Doctor of Philosophy Program in Bioscience for Sustainable Agriculture
(International Program/Revision 2020)

Faculty of Animal Sciences and
Agricultural Technology

Program title

Thai	หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาชีววิทยาศาสตร์เพื่อเกษตรกรรมที่ยั่งยืน (หลักสูตรนานาชาติ)
English	Doctor of Philosophy Program in Bioscience for Sustainable Agriculture (International Program)

Degree title and field of study

Thai	ปรัชญาดุษฎีบัณฑิต (ชีววิทยาศาสตร์เพื่อเกษตรกรรมที่ยั่งยืน) ปร.ด. (ชีววิทยาศาสตร์เพื่อเกษตรกรรมที่ยั่งยืน)
English	Doctor of Philosophy (Bioscience for Sustainable Agriculture) Ph.D. (Bioscience for Sustainable Agriculture)

Place of instruction

Faculty of Animal Sciences and Agricultural Technology, Silpakorn University, Phetchaburi IT Campus, Phetchaburi

Objectives of the curriculum

1. To produce graduates with a Ph.D. qualification who are knowledgeable in bioscience for sustainable agriculture, regards to the principles of science, biology, and factors relating to agricultural technology and patterns.
2. To produce graduates with a Ph.D. qualification who competent with ethics, leadership skill, creativity, criticism, and excellent communication skills with scholars, farmers, and communities.
3. To produce graduates with a Ph.D. qualification who are capable of analyzing and evaluating the information to create the research project related to sustainable agriculture.
4. To produce graduates with a Ph.D. qualification who can create a research project, knowledge, product, or novel technology in bioscience for sustainable agriculture which can be disseminated at the international level.

Student qualifications

1. Student qualifications according to study plan

Plan 1.1 Graduates of Master Degree or equivalent in agricultural science, biological science, or related fields with excellent academic record or with the decision and consent of the curricular academic committee.

Plan 1.2 Graduates of Bachelor Degree in agricultural science, biological science, or related fields with excellent academic record and consent of the curricular academic committee.

Plan 2.1 Graduates of Master Degree in agricultural science, biological science, or related fields with an equivalent GPA of 3.00 or higher or with the decision and consent of the curricular academic committee.

Plan2.2 Graduates of Bachelor Degree in agricultural science, biological science, or related fields with excellent academic record and consent of the curricular academic committee.

2. The eligible candidate must have a result of English language examination according to the criteria of the Higher Education Commission or Silpakorn University's announcement on standards of English language proficiency for admission Doctoral Degree Admission of Silpakorn University and/or subsequent changes. The results of the English language examination according to the CEFR standard or comparable test must not less than A2 level and must not exceed 2 years prior to the admission to study.

3. Eligible candidates under Clause 1 must have all the qualifications specified in Clause 6 of Silpakorn University's Regulation on Graduate Study B.E. 2561 (2018) and/or subsequent changes.

4. Candidates who do not meet the qualification in 1 must have their cases considered by the program committee.

Curriculum Structure

Plan 1.1 equivalent to 48 credits

Seminar (non-credit)	2	credits
Required course (non-credit)	6	credits
Thesis (equivalent to)	48	credits

Plan 1.2 equivalent to 72 credits

Seminar (non-credit)	2	credits
Required course (non-credit)	7	credits
Thesis (equivalent to)	72	credits

Plan 2.1 not less than 48 credits

Seminar (non-credit)	2	credits
Required courses (non-credit)	3	credits
Required courses	9	credits
Elective courses not less than	3	credits
Thesis (equivalent to)	36	credits

Plan 2.2 not less than 72 credits

Seminar	2	credits
Required courses	13	credits
Elective courses not less than	9	credits
Thesis (equivalent to)	48	credits

Note: All students enrolled in every study plans are required to pass (gain "S") the qualifying examination (QE).

Curriculum Courses

1. Plan 1.1

1.1 Seminar (non-credit) 2 credits

(Course in which no credit will be given as part of the curriculum and its assessment will be given as S or U)

715 605	Seminar in Bioscience for Sustainable Agriculture I	1*(1-0-2)
715 606	Seminar in Bioscience for Sustainable Agriculture II	1*(1-0-2)

1.2 Required course (non-credit) 6 credits

(Course in which no credit will be given as part of the curriculum and its assessment will be given as S or U)

715 603	Agricultural Research Design and Methodology	3*(3-0-6)
715 607	Innovative Research in Bioscience for Sustainable Agriculture	3*(2-3-4)

1.3 Thesis (equivalent to) 48 credits

715 691	Thesis	(equivalent to) 48 credits

2. Plan 1.2

2.1 Seminar (non-credit) 2 credits

(Course in which no credit will be given as part of the curriculum and its assessment will be given as S or U)

715 605	Seminar in Bioscience for Sustainable Agriculture I	1*(1-0-2)
715 606	Seminar in Bioscience for Sustainable Agriculture II	1*(1-0-2)

2.2 Required course (non-credit) 7 credits

(Course in which no credit will be given as part of the curriculum and its assessment will be given as S or U)

715 603	Agricultural Research Design and Methodology	3*(3-0-6)
715 604	Essential Research Skills in Bioscience for Sustainable Agriculture	1*(1-0-2)
715 607	Innovative Research in Bioscience for Sustainable Agriculture	3*(2-3-4)

2.3 Thesis (equivalent to) 72 credits

715 692	Thesis	(equivalent to) 72 credits

3. Plan 2.1

3.1 Seminar (non-credit) 2 credits

(Course in which no credit will be given as part of the curriculum and its assessment will be given as S or U)

715 605	Seminar in Bioscience for Sustainable Agriculture I	1*(1-0-2)
715 606	Seminar in Bioscience for Sustainable Agriculture II	1*(1-0-2)

Note: * means non-credit subjects.

3.2 Required Courses (non-credit) 3 credits

715 607	Innovative Research in Bioscience for Sustainable Agriculture	3*(2-3-4)

3.3 Required Courses 9 credits

715 601	Advanced Cell and Molecular Biotechnology	3(3-0-6)
715 602	Advanced Bioscience for Agricultural and Environmental Sustainability	3(3-0-6)
715 603	Agricultural Research Design and Methodology	3(3-0-6)

3.4 Elective courses not less than 3 credits

The elective courses can be chosen from the following list or can be chosen from the post-graduate courses provided by the Faculty of Animal Sciences and Agriculture Technology with the decision and content of the curricular academic committee.

715 621	Population Genetics for Agricultural Research	3(3-0-6)
715 622	Molecular Biotechnology in Aquaculture	3(3-0-6)
715 623	Selected Topics in Bioscience for Sustainable Agriculture	3(3-0-6)

3.5 Thesis (equivalent to) 36 credits

715 693	Thesis	(equivalent to) 36 credits

4. Plan 2.2

4.1 Seminar 2 credits

715 605	Seminar in Bioscience for Sustainable Agriculture I	1(1-0-2)
715 606	Seminar in Bioscience for Sustainable Agriculture II	1(1-0-2)

4.2 Required Courses 13 credits

715 601	Advanced Cell and Molecular Biotechnology	3(3-0-6)
715 602	Advanced Bioscience for Agricultural and Environmental Sustainability	3(3-0-6)
715 603	Agricultural Research Design and Methodology	3(3-0-6)
715 604	Essential Research Skills in Bioscience for Sustainable Agriculture	1(1-0-2)
715 607	Innovative Research in Bioscience for Sustainable Agriculture	3(2-3-4)

4.3 Elective courses not less than 9 credits

The elective courses can be chosen from the following list or can be chosen from the post-graduate courses provided by the Faculty of Animal Sciences and Agriculture Technology with the decision and content of the curricular academic committee.

715 621	Population Genetics for Agricultural Research	3(3-0-6)
715 622	Molecular Biotechnology in Aquaculture	3(3-0-6)
715 623	Selected Topics in Bioscience for Sustainable Agriculture	3(3-0-6)

Note: * means non-credit subjects.

4.4 Thesis (equivalent to) 48 credits

715 694 Thesis (equivalent to) 48 credits

Course description

715 601 Advanced Cell and Molecular Biotechnology 3(3-0-6)

Novel discoveries and research approaches on cell and molecular biology, high throughput genome sequencing technologies, transcriptional and post-transcriptional regulation of gene expression, gene interaction at the network and systems biology level, post-genomic projects and biological databases, research article interpretation in the field of cell and molecular biology, and current cell and molecular biotechnology research in agricultural application.

715 602 Advanced Bioscience for Agricultural and Environmental Sustainability 3(3-0-6)

Application of the integrated bioscience with King Rama IX wisdom, sufficiency economy philosophy, and local wisdom for promote sustainable agriculture using concepts of good agricultural practices, organic farming, green production, smart farming, zero waste agricultural practices, integrated agricultural farming system, agricultural product processing and marketing, relationship and impact of farming on the natural resources and environment.

715 603 Agricultural Research Design and Methodology 3(3-0-6)

Concept and operation of agricultural research, skills in the utilization of different research methods, key principles of research project design, intellectual and methodological debates on research design, ethics in agricultural research practice, techniques in sampling, surveying, interviewing, case study analysis, focus groups, interviewing, analyzing, and presenting data.

715 604 Essential Research Skills in Bioscience for Sustainable Agriculture 1(1-0-2)

Criteria: Assessment will be given as S or U.

Application of research ethics and virtues, intellectual property rights, self-safety and environmental safety in agricultural research conduction, responsibilities to society and the environment, lifelong learning skills, problem-solving skills, and English skills for the international scientific communications.

715 605 Seminar in Bioscience for Sustainable Agriculture I 1(1-0-2)

Criteria: Assessment will be given as S or U.

Searching, compiling the information, discussion on modern research in bioscience for sustainable agriculture, competency of analytical thinking, and presentation of research in bioscience for sustainable agriculture under supervision of seminar instructors.

715 606 Seminar in Bioscience for Sustainable Agriculture II 1(1-0-2)

Pre-requisite: 715 605 Seminar in Bioscience for Sustainable Agriculture I

Criteria: Assessment will be given as S or U.

Discuss the concept or principal of bioscience in agriculture from case study of research project or articles, interpretation of scientific data from agricultural research, competency of analytical thinking, critizism, presentation of modern research in bioscience for sustainable agriculture or topic related to student's thesis, and discussion for application of local wisdom to research work.

715 607 Innovative Research in Bioscience for Sustainable Agriculture 3(2-3-4)

Criteria: Assessment will be given as S or U.

Innovation concept, innovation to create sustainability, important technologies for research and creativity for current and future agriculture, application of technology for creation or extension of agricultural innovation.

715 621 Population Genetics for Agricultural Research 3(3-0-6)

Mendel's concept, Hardy-Weinberg principle, allele frequency, evolutionary processes, adaptation and speciation, statistical analysis for population genetics study, application of Mendel's theory for studying population genetics (in both animals and plants) under Hardy-Weinberg equilibrium.

715 622 Molecular Biotechnology in Aquaculture 3(3-0-6)

Genetic variation at the molecular level in aquatic animals, genomic tools and genome mapping, gene expression and functional analysis, cloning and DNA sequencing techniques, gene transfer and transgenic aquatic organisms, commercial application of genetic biotechnology in aquaculture.

715 623 Selected Topics in Bioscience for Sustainable Agriculture 3(3-0-6)

Criteria: With the consent of the curricular academic committee.

Topics of current interest in Bioscience for Sustainable agriculture.

715 691 Thesis (equivalent to) 48 credits

Criteria: For student enrolled in plan 1.1

Implementation of research project under the supervision of advisory committee, thesis defense and publishing the manuscript in peered review journal.

715 692 Thesis (equivalent to) 72 credits

Criteria: For student enrolled in plan 1.2

Implementation of research project under the supervision of advisory committee, thesis defense and publishing the manuscript in peered review journal.

715 693 Thesis (equivalent to) 36 credits

Criteria: For student enrolled in plan 2.1

Implementation of research project under the supervision of advisory committee, thesis defense and publishing the manuscript in peered review journal.

715 694 Thesis (equivalent to) 48 credits

Criteria: For student enrolled in plan 2.2

Implementation of research project under the supervision of advisory committee, thesis defense and publishing the manuscript in peered review journal.