



GRADUATE PROGRAMS

FACULTY OF PHARMACEUTICAL SCIENCES
KHON KAEN UNIVERSITY



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Message from Dean

Associate Professor. Paiboon Daosodsai, Ph.D.

The Faculty of Pharmaceutical Sciences of Khon Kaen University is one of the leading pharmaceutical institution in Northeast Region of Thailand with international importance in educational and research fields. In 2020, the faculty is in 201st – 250th in QS World University Rankings by Subject 2020 (Pharmacy and Pharmacology). Our missions are to produce qualified graduates with the advanced scientific knowledge and rich academic experience to maintain high quality research and to create new innovations and products.

Quickly developing and progressing changes in the international trends of pharmaceutical profession require the wide diapason of knowledge and integration of practical experience and research knowledge. Our pharmacy school ensure high quality graduate education that incorporates innovative aspects of educational training and research. The varieties of graduate programs in pharmaceutical sciences enable graduates to find the expertise field of their interest providing with an excellent foundation for the academic and professional career.

The Faculty of Pharmaceutical Sciences is internationally opened place. Every year we accept and graduate international students in different fields of pharmaceutical expertise. We ensure high standard research facilities with the equipped according to the laboratory standards work places and provide new laboratory equipment for conduction of research. We also provide a high-quality professional knowledge and supportive community to base a clinical practice. After graduation, many of our international graduate students bring obtained knowledge and skills back to their home countries, standing out with their affirming international perspective and strong sense of self. We highly support this trend and strive for its development in the future.

I would like to invite you to join the graduate program at our faculty and become a part of our family.

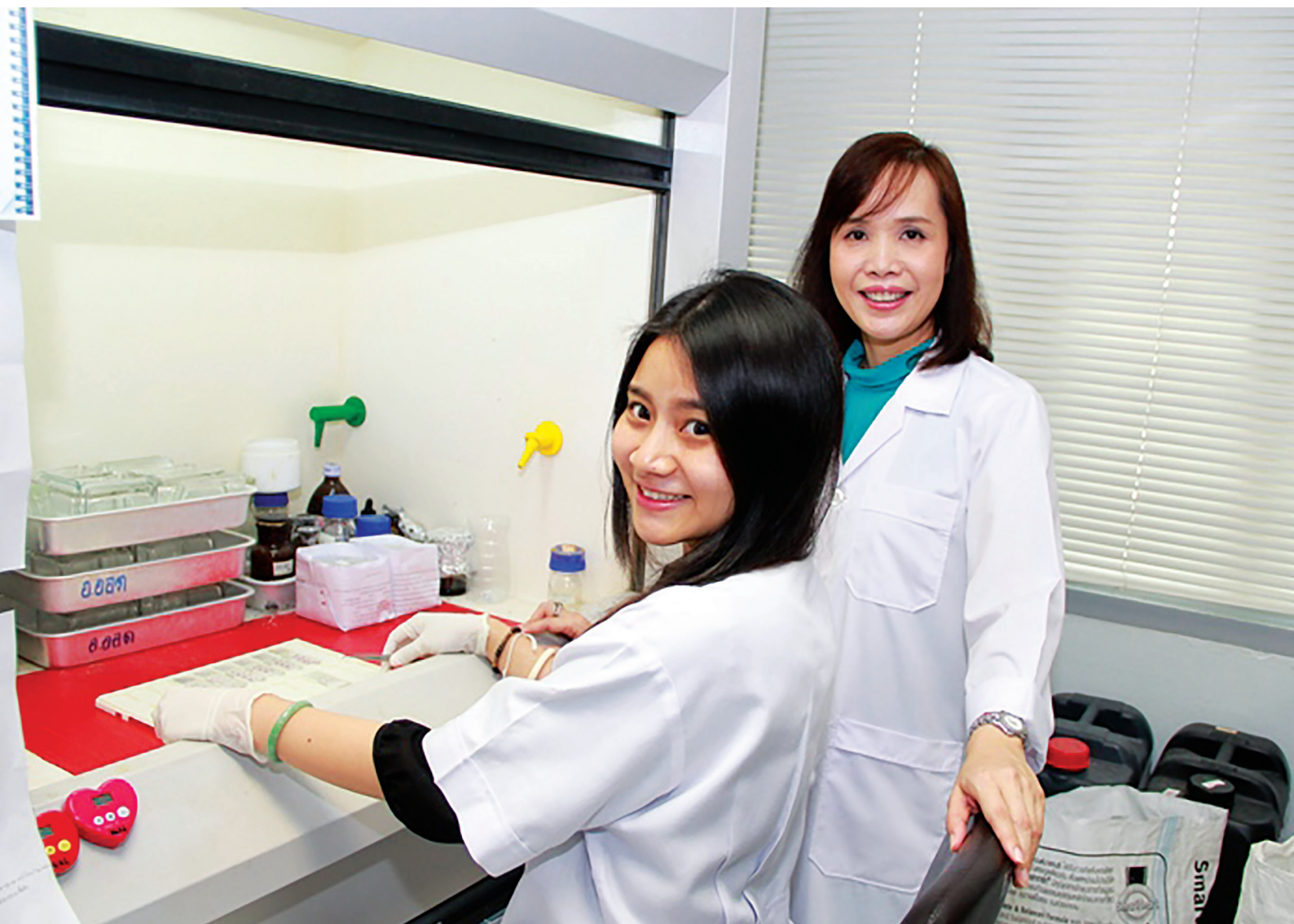
Assoc. Prof. Dr. Paiboon Daosodsai

Dean, Faculty of Pharmaceutical Sciences, KKU

Doctor of Philosophy Program in Research and Development in Pharmaceuticals







Doctor of Philosophy Program in Research and Development in Pharmaceuticals

Faculty of Pharmaceutical Sciences
General information



• Program

Doctor of Philosophy (Research and Development in
Pharmaceuticals)



• Degree

Ph.D. (Research and Development in Pharmaceuticals)



• Total credits

Type 1.1	48 credits (3 year program)
Type 1.2	72 credits (4 year program)
Type 2.1	48 credits (3 year program)
Type 2.2	72 credits (4 year program)



• Study plan

- 1) Type 1.1 Dissertation only
- 2) Type 1.2 Course work and Dissertation
- 3) Type 2.1 Course work and Dissertation
- 4) Type 2.2 Course work and Dissertation



• Language (Mode of teaching)

Thai and English



• Future career after graduation

- (1) Researcher
- (2) University Instructor
- (3) Industrial pharmacist
- (4) Compounding pharmacist

● Program structure

	Program structure			
	Type 1.1	Type 1.2	Type 2.1	Type 2.2
1) Compulsory	2*	3*	2	3
2) Electives I	-	1**	7	7
Electives II		2**	3	14
3) Dissertation	48	72	36	48
	48	72	48	72

Note: Type 1.1, 2.1 for Master's Degree or equivalent

Type 1.2, 2.2 for Bachelor's Degree or equivalent

* Compulsory for Type A/1, A1/2 (audit)

Compulsory

Code	Course	Credit
PS617 991	Seminar I	1(1-0-3)
PS617 992	Seminar II	1(1-0-3)
PS617 993	Seminar III	1(1-0-3)

Electives I

Code	Course	Credit
PS617 830	Application of Statistics in Pharmaceutical Research	2(1-2-4)
PS617 831	Instrumental Analysis in Pharmaceutical Sciences	3(2-3-6)
PS617 832	Consideration for Pharmaceutical Research	2(2-0-4)
PS617 833	Academic communication and presentation	2(2-0-4)

Electives II

Subject Groups

I : Drug Discovery Technologies

Code	Course	Credit
PS617 834	Advanced Medicinal Chemistry	3(3-0-6)
PS617 835	Synthesis of Organic Medicinal Agents	3(3-0-6)
PS617 836	Spectroscopy in Medicinal Chemistry	3(3-0-6)
PS617 837	Techniques in Medicinal Chemistry	3(3-0-6)
PS617 838	Drug Discovery from Natural Sources	3(2-3-6)
PS617 839	Natural Products for Health	3(3-0-6)
PS617 842	Biological Matrices and Trace Analysis	2(1-3-4)

II : Pharmaceutical Biotechnology

Code	Course	Credit
PS617 840	Drug and Xenobiotic Metabolism	3(3-0-6)
PS617 841	Application of Biotechnology in Pharmaceutical Sciences	2(1-3-4)
PS617 843	Selected Topics in Pharmaceutical Molecular Genetics	1(1-0-2)
PS617 849	Advancement in Pharmaceutical Nanotechnology	2(2-0-4)
PS617 851	Concepts of Biosimilar and Bioequivalence	1(1-0-2)
PS617 852	Pharmaceutical Plant Tissue Culture	2(1-3-4)

III : Drug Delivery and Pharmaceutical Quality Assurance

Code	Course	Credit
PS617 842	Biological Matrices and Trace Analysis	2(1-3-4)
PS617 844	Development of Drug Delivery Systems	2(2-0-4)
PS617 845	Pharmacokinetics for Product Development	2(2-0-4)
PS617 846	Development and Selection of Pharmaceutical Excipients	2(1-3-4)
PS617 847	Drug Stability Influencing Formulation Development	2(2-0-4)
PS617 848	Analytical Method Validation	2(1-3-4)
PS617 849	Advances in Pharmaceutical Nanotechnology	2(2-0-4)
PS617 850	Development of Pharmaceutical Products	1(1-0-2)

Dissertation

Code	Course	Credit
PS617 996	Dissertation	72 credits
PS617 997	Dissertation	48 credits
PS617 998	Dissertation	48 credits
PS617 999	Dissertation	36 credits

Example for Study Plan Type 1.1, 1.2

Year 1, Semester 1		Credits	
		Type 1.1	Type 1.2
PS617 991	Seminar I	1(1-0-3)	1(1-0-3)
PSXXX XXX	Elective Courses; Group I	-	1-3 (1 subject)
PSXXX XXX	Elective Courses; Group II	-	1-3 (1 subject)
PS617 996	Dissertation	-	9
PS617 997	Dissertation	9	-
Total credits		10	12-16
Accumulate credits		9	9

Year 1, Semester 2		Credits	
		Type 1.1	Type 1.2
PS617 992	Seminar II	1(1-0-3)	1(1-0-3)
PSXXX XXX	Elective Courses; Group II	-	1-3 (1 subject)
PS617 996	Dissertation	-	9
PS617 997	Dissertation	9	-
Total credits		10	11-13
Accumulate credits		18	18

Year 2, Semester 1		Credits	
		Type 1.1	Type 1.2
PS617 993	Seminar II	-	1(1-0-3)
PS617 996	Dissertation	-	9
PS617 997	Dissertation	9	-
Total credits		9	9
Accumulate credits		27	27

Year 2, Semester 2		Credits	
		Type 1.1	Type 1.2
PS617 996	Dissertation	-	9
PS617 997	Dissertation	9	-
Total credits		9	9
Accumulate credits		36	36

Year 3, Semester 1		Credits	
		Type 1.1	Type 1.2
PS617 996	Dissertation	-	9
PS617 997	Dissertation	9	-
Total credits		9	9
Accumulate credits		45	45

Year 3, Semester2		Credits	
		Type 1.1	Type 1.2
PS617 996	Dissertation	-	9
PS617 997	Dissertation	3	-
Total credits		3	9
Accumulate credits		48	54

Year 4, Semester 1		Credits	
		Type 1.1	Type 1.2
PS617 996	Dissertation	-	9
Total credits		-	9
Accumulate credits		-	63

Year 4, Semester 2		Credits	
		Type 1.1	Type 1.2
PS617 996	Dissertation	-	9
Total credits		-	9
Accumulate credits		-	72

Example for Study Plan Type 2.1, 2.2

Year 1, Semester 1		Credits	
		Type 2.1	Type 2.2
PS617 830	Application of Statistics in Pharmaceutical Research	2(1-2-4)	2(2-0-4)
PS617 831	Instrumental Analysis in Pharmaceutical Sciences	3(2-3-4)	3(2-3-4)
PS617 832	Consideration for Pharmaceutical Research	2(2-0-4)	2(2-0-4)
PSXXX XXX	Elective Courses	3	3
Total credits		10	10
Accumulate credits		10	10

Year 1, Semester 2		Credits	
		Type 2.1	Type 2.2
PS617 991	Seminar I	1(1-0-3)	1(1-0-3)
PS617 xxx	Elective II	-	8
PS617 898	Dissertation	-	9
PS617 999	Dissertation	9	-
Total credits		10	18
Accumulate credits		19	19

Year 2, Semester 1		Credits	
		Type 2.1	Type 2.2
PS617 992	Seminar II	1(1-0-3)	1(1-0-3)
PS617 xxx	Elective II	-	3
PS617 998	Dissertation	-	6
PS617 999	Dissertation	8	-
Total credits		9	10
Accumulate credits		28	29

Year 2, Semester 2		Credits	
		Type 2.1	Type 2.2
PS617 993	Seminar III	-	1(1-0-3)
PS617 998	Dissertation	-	9
PS617 999	Dissertation	9	-
Total credits		9	10
Accumulate credits		37	39

Year 3, Semester 1		Credits	
		Type 2.1	Type 2.2
PS617 998	Dissertation	-	9
PS617 999	Dissertation	9	-
	Total credits	9	9
	Accumulate credits	46	48

Year 3, Semester 2		Credits	
		Type A2/1	Type A2/2
PS617 998	Dissertation	-	9
PS617 999	Dissertation	2	-
	Total credits	2	9
	Accumulate credits	48	57

Year 4, Semester 1		Credits	
		Type 2.1	Type 2.2
PS627 998	Dissertation	-	9
	Total credits	-	9
	Accumulate credits	-	66

Year 4, Semester 2		Credits	
		Type 2.1	Type 2.2
PS627 999	Dissertation	-	6
	Total credits	-	6
	Accumulate credits	-	72

Course description

PS617 830	Application of Statistics in Pharmaceutical Research	2(1-2-4)
Prerequisite : No		
Selection and application of statistic for the pharmaceutical research, experimental design, data analysis and conclusions by mean of statistic		
PS617 831	Instrumental Analysis in Pharmaceutical Sciences	3(2-3-6)
Prerequisite : No		
Analytical methods of drugs and chemical compounds by using spectrophotometry, i.e., UV-visible Spectrophotometry, Spectrofluorometry, FT-IR, NIR and chromatography, i.e., TLC, CC, HPLC, UHPLC and Capillary Electrophoresis technique		
PS617 831	Instrumental Analysis in Pharmaceutical Sciences	3(2-3-6)
Prerequisite : No		
Analytical methods of drugs and chemical compounds by using spectrophotometry, i.e., UV-visible Spectrophotometry, Spectrofluorometry, FT-IR, NIR and chromatography, i.e., TLC, CC, HPLC, UHPLC and Capillary Electrophoresis technique		
PS617 832	Consideration for Pharmaceutical Research	2(2-0-4)
Prerequisite : No		
Drug discovery process, acute and chronic toxicity tests in animals, pharmacokinetics of drugs in animals and human, research and development in pharmacodynamics, preclinical and clinical studies and research ethics		
PS617 833	Academic Communication and Presentation	2(2-0-4)
Prerequisite : No		
Effective writing and academic communication procedure, skill in specialized field for review literature and communication, document presentation in academic articles, reports, theses and oral presentation, ethics and rights with respect to the academic writing and communication		

PS617 834	Advanced Medicinal Chemistry	3(3-0-6)
Prerequisite : No		
Applications of chemical, physical and biological principles to rational drug design and development process, traditional and modern approaches as well as innovative drug design strategies, methodologies and impacts from technology leading to drug design and development, bioinformatics, diseases on target diseases for research. Case studies		
PS617 835	Synthesis of Organic Medicinal Agents	3(3-0-6)
Prerequisite : No		
Reaction of synthesis of organic medicinal compounds classified by their functional groups. Mechanisms of the reactions of carbon and heterocyclic compounds		
PS617 836	Spectroscopy in Medicinal Chemistry	3(3-0-6)
Prerequisite : No		
Theories and principles used to determine structure, conformation and configuration using infrared, mass spectrometer, nuclear magnetic resonance with an emphasis on spectroscopic methods used in solving structural problems and in analyzing biological molecules		
PS617 837	Techniques in Medicinal Chemistry	3(3-0-6)
Prerequisite : No		
Combinatorial chemistry, quantitative structure-activity relationship, computer used in molecular design studies, molecular modeling and simulation of the interaction between drug molecule and biological target		
PS617 838	Drug Discovery from Natural Sources	3(2-3-6)
Prerequisite : No		
History of drug discovery from natural sources. Isolation, purification, screening tests of function groups and some specific pharmacological activities for the bioactive compounds		

PS617 839	Natural Products for Health	3(3-0-6)
Prerequisite : No		
Definition and significance of health, concepts for health promotion, natural therapy, food and health, nutraceuticals, sources and values of food, health products from plants and their parts, health products from animals and minerals, national health policy, regulations and laws related to health food		
PS617 840	Drug and Xenobiotic Metabolism	3(3-0-6)
Prerequisite : No		
Mechanism of biotransformation of drug and xenobiotics catalyzed by enzymatic reactions, including phase 0, I, II, and III. Molecular and biochemical factors affecting basic mechanisms of enzyme inhibition/ induction. Drug-drug or drug-xenobiotic interaction. Genetic polymorphism and pharmacogenetics		
PS617 841	Application of Biotechnology in Pharmaceutical Sciences	2(1-3-4)
Prerequisite : No		
Principle of pharmaceutical biotechnology and advanced molecular and biotechnological-related techniques. Biotechnological derived pharmaceutical products. Gene therapy. Advanced bioinformatics in pharmaceutical sciences		
PS617 842	Biological Matrices and Trace Analysis	2(1-3-4)
Prerequisite : No		
Extraction and analytical methods of compounds in biological matrices and trace analysis techniques using solid phase extraction, pre- and post-column derivatization in cooperation with high performance liquid chromatography-electrochemical detector, high performance liquid chromatography-spectrofluorometer, high performance liquid chromatography-ultraviolet-visible detector, liquid chromatography-mass spectrophotometry and gas chromatography-mass spectrophotometry		
PS617 843	Selected Topics in Pharmaceutical Molecular Genetics	1(1-0-2)
Prerequisite : No		
Current selected topic in molecular genetics focusing on biotechnological derived pharmaceutical products. Direction, consideration, and ethical concerns on genetically modified pharmaceutical products		

PS617 844	Development of Drug Delivery Systems	2(2-0-4)
Prerequisite : No		
Principle and strategy of physicochemical pharmacy in drug delivery system development. Factors influencing drug delivery system design. Mechanisms of drug targeting and utilization of these mechanisms in the development of delivery systems for drugs and macromolecules		
PS617 845	Pharmacokinetics for Pharmaceuticals Development	2(2-0-4)
Prerequisite : No		
Development and screening of optimal pharmaceutical products through prediction and simulation of in vitro/in vivo, correlation between laboratory findings and pharmacokinetic study in animals or humans		
PS617 846	Development and Selection of Pharmaceutical Excipients	2(1-3-4)
Prerequisite : No		
Principles of the pharmaceutical excipient selection. Preformulation study using the relevant physicochemical characteristics of pharmaceutical excipients. Development of pharmaceutical excipients		
PS617 847	Drug Stability Influencing Formulation Development	2(2-0-4)
Prerequisite : No		
Principle of drug stability, compatibility of drug and pharmaceutical excipients. Evaluation of drug products, methods of stability testing and techniques to improve drug stability, prediction of expiry date of drug using computerize simulation program, study design of stability of pharmaceutical dosage forms		
PS617 848	Analytical Method Validation	2(1-3-4)
Prerequisite : No		
Regulations, analytical method validation, quality control for pharmaceutical products, instrumental calibration and good laboratory practice		

PS617 849	Advancement in Pharmaceutical Nanotechnology	2(2-0-4)
Prerequisite : No		
Nanotechnology, pharmaceutical nanotechnology, bionanotechnology. Current advances in applications of nanotechnology in delivery of drugs, cosmetics and nutrients, in diagnostic agents, therapeutics and environmental hygiene, toxicity of nanomaterials		
PS617 850	Development of Pharmaceuticals	(1-0-2)
Prerequisite : No		
Principles, design, dosage form, factors of dosage form design		
PS617 851	Concepts of Biosimilar and Bioequivalence	1(1-0-2)
Prerequisite : No		
Biologic drugs and biosimilars generic drugs and bioequivalence, concepts for validation and selection of the high quality of the biologic drug and generic drug compared to the original one		
PS617 852	Pharmaceutical Plant Tissue Culture	2(1-3-4)
Prerequisite : No		
Principles and basic technique of plant tissue culture, organization of tissue culture laboratory and equipment, composition and preparation of nutrient media for plant tissue culture, plant tissue techniques, storage of plant cell culture, transferring of the plantlets from nutrient medium to soil, applications of plant tissue culture technique for the secondary metabolite production, variety selection, controlling of culture condition, feeding of precursor, elicitation, immobilization, transformation by Agrobacterium, plant tissue culture in bioreactor, application of for improvement of plant or plant tissue with high yield production of secondary metabolite which possesses pharmaceutical activity		
PS617 991	Seminar I	1(1-0-3)
Prerequisite : No		
Survey, review, discussion group working and presentation of recent interesting research aspect in research and development in pharmaceuticals		

PS617 992	Seminar II	1(1-0-3)
Prerequisite : No		
Survey, review, discussion group working and presentation of recent interesting research aspect possibly related to doctoral dissertation		
PS617 993	Seminar III	1(1-0-3)
Prerequisite : No		
Survey, review, discussion group working and presentation of research aspect related to doctoral dissertation		
PS617 997	Dissertation	48 credits
Prerequisite : No		
Research of high quality illustrating the innovation of concept or knowledge or technology applicable to the pharmaceuticals or related area, identification, writing dissertation, a poster presentation or oral presentation in the international conference, national and international publications of the dissertation in national and international journals ethics in research and writing article		
PS617 998	Dissertation	48 credits
Prerequisite : No		
Research of high quality illustrating the innovation of concept or knowledge or technology applicable to the pharmaceuticals or related areas. Identification, solving the problem scientifically, ethics in research and writing article and presenting in a dissertation form, a poster presentation or an oral presentation in an international conference, an international publication of the dissertation		
PS617 999	Dissertation	36 credits
Prerequisite : No		
Research of high quality illustrating the innovation of concept or knowledge or technology applicable to the pharmaceuticals or related areas. Identification, solving the problem scientifically, ethics in research and writing article and presenting in a dissertation form, a poster presentation or an oral presentation in an international conference, an international and a national publication of the dissertation		



