricultural System Simulation		System Approaches in Agriculture for Sustainable Development Seminar I
	3(3-0-6)		1(1-0-2)
	Advanced Agricultural Production Systems Management		System Approaches in Agriculture for Sustainable Development Seminar II
	3(3-0-6)		1(1-0-2)
	Advanced Agricultural Logistics Management		
	3(3-0-6)		
	Research Methods in Agricultural Systems Technology		
	3(3-0-6)		
	Elective		Elective
	Agriculture in the Tropics		Agricultural Systems under Changing Environments
	3(3-0-6)		3(3-0-6)
	Integrated Pest Management		Agricultural and Rural Sociology
	3(3-0-6)		3(3-0-6)
	Agricultural Pest Ecology		Current Topics in System Approaches in Agriculture for Sustainable Development
	3(3-0-6)		3(1-6-5)
	Pesticides and the Environment		Special Problems in System Approaches in Agriculture for Sustainable Development
	3(3-0-6)		3(1-6-5)
	Sustainable Crop Production		Decision Supporting System Application for Crop Production and Management
	3(3-0-6)		3(3-0-6)
	Sustainable Animal Production		Precision Agriculture and Smart Farming
	3(3-0-6)		3(3-0-6)
	Soil Fertility and Organic Matter		Sustainable Crop Production for Food Security and Food Safety
	3(3-0-6)		3(3-0-6)
	Natural Resources for Sustainable Agriculture		Agroforestry
	3(3-0-6)		3(3-0-3)
	Sustainable Agriculture		
	3(3-0-6)		
	Technology Transfer for Sustainable Agriculture		
	3(3-0-6)		
	Sustainable Agriculture in Socio-economic Dimensions		
	3(3-0-6)		

PSU	KU	CMU	KKU
			Agriculture (International Program)
			Compulsory
			Subject
			Credit
			Statistical Methods in Agriculture
			3(2-3-5)
			Seminar in Agriculture I
			1(1-0-2)
			Seminar in Agriculture II
			1(1-0-2)
			Elective
			System Theories and Concepts
			3(2-3-5)
			Analysis of Agro-eco, Resource Systems & Communication Systems
			3(1-6-5)
			Case Study of Agricultural Systems
			3(0-9-4)
			Participatory Action Research
			3(2-3-5)
			Selected Topics in System Approached Agriculture
			3(1-6-5)
			Plant-Pathogen Interactions
			3(3-0-6)
			Research Methodology in Plant Pathology
			3(2-3-5)
			Epidemiology and Plant Disease Management
			3(3-0-6)

			Post-harvest Pathology of Vegetables and Fruits	3(3-0-6)
			Seed Pathology	3(3-0-6)
			Major Diseases of Economic Crops	3(3-0-6)
			Management System of Horticulture Crop	3(3-0-6)
			Applied Environmental Physiology of Horticultural Crop Production	3(3-0-6)
			Postharvest Physiology of Horticultural Crop	3(3-0-6)
			Value added Creation of Horticultural Products	3(3-0-6)
			Horticult. Crop Improvement for resistance to Biotic & Abiotic Stress	3(2-3-5)
			Biotechnology for Agriculture	3(2-3-5)
			Principles of Environmental Sci. for Agricult Resource Management	3(3-0-6)
			Advanced Soil Fertility	3(3-0-6)
			Rice Soil and Greenhouse Gases	3(3-0-6)
			Advanced Soil Physics	3(3-0-6)
			Advanced Soil Microbiology	3(3-0-6)
			Agriculture in ASEAN Countries	3(3-0-6)
			Research Methods in Plant Science	3(2-3-5)
			Application of Decision Supporting System for Crop Production and Managements	3(2-3-5)
			Crop Growth Modeling	3(2-3-5)
			Food Security and Food Safety	3(3-0-6)
			Techniques in Crop Improvement	1(0-3-1)
			Climate and Its Impact on Crop Production	3(3-0-6)
			Animal Production System	3(3-0-6)
			Planning and Development for Sustainable Livestock Production	3(3-0-6)
			Advanced Animal Physiology	3(3-0-6)
			Advanced Animal Nutrition	3(3-0-6)
			Advanced Animal Breeding	3(3-0-6)
			Statistical Methods in Animal Science	3(2-3-5)
			Applied Planktonology	3(2-3-5)
			Aquatic Animal Toxicology	3(2-3-5)
			Economic Theory for Agriculture	3(3-0-6)
			Advance Research Methodology for Agricultural Economics	3(3-0-6)
			Econometric for Agricultural Analysis	3(3-0-6)
			Agriculture Policy	3(3-0-6)
			Strategic Planning for Agriculture	3(3-0-6)
			Planning and Evaluation in Agricult. Extension & Development	3(3-0-6)
			Strategic Manage. in Agricult. Extension and Development	3(3-0-6)
			Agricult. Policies and Agricultural Development Strategies	3(3-0-6)
			Agricultural Extension Methodology	3(3-0-6)
			Knowledge Management for Agricultural Development	3(2-3-5)
			Utilization of Indigenous Knowledge in Agricultural Development	3(3-0-6)
			Research Method in Agricult. Extension and Development	3(2-3-5)

6. Accreditation Procedure

The Double Master's Degree Program in Sustainable Agriculture is developed based on the existing masters' programmes at Thai partner universities that approved by the Office of Higher Education Commission (OHEC), Ministry of Education. However, there is accreditation protocol for collaborative double/dual programme at each Thai partner university which follows rules/regulations issued by each university through academic accreditation system empowered by the Ministry of Education, Government of Thailand.

This section demonstrates the accreditation system at each partner university which differs in steps to proceed for programme approval and accreditation. At the four partner universities, a common procedure lines in the three levels, faculty level, university level and the ministry level. For approval of double degree programmes, the Ministry of Education by OHEC empowers University Council at each Thai university to handle the approval and accreditation of the programmes by respecting the principal regulations of the National Regulations issued by OHEC. Therefore, the university council is the approval body for the double degree programmes at all higher educational levels, Bachelor, Master and Ph.D.

The following pages show the approval procedures for improved/new programs at each partner university.

Approval Process for New Curriculum/Revised Curriculum

1) At Faculty Level

Submission of the Form for a New Curriculum/Revised Curriculum by the Department



Approved by the Graduate Studies Committee of the Faculty

2) At University Level



Approved by the Faculty Committee (Dean is the Chairman of the committee)



Approved by the Graduate School Committee, PSU.



Approved by the Academic Council



Approved by University Council

3) At Ministry and Government Level



Endorsed by Office of the Higher Education Commission, Ministry of Education



Office of the Civil Service Commission, Government of Thailand Acknowledges the Accreditation and Catalogues in Employment Classification

Remark: The process varies from 6-12 months depending on the meeting schedule of the Faculty Committee, Graduate School Committee and the University Council.

Composition of Each Committee

1) At Faculty Level

- *Graduate Studies Committee of the Faculty*
 - Dean is the Chairman
 - Associate Dean for Graduate Studies
 - Head of Departments
 - Chairperson of the Program
 - Representatives of Lecturers of each discipline
 - Secretary to the Committee
- *Faculty Committee*
 - Dean – Chairman of Committee
 - Associate Deans
 - Head of Departments
 - Representatives of Lecturers of each discipline
 - Secretary to the committee

2) At University Level

- External Outstanding and Successful Professor/Academic Admin. - Chairman
- Faculty Deans as members
- External members from academics, private sector and related public organizations who are nominated and approved by the University Council
- Vice President for Academic Affairs as the Secretary to the council

3) At Ministry and Government Level

- *Office of the Higher Education Commission, Ministry of Education*
 - Secretary General of Higher Education Commission
 - The Committee of Higher Education Commission
 - The Minister of Education
- *Office of the Civil Service Commission, Government of Thailand*
According to Commission procedure

Approval Process for New Curriculum/Revised Curriculum

1) At Faculty Level

The Committee for Improvement/Revised Curriculum
(At Department Level)

The Committee for Improvement/Revised Curriculum or
the Academic Committee
(At Faculty Level)

2) At University Level

Approved by the Faculty Committee
(Dean/Associate Dean for Academic Affairs)

Approved by the Graduate School Committee, KU.

Approved by Vice President for Academic Affairs
(Acting by Assistant President for Academic Affairs)

Approved by Board of Education

Approved by Vice President for Academic Affairs

Approved by KU. Academic Committee

Approved by Kasetsart University Council

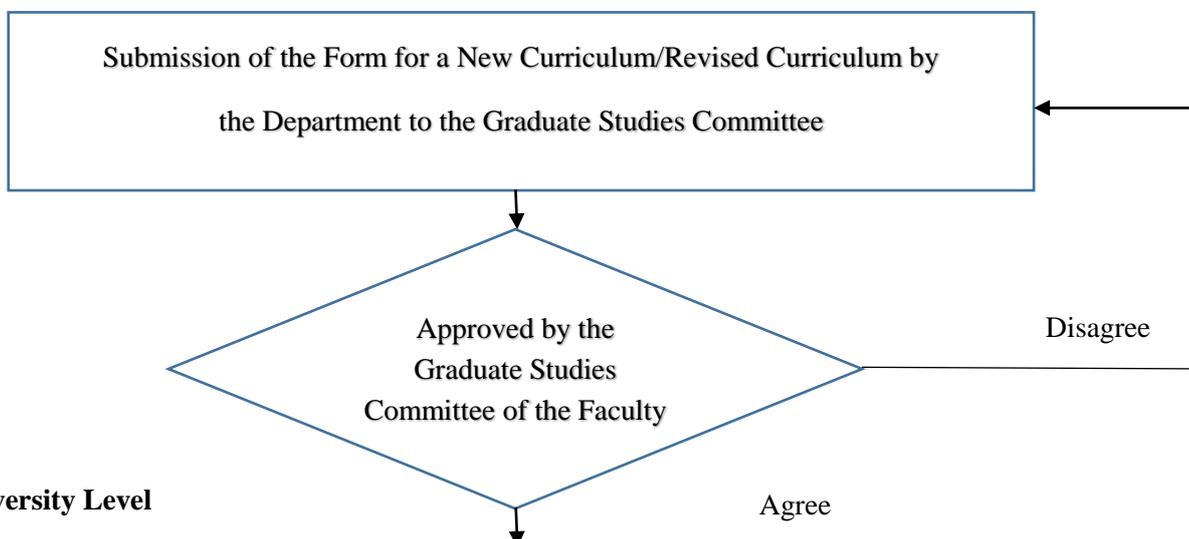
3) At Ministry and Government Level

Endorsed by Office of the Higher Education Commission, Ministry of Education

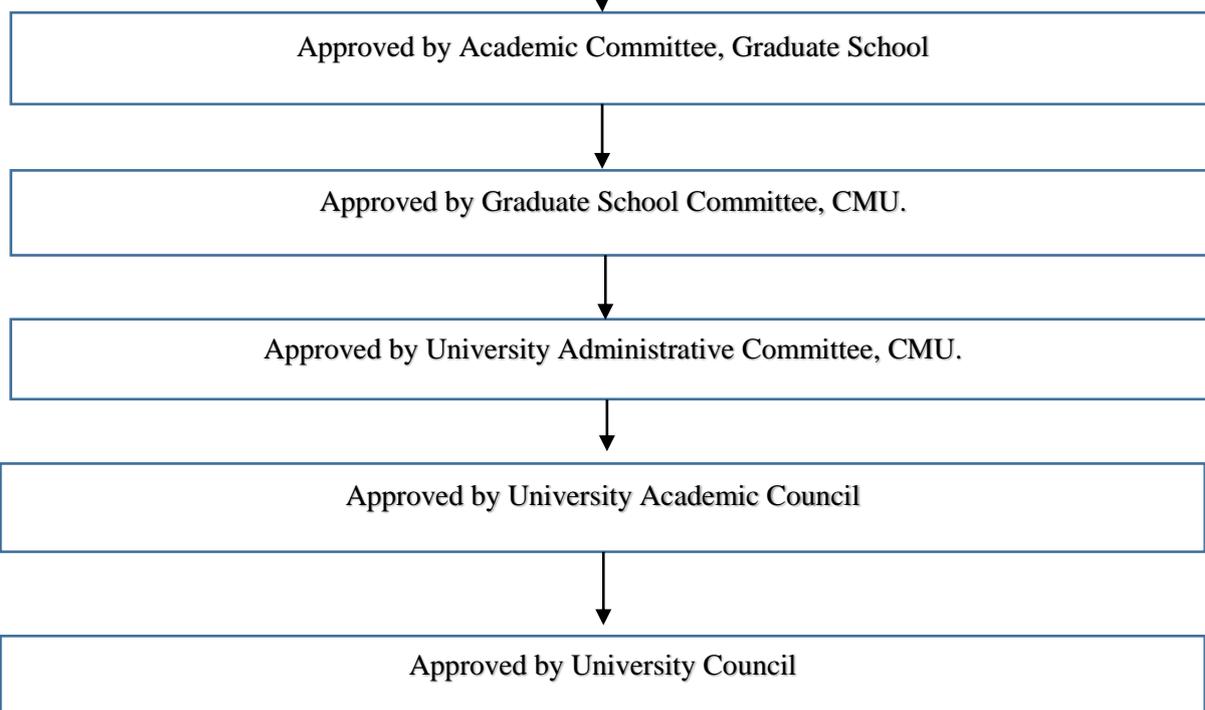
Office of the Civil Service Commission, Government of Thailand Acknowledges the
Accreditation and Catalogues in Employment Classification

Approval Process for New Curriculum/Revised Curriculum

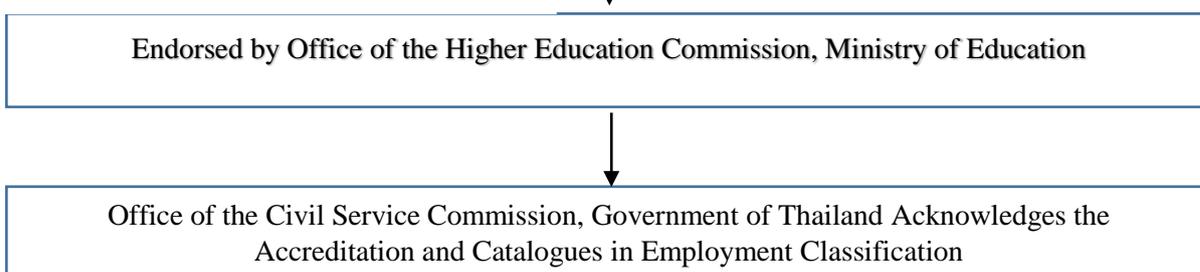
1) At Faculty Level



2) At University Level

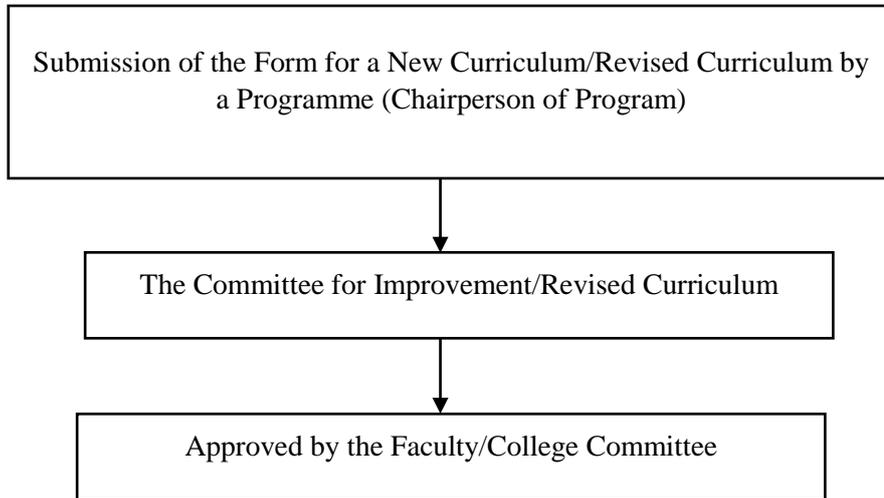


3) At Ministry and Government Level

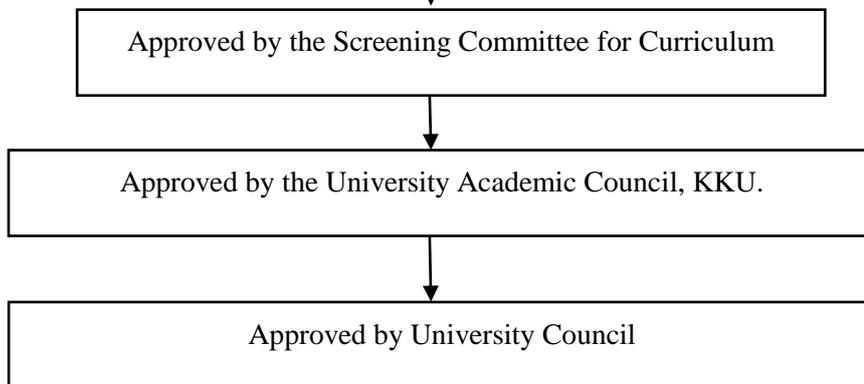


Approval Process for New Curriculum/Revised Curriculum

1) At Faculty or College Level



2) At University Level



3) At Ministry and Government Level

