

Course Title
Doctor of Philosophy in Biotechnology (International Program)

Academic Institution: Faculty of Agro-Industry, Prince of Songkla University

Program Title: Doctor of Philosophy (Biotechnology)

Ph.D. (Biotechnology)

Expected learning outcome (ELO)

- Ethics and Morality

- 1) Demonstrate discipline and honesty
- 2) Demonstrate a good manner and respect for other's opinion
- 3) Demonstrate responsibility for own work and society

- Knowledge

- 1) Explain up-to-date knowledge within the area of biotechnology
- 2) Explain integrated knowledge in other related disciplines
- 3) Develop the new knowledge and innovation

- Cognitive skill

- 1) Apply the systematic thinking
- 2) Analyze causes of problem and solve the problem using biotechnology
- 3) Develop the proposed research with systematic and creative process

- Interpersonal Skills and Responsibility

- 1) Develop an ability to work with responsibility for individual and group assignment
- 2) Develop an ability to work collaboratively with others in group and act effectively and friendly as leader and/or member

- Numerical Analysis, Communication, and Information Technology Skills

- 1) Apply statistic and mathematic for analysis, interpretation and solving problem
- 2) Communicate in English effectively both oral and written
- 3) Employ information technology for searching the up-to-date technology, innovation and world current situation

Philosophy of the Program

This program would provide students with the principles knowledge in the area of biotechnology and skills in research for the development of innovative knowledge in biotechnology. This program also comply student to be able to apply the knowledge integration with ethics and morality.

PSU's educational philosophy (<http://webagro.psu.ac.th>)

PSU's educational philosophy is managed by

- Progressivism using learning process with the students as the 'center of attention' and the basis of 'Outcome Based Education' such as active learning, problem-based learning, project-based learning, service learning
- PSU aims to provide students with a lifelong learning approach
- PSU believes that these principles can be met and aided by Prince of Songkla Mahidon Adulyadej's motto "Our soul is for the benefit of mankind"

Program Objectives:

1. To develop students with the knowledge in biotechnology and be able to develop the new knowledge
2. To develop students to be able to analyze causes of problem and solve the problem using biotechnology
3. To produce student with ethics and morality
4. To develop student to be able to work collaboratively with others in group and act effectively as leader
5. To provide students to be able to numerical analysis and communication using information technology

Program structure:

This program offers four plans;

Plan 1.1 and 1.2 Research only plan)

Plan 2.1 and 2.2 Research with course works plan

Note: Plan 1.1 and 2.1 for student who already graduated in Master program and

Plan 1.2 and 2.2 for student who already graduated in Bachelor program

Course	Plan 1.1	Plan 1.2	Plan 2.1	Plan 2.2
Compulsory	-	-	6	17
Elective	-	-	6	7
Thesis	48	72	36	48
Total	48	72	48	72

Study plan

For student Plan 1

Academic year	Semester	Plan 1.1	Plan 1.2
1	1	853-948 Thesis 8 credits	853-972 Thesis 9 credits
	2	853-948 Thesis 8 credits 853-696 Seminar 1	853-972 Thesis 9 credits 853-696 Seminar 1
	Total	16 credits	Total 18 credits
2	1	853-948 Thesis 8 credits	853-972 Thesis 9 credits
	2	853-948 Thesis 8 credits 853-697 Seminar 2	853-972 Thesis 9 credits 853-697 Seminar 2
	Total	16 credits	Total 18 credits
3	1	853-948 Thesis 8 credits	853-972 Thesis 9 credits
	2	853-948 Thesis 8 credits 853-698 Seminar 3	853-972 Thesis 9 credits 853-698 Seminar 3
	Total	16 credits	Total 18 credits
4	1	-	853-972 Thesis 9 credits
	2	-	853-972 Thesis 9 credits 853-699 Seminar 4
	Total	-	Total 18 credits
Total		48 credits	Total 72 credits

Note: 853-696, 853-697, 853-698, 853-699 are the required courses without credits accumulation for program

For student Plan 2

Academic year	Semester	Plan 2.1	Plan 2.2
1	1	853-691 Special topics in Biotechnology 1 credit Elective course and/or thesis 9 credits	853-521 Biotechnology 4 credits 853-525 Research Techniques in Biotechnology 3 credits Group compulsory course 3 credits Elective course 3 credits
		Total 10 credits	Total 13 credits
	2	853-621 Advanced Research Techniques in Biotechnology 2 credits 853-696 Seminar 1 1 credit Elective course and/or thesis 6 credits	853-621 Advanced Research Techniques in Biotechnology 2 credits Elective course 4 credits 853-948 Thesis 3 credits 853-696 Seminar 1 1 credit
		Total 9 credits	Total 10 credits
2	1	853-936 Thesis 7 credits	853-691 Special topics in Biotechnology 1 credit 853-948 Thesis 8 credits
		Total 7 credits	Total 9 credits
	2	853-936 Thesis 7 credits 853-697 Seminar 2 1 credit	853-948 Thesis 8 credits 853-697 Seminar 2 1 credit
		Total 8 credits	Total 9 credits
3	1	853-936 Thesis 7 credits	853-948 Thesis 8 credits
		Total 7 credits	Total 8 credits
	2	853-936 Thesis 6 credits 853-698 Seminar 3 1 credit	853-948 Thesis 8 credits 853-698 Seminar 3 1 credit
		Total 7 credits	Total 9 credits
4	1	-	853-948 Thesis 8 credits
			Total 8 credits
	2	-	853-948 Thesis 5 credits 853-699 Seminar 4 1 credit
			Total 6 credits
		Total 48 credits	Total 72 credits

Group compulsory course 3 credits

- Environmental Biotechnology Group ; 853-542 Advanced Environmental Biotechnology
- Food Biotechnology and Enzyme Technology Group;
853-534 Enzyme Technology or 853-561 Food Biotechnology
- Marine Biotechnology Group ; 853-552 Advanced Marine Biotechnology
- Bioprocess Engineering Group; 854-511 Advanced Bioprocess Engineering

Elective courses 6 credits

Semester 1/2018

- 853-534 Enzyme Technology 3 (3-0-6) credits
- 853-542 Advanced Environmental Biotechnology 3 (3-0-6) credits
- 853-561 Food Biotechnology 3 (3-0-6) credits
- 854-531 Bioreactor Design 3 (3-0-6) credits

Semester 2/2018

- 853-531 Traditional Fermented Foods 3 (3-0-6) credits
- 853-535 Advanced Fermentation Technology 3 (3-0-6) credits

853-541 Waste Utilization and Treatment in Agro-Industry 3 (3-0-6) credits

853-543 Biodegradation and Bioremediation 3 (3-0-6) credits

853-571 Genetic Engineering Technology 3 (3-0-6) credits

854-511 Advanced Bioprocess Engineering 3 (3-0-6) credits

Duration:

Plan 1.1 and 2.1: Three (3) years (not more than 6 year)

Plan 1.2 and 2.2: Three (4) years (not more than 8 year)

Graduation Requirements

1. Meet the English performance following the regulation issued by Graduate School
2. Satisfy the Qualifying Examination (QE) (both oral and written examination)
3. Fulfill the program requirements with a GPA of at least 3.00 (except Plan 1)
4. Satisfy the proposal examination and thesis with grade S or X
5. Plan 1 publish the academic article from thesis or a part of thesis in a journal or an academic printed matter which has a peer review at least 2 articles
6. Plan 2 publish the academic article from thesis or a part of thesis in a journal or an academic printed matter which has a peer review at least 1 articles

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