



หลักสูตรปรัชญาดุษฎีบัณฑิต
สาขาวิชาพยาธิชีววิทยา
(หลักสูตรนานาชาติ)

DOCTOR OF PHILOSOPHY PROGRAM
IN
PATHOBIOLOGY
(INTERNATIONAL PROGRAM)

DEPARTMENT OF PATHOBIOLOGY OF THE
FACULTY OF SCIENCE
AND
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY

REVISED PROGRAM IN 2022

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**Doctor of Philosophy Program in Pathobiology
(International Program)
Revised Program in 2022**

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Name of Institution Mahidol University
Campus/Faculty/Department Faculty of Science, Department of Pathobiology

Section 1 General Information

1. Curriculum Name

Thai : หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาธิชีววิทยา
(หลักสูตรนานาชาติ)
English : Doctor of Philosophy Program in Pathobiology
(International Program)

2. Name of Degree and Major

Full Title Thai : ปรัชญาดุษฎีบัณฑิต (พยาธิชีววิทยา)
Abbreviation Thai : ประ.ด. (พยาธิชีววิทยา)
Full Title English : Doctor of Philosophy (Pathobiology)
Abbreviation English : Ph.D. (Pathobiology)

3. Major Subjects : None

4. Required Credits:

4.1 Plan 1 : Research only

1. Plan 1.1 : For Student's with Master's degree must register for total credits not less than 48 credits

4.2 Plan 2 : Courses work and Research

1. Plan 2.1 : Students holding a Master's degree must register for total credits not less than 48 credits.

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หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

2. Plan 2.2 : Students holding a Bachelor’s degree must register for total credits not less than 72 credits.

5. Curriculum Characteristics

5.1 Curriculum type/model : Doctor’s degree

5.2 Language : English

5.3 Recruitment : Both Thai and international students

5.4 Collaboration with Other Universities : This program is Mahidol University’s program.

5.5 Graduate Degrees Offered to the Graduates : One degree with one major

6. Curriculum Status and Curriculum Approval

6.1 Program Revised in 2022

6.2 Starting in semester 1, academic year 2022 onwards

6.3 Curriculum committee approved the program in its meeting 17/2020 on 28 September 2020.

6.4 The Mahidol University Council approved the program in its meeting 566 on 17 March 2021

7. Readiness to Implement/Promote the Curriculum

The curriculum is ready to be implemented and promoted according to criteria set by Thai Qualification Framework for Higher Education in academic year 2025 (4 years after implementation).

8. Career Opportunities of the Graduates

8.1 A knowledge transfer specialist in pathobiology and biomedical science

8.2 A research and development in pathobiology and biomedical science

8.3 A specialist biomedical scientist

9. Name, ID Number, Title and Degree of the Faculty in Charge of the Program

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x xxxx xxxxx xx x Associate Professor Dr. Prasit Suwannalert	Ph.D. (Pathobiology) Mahidol University : 2010 M.Sc. (Medical Biochemistry) Khon Kaen University : 2006 B.Sc. (Medical Technology) Naresuan University : 2003	Department of Pathobiology, Faculty of Science, Mahidol University
2.	x xxxx xxxxx xx x Associate Professor Dr. Wannee Jiraungkoorskul	Ph.D. (Biology) Mahidol University : 2002 M.Sc. (Physiology) Mahidol University : 1992 B.Sc. (Medical Technology) Mahidol University : 1984	Department of Pathobiology, Faculty of Science, Mahidol University
3.	x xxxx xxxxx xx x Assistant Professor Dr. Amornrat Naranuntarat Jensen	Ph.D. (Toxicology) Johns Hopkins University, USA : 2009 B.Sc. (Pharmaceutical Sciences) Chulalongkorn University : 2000	Department of Pathobiology, Faculty of Science, Mahidol University

10. Venue for Instruction

Department of Pathobiology, Faculty of Science, Mahidol University and/or Online Education

11. External Factors to Be Considered in Curriculum Planning

11.1 Economic Situation/Development

หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

The goal of Thailand becoming a “Hub of Wellness and Medical Services” within 2016-2025 in four major areas including wellness, medical services, academics and products requires the training of professionals capable of understanding processes related to clinical research and development. In order to be competitive, both nationally and worldwide, graduates require the ability to use technology to develop novel knowledge regarding the disease mechanisms for the diagnosis of disease as well as the search for new and better treatments. Increase in the movement of migrant workers and tourists to Thailand, both of which play a major role in Thai economy, in the coming years also has the potential to impact public health through introduction of new diseases. The graduate programs in the Department of Pathobiology, Faculty of Science, Mahidol University provide training that enable performance of basic and applied research on disease pathogenesis and allow the graduates to become competence with problem-solving ability using an interdisciplinary approach in medical research.

11.2 Social and Cultural Situation/Development

The aging of society will bring substantial challenges to Thailand. The need to better understand the pathology of aging related diseases will be critical. In addition, economic competition is expected to impact public health through increased occurrence of diseases related to changes in lifestyle including cardiovascular diseases and diabetes. The curriculum needs to be revised in order to facilitate the training of students in diagnosis and treatment of diseases of aging and lifestyle. The ability to perform basic and applied research on disease pathogenesis impacted by changing age structure of Thai population will provide a significant advantage to graduates.

12. The Effects Mentioned in No.11.1 and 11.2 on Curriculum Development and Relevance to the Missions of the University/Institution

12.1 Curriculum Development

According to items 11.1 and 11.2, Department of Pathobiology, Faculty of Science, Mahidol University need to update the curriculum of Doctoral of Philosophy Program in Pathobiology (International Program) by integrating knowledge, research and development, and also information and communicating technology in order that students are able to apply their integrated knowledge to develop the organization effectively

12.2 Relevance to the Missions of the University

หลักสูตรปรับปรุงแก้ไขนี้ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

This curriculum supports the mission of the university on the part of teaching and learning excellence, and research excellence and aims to enhance students to apply their knowledge in sciences and innovation with integrity for the betterment of Thai society and the benefit of mankind.

13. Collaboration with Other Curricula of the University

-None-

Section 2 Information of the Curriculum

1. Philosophy, Justification, and Objectives of the Curriculum

1.1 Philosophy and Justification of the Curriculum

To produce graduates with expertise in pathobiology and create the research and innovation at internationally accepted quality in fields of pathobiology for social impact and improvement of quality of life for mankind.

1.2 Objectives of the Program

By the end of the study in Doctor of Philosophy Program in Pathobiology, the graduate students have qualified follow by Thailand Qualification Framework for Higher Education, they are able to

- 1.2.1 Integrate the moral standards and research ethics into academic and scientific works
- 1.2.2 Hypothesize the knowledge in pathobiology and other related fields, conduct self-directed and life-long learning
- 1.2.3 Design novel research project and synthesize new knowledge in pathobiology and other related fields
- 1.2.4 Work as a team in the role of leadership in professional and academic research
- 1.2.5 Apply appropriate information technology for data searching, data analysis, and presentation in both academic setting and scientific research

1.3 Program Learning Outcomes (PLOs)

- 1.3.1 PLO1: Judge proper usage of scientific citation
- 1.3.2 PLO2: Analyze basis of anatomical pathology, histological technique and pathophysiology to clinical correlation

- 1.3.3 PLO3: Analyze pathology at molecular, cellular and organ levels
- 1.3.4 PLO4: Develop new research questions and design scientific technique in research
- 1.3.5 PLO5: Integrate basic knowledge with clinical correlations
- 1.3.6 PLO6: Design novel research proposal with innovation using advanced techniques in pathobiology
- 1.3.7 PLO7: Judge good teamwork and express roles in the workgroup appropriately and with cultural sensitivity
- 1.3.8 PLO8: Judge proper information technology for scientific communication and statistical analysis in pathobiology

2. Plan for Development and Improvement

Plan for Development/Revision	Strategies	Evidences/Indexes
1. Program administration	Program Administrative Committees, all faculty members and stakeholders will analyze the output, gap and SWOT analysis for planning the program improvement	1. Pathobiology Planning Administration 2. Monthly Program Meeting Report
2. Feedbacks from stakeholders to continuously improve the curriculum	1.The program will contact and ask questions to the stakeholder directly instead of sending questionnaire and also organize the meeting to discuss and receive inputs from various stakeholders 2.The adjustment at the course content levels will be implemented right away	Satisfactory evaluation report
3.Assessment analysis	Rubrics for assessment of some courses will be discussed at the curriculum meeting and will be	Satisfactory rubric form

Plan for Development/Revision	Strategies	Evidences/Indexes
	added or modified accordingly	
4. The curriculum is to be revised every five year based on the policy of Thai Commission of Higher Education.	Evaluate and revise the curriculum every five years on a part of - Satisfaction of employer or those who hire graduate students - Strengths and Weaknesses analysis	1. Satisfactory evaluation report 2. Program proceeding report

Section 3 Educational Management System, Curriculum Implementation, and Structure

1. Educational Management System

- 1.1 **System:** Two Semester Credit system. 1 Academic Year consists of 2 Regular Semesters, each with not less than 15 weeks of study.
- 1.2 **Summer Session** -None-
- 1.3 **Credit Equivalence to Semester System** -None-

2. Curriculum Implementation

- 2.1 **Teaching Schedule** Onsite and/or Online education
Weekdays from Monday to Friday (8:00 A.M. – 4:00 P.M.)
Semester 1: August – December
Semester 2: January - May

2.2 Qualifications of Prospective Students

Plan 1 : Research only

Plan 1.1: For Student's with Master's degree

- (1) Applicants hold a Master's degree in pathobiology, biology, biological science, medical science, medical technology, microbiology, pharmacy, or other related fields which accredited by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation. They must have cumulative GPA not less than 3.50.

- (2) Applicants must have research experience in the field of pathobiology not less than 5 years,
- (3) Applicants must demonstrate proof of their research articles published in international peer-reviewed journals or other publications or accepted to be published at the international level, not less than 3 research articles within 5 years. These research articles must not be part of the applicant's own graduate studies in any degree level from any institution both in the country and abroad.
- (4) Applicants have an English Proficiency Examination score as the requirement of Faculty of Graduate Studies
- (5) Applicant with other qualifications may be considered by the Program Director, committee and the Dean of Faculty of Graduate Studies.

Plan 2 : Courses work and Research

Plan 2.1: For Student's with Master's degree

- (1) Applicants must be studying in the final year at the M.Sc. level, or hold a Master degree in pathobiology, biology, biological science, medical science, medical technology, microbiology, pharmacy or other related fields which accredited by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation. They must have cumulative GPA not less than 3.50.
- (2) Applicants have an English Proficiency Examination score as the requirement of Faculty of Graduate Studies.
- (3) Applicant with other qualifications may be considered by the Program Director, committee and the Dean of Faculty of Graduate Studies.

Plan 2.2: For Student's with Bachelor's degree

- (1) Applicants must be studying in the final year at the B.Sc. level, or hold a Bachelor degree in biology, biological science, dental surgery, medicine, medical science, medical technology, microbiology, pharmacy, veterinary medicine or other related fields which accredited by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation. They must have cumulative GPA not less than 3.50 or
- (2) Applicants have an English Proficiency Examination score as the requirement of Faculty of Graduate Studies.

- (3) Applicant with other qualifications may be considered by the Program Director, committee and the Dean of Faculty of Graduate Studies.

2.3 Problems of New Students Encounter

Different knowledge background of students and English skills

2.4 Strategies for Problem Solving/Limited Requirement in No.2.3

Problems of New Students	Strategies for Problem Solving
Different knowledge background of students	Tutoring sessions in basic pathology is offered prior to start of first semester to help acclimate students to graduate level courses.
Problems of New Students	Strategies for Problem Solving
English skills	Students with poor English skills are encouraged to take English courses in listening, speaking and comprehension offered by Faculty of Graduate Studies.

2.5 Five-Year-Plan for Recruitment and Graduation of Students

Plan 1 : Research only

Plan 1.1: For Student's with Master's degree

Academic Year	2022	2023	2024	2025	2026
1 st	2	2	2	2	2
2 nd	-	2	2	2	2
3 rd	-	-	2	2	2
Cumulative numbers	2	4	6	6	6
Expected number of students graduated	-	-	2	2	2

Plan 2 : Course work and Research

Plan 2.1 : For Student's with Master's degree

Academic Year	2022	2023	2024	2025	2026
1 st	2	2	2	2	2
2 nd	-	2	2	2	2

3 rd	-	-	2	2	2
Cumulative numbers	2	4	6	6	6
Expected number of students graduated	-	-	2	2	2

Plan 2.2 : For Student's with Bachelor's degree

Academic Year	2022	2023	2024	2025	2026
1 st	2	2	2	2	2
2 nd	-	2	2	2	2
3 rd	-	-	2	2	2
4 th	-	-	-	2	2
Cumulative numbers	2	4	6	8	8
Expected number of students graduated	-	-	-	2	2

2.5 Budget based on the plan

Budget: The budget is from Department of Pathobiology, Faculty of Science, Mahidol University.

Plan 1 : Research only

Plan 1.1: For Student's with Master's degree

Estimated income per student

Registration fee

Tuition -

Dissertation 48 credits xxxx Baht

Qualifying Examination Fee xxxx Baht

Dissertation research fee xxxxxx Baht

Total income per student xxxxxx Baht

Estimated expenses

Variable expenses per student

College/university allocation -

Position allowance of qualifying examination committee xxxx Baht

Position allowance of thesis advisor and committee xxxxx Baht

Total variable expenses per student xxxxx Baht

Fixed expenses

Staff salary	xxxxx Baht
Utility fee	xxxxx Baht
Material fee	xxxxxxx Baht
Equipment fee	xxxxx Baht
Total Fixed expenses	xxxxxxx Baht
Number of students at break-even point	2 persons
Cost of students at break-even point	506,400 Baht
Expenses per student per academic year	253,200 Baht

Plan 2 : Course work and Research**Plan 2.1 : For Student's with Master's degree****Estimated income per student**

Registration fee	
Tuition 12 credits (9000 baht per credit)	xxxxxxx Baht
Dissertation 36 credits	xxxxx Baht
Qualifying Examination Fee	xxxxx Baht
Dissertation research fee	xxxxxxx Baht
Total income per student	xxxxxxx Baht

Estimated expenses

Variable expenses per student	
College/university allocation	xxxxx Baht
Position allowance of qualifying examination committee	xxxx Baht
Position allowance of thesis advisor and committee	xxxxx Baht
Total variable expenses per student	xxxxx Baht

Fixed expenses

Staff salary	xxxxxxx Baht
Teaching payment	xxxxxxx Baht
Utility fee	xxxxx Baht
Material fee	xxxxxxx Baht
Equipment fee	xxxxx Baht
Total Fixed expenses	xxxxxxx Baht

Number of students at break-even point	2	persons
Cost of students at break-even point	321,800	Baht
Expenses per student per academic year	107,267	Baht

Plan 2.2 : For Student's with Bachelor's degree

Estimated income per student

Registration fee		
Tuition 24 credits (9000 baht per credit)	xxxxxx	Baht
Dissertation 48 credits	xxxxx	Baht
Qualifying Examination Fee	xxxx	Baht
Dissertation research fee	xxxxxx	Baht
Total income per student	xxxxxx	Baht

Estimated expenses

Variable expenses per student		
College/university allocation	xxxxx	Baht
Position allowance of qualifying examination committee	xxxx	Baht
Position allowance of thesis advisor and committee	xxxxx	Baht
Total variable expenses per student	xxxxxx	Baht

Fixed expenses

Staff salary	xxxxxx	Baht
Teaching payment	xxxxxx	Baht
Utility fee	xxxxx	Baht
Material fee	xxxxxx	Baht
Equipment fee	xxxxx	Baht
Total Fixed expenses	xxxxxx	Baht

Number of students at break-even point	2	persons
Cost of students at break-even point	476,400	Baht
Expenses per student per academic year	119,100	Baht

2.6 Educational System : Classroom Mode

2.7 Transfer of Credits, Courses and Cross University Registration (If any) Credits transferring must be in compliance with Mahidol University's regulations on Graduate Studies. Should you have more information, please visit our website: www.grad.mahidol.ac.th.

3. Curriculum and Instructors

3.1 Curriculum

3.1.1 Number of credits

Plan 1 Research only

Plan 1.1 Not less than 48 credits for Master's Degree Applicant

Plan 2 Course work and Research

Plan 2.1 Students holding a Master's degree must register for no less than 12 credits of coursework and 36 credits of thesis. Total credits acquired must be no less than 48 credits.

Plan 2.2 Students holding a Bachelor's degree must register for no less than 24 credits of coursework and 48 credits of thesis. Total credits acquired must be no less than 72 credits.

3.1.2 Curriculum Structure

The curriculum structure is set in compliance with Announcement of Ministry of Education on the subject of Criteria and Standards of Graduate Studies 2015, Doctoral of Philosophy Degree, Plan 1 and Plan 2 as below:

(1) Plan 1 : Research only

Dissertation	48 credits
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Total not less than	48 credits
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(2) Plan 2 : Course work and Research

Plan 2.1 For Student's with Master's degree

(1) Required courses	6 credits
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(2) Elective courses not less than	6 credits
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(3) Dissertation	36 credits
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Total not less than	48 credits
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Plan 2.2 For Student's with Bachelor's degree

(1) Required courses	17	credits
(2) Elective courses not less than	7	credits
(3) Dissertation	48	credits
Total not less than	72	credits

3.1.3 Courses in the curriculum**(1) Plan 1 : Research only****Plan 1.1 : For Student's with Master's degree****Credits (lecture – practice – self-study)**

SCPA 898	Dissertation	48(0-144-0)
วทพย ๘๘๘	วิทยานิพนธ์	

(2) Plan 2 : Course work and Research**1. Required Courses****Plan 2.1 For Student's with Master's degree 6 credits****Credits (lecture – practice – self-study)**

SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
วทพย ๖๑๔	สัมมนาทางพยาธิชีววิทยาขั้นสูง ๑	
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
วทพย ๖๑๕	สัมมนาทางพยาธิชีววิทยาขั้นสูง ๒	
SCPA 616	Current Research in Pathobiology	2(1-2-3)
วทพย ๖๑๖	งานวิจัยในปัจจุบันทางพยาธิชีววิทยา	
*SCPA 617	Integrative Systemic Pathology	2(2-0-4)
วทพย ๖๑๗	พยาธิวิทยาระบบบูรณาการ	

Plan 2.2 For Student's with Bachelor's degree 17 credits**Credits (lecture – practice – self-study)**

SCPA 501	General Pathology	2(1-2-3)
วทพย ๕๐๑	พยาธิวิทยาทั่วไป	
SCPA 502	Systemic Pathology	2(1-2-3)
วทพย ๕๐๒	พยาธิวิทยาระบบ	
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
วทพย ๖๐๒	พื้นฐานทางกายวิภาคสำหรับการศึกษาพยาธิวิทยา	

SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
วทพย ๖๐๓	เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย	
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
วทพย ๖๑๔	สัมมนาทางพยาธิชีววิทยาขั้นสูง ๑	
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
วทพย ๖๑๕	สัมมนาทางพยาธิชีววิทยาขั้นสูง ๒	
SCPA 616	Current Research in Pathobiology	2(2-0-4)
วทพย ๖๑๖	งานวิจัยในปัจจุบันทางพยาธิชีววิทยา	
*SCPA 617	Integrative Systemic Pathology	2(1-2-3)
วทพย ๖๑๗	พยาธิวิทยาระบบบูรณาการ	
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
วทพย ๖๒๒	พยาธิวิทยาระดับโมเลกุลและระดับเซลล์	
SCID 518	Generic Skills in Science Research	1(1-0-2)
วทคร ๕๑๘	ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	

Note: * New course

2. Elective Courses

Plan 2.1 For Student's with Master's degree level not less than 6 credits

Credits (lecture – practice – self-study)

*SCPA 609	Systems Immunology	1(1-0-2)
วทพย ๖๐๙	ภูมิคุ้มกันวิทยาเชิงระบบ	
*SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
วทพย ๖๑๘	การวิจัยสำหรับเวชศาสตร์และฟื้นฟูการชราภาพ	
*SCPA 619	Toxicopathology	2(2-0-4)
วทพย ๖๑๙	พยาธิพิษวิทยา	
*SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
วทพย ๖๒๐	ผลกระทบทั่วโลกของโรคติดเชื้อ	
#SCPA 621	Pathology of Cancer and Research	2(2-0-4)
วทพย ๖๒๑	พยาธิวิทยาของมะเร็งและการวิจัย	

Plan 2.2 : For Student's with Bachelor's degree level not less than 7 credits

Credits (lecture – practice – self-study)

SCPA 604	Clinical Pathology	2(1-2-3)
วทพย ๖๐๔	พยาธิวิทยาคลินิก	
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
วทพย ๖๐๖	หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา	
*SCPA 609	Systems Immunology	1(1-0-2)
วทพย ๖๐๙	ภูมิคุ้มกันวิทยาเชิงระบบ	
*SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
วทพย ๖๑๘	การวิจัยสำหรับเวชศาสตร์และฟื้นฟูการชราภาพ	
*SCPA 619	Toxicopathology	2(2-0-4)
วทพย ๖๑๙	พยาธิพิษวิทยา	
*SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
วทพย ๖๒๐	ผลกระทบทั่วโลกของโรคติดเชื้อ	
#SCPA 621	Pathology of Cancer and Research	2(2-0-4)
วทพย ๖๒๑	พยาธิวิทยาของมะเร็งและการวิจัย	
SCID 500	Cell and Molecular Biology	3(3-0-6)
วทคร ๕๐๐	ชีววิทยาระดับเซลล์และโมเลกุล	
SCID 502	Cell Science	2(2-0-4)
วทคร ๕๐๒	วิทยาศาสตร์เรื่องเซลล์	
SCID 503	Systemic Bioscience	3(3-0-6)
วทคร ๕๐๓	วิทยาศาสตร์ชีวภาพเชิงระบบ	
SCID 506	Concepts of Molecular Bioscience	2(2-0-4)
วทคร ๕๐๖	หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล	
SCID 507	Microscopic Technique	1(0-2-1)
วทคร ๕๐๗	เทคนิคการใช้กล้องจุลทรรศน์	
SCID 508	Biomolecular and Spectroscopy Techniques	1(0-2-1)
วทคร ๕๐๘	เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	
SCID 509	Separation Techniques	1(0-2-1)
วทคร ๕๐๙	เทคนิคการแยกสาร	

Note: * New course

SCID 510	Immunological Methods	1(0-2-1)
วทศร ๕๑๐	ระเบียบวิธีวิทยาภูมิคุ้มกัน	
SCID 511	Gene Technology	1(0-2-1)
วทศร ๕๑๑	เทคโนโลยีด้านยีน	
SCID 513	Animal Cell Culture Techniques	1(0-2-1)
วทศร ๕๑๓	เทคนิคการเพาะเลี้ยงเซลล์สัตว์	
SCID 514	Animal Experimentation in Biomedical Research	1(0-2-1)
วทศร ๕๑๔	การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์	
SCID 516	Biostatistics	3(3-0-6)
วทศร ๕๑๖	ชีวสถิติ	
GRID 521	Research Ethics	1(1-0-2)
บศทศร ๕๒๑	จริยธรรมการวิจัย	

Note: #Change name and code

In addition to elective courses mentioned above, a student may register other courses in international program offered by other faculty's equivalent to graduate studies, Mahidol University or the ones offered by other universities according to the student's interest with the approval of the curriculum committee or the advisor.

3. Dissertations

Plan 1 : Research only

Credits (lecture – laboratory – self-study)

SCPA 898	Dissertation	48(0-144-0)
วทพย ๘๘๘	วิทยานิพนธ์	

Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

SCPA 699	Dissertation	36(0-108-0)
วทพย ๖๙๙	วิทยานิพนธ์	

Plan 2.2 : For Student's with Bachelor's degree

SCPA 799	Dissertation	48(0-144-0)
วทพย ๗๙๙	วิทยานิพนธ์	

.....
 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

3.1.4 Research Project of the Program

Guidelines for conducting a research project are as follows:

- 1) Cellular and molecular mechanisms of microbial infection
- 2) Cancer biomaker, Aging control, Innovative medicine
- 3) Toxicopathology and environmental impact of toxicants
- 4) Novel mechanism and therapeutic strategies in genetic diseases

3.1.5 Definition of Course Codes

Four main alphabets are defined as follows:

The first two alphabets are abbreviation of the faculty offering the course.

SC means Faculty of Science

The latter two alphabets are abbreviation of the department or the major offering the course.

ID means the interdiscipline departments.

PA means Department of Pathobiology.

2. digits of number are 5XX and 6XX indicate that the courses are in the graduate study level.

3.1.6 Study Plan

Plan 1 : Research only

Plan 1.1 : For Student's with Master's degree

Year	Semester 1	Semester 2
1	(Qualifying Examination) * SCPA 898 Dissertation 8(0-24-0) Total 8 credits	SCPA 898 Dissertation 8(0-24-0) Total 8 credits
2	SCPA 898 Dissertation 8(0-24-0) Total 8 credits	SCPA 898 Dissertation 8(0-24-0) Total 8 credits
3	SCPA 898 Dissertation 8(0-24-0) Total 8 credits	SCPA 898 Dissertation 8(0-24-0) Total 8 credits

Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

Year	Semester 1	Semester 2
1	SCPA 614 Seminar in Advanced Pathobiology I Elective course Total 7 credits	SCPA 615 Seminar in Advanced Pathobiology II SCPA 616 Current Research in Pathobiology SCPA 617 Integrative Systemic Pathology Total 5 credits
2	(Qualifying Examination) * SCPA 699 Dissertation Total 9 credits	SCPA 699 Dissertation Total 9 credits
3	SCPA 699 Dissertation Total 9 credits	SCPA 699 Dissertation Total 9 credits

Plan 2.2 : For Student's with Bachelor's degree

Year	Semester 1	Semester 2
1	SCPA 501 General Pathology SCPA 602 Anatomical Basis for Pathological Study SCPA 603 Histopathological Techniques for Routine and Research SCPA 622 Molecular and Cellular Pathology SCPA 614 Seminar in Advanced Pathobiology I SCID 518 Generic Skills in Science Research Elective course Total 13 credits	SCPA 502 Systemic Pathology SCPA 615 Seminar in Advanced Pathobiology II SCPA 616 Current Research in Pathobiology SCPA 617 Integrative Systemic Pathology Elective course Total 11 credits

Year	Semester 1	Semester 2
2	(Qualifying Examination) * SCPA 799 Dissertation 8(0-24-0) Total 8 credits	SCPA 799 Dissertation 8(0-24-0) Total 8 credits
3	SCPA 799 Dissertation 8(0-24-0) Total 8 credits	SCPA 799 Dissertation 8(0-24-0) Total 8 credits
4	SCPA 799 Dissertation 8(0-24-0) Total 8 credits	SCPA 799 Dissertation 8(0-24-0) Total 8 credits

* Student enrolled Ph.D. program are required to pass a qualifying examination before registering for Ph.D. Dissrtation.

3.1.7 Course Description

Please see Appendix A

3.2 Name, I.D. Number, Title and Degree of Instructors

3.2.1 Full time instructors of the curriculum (Please see Appendix B1)

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x xxxx xxxxx xx x Associate Professor Dr. Prasit Suwannalert	Ph.D. (Pathobiology) Mahidol University : 2010 M.Sc. (Medical Biochemistry) Khon Kaen University : 2006 B.Sc. (Medical Technology) Naresuan University : 2003	Department of Pathobiology, Faculty of Science, Mahidol University
2.	x xxxx xxxxx xx x Associate Professor Dr. Wannee Jiraungkoorskul	Ph.D. (Biology) Mahidol University : 2002 M.Sc. (Physiology) Mahidol University : 1992 B.Sc. (Medical Technology)	Department of Pathobiology, Faculty of Science, Mahidol University

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
		Mahidol University : 1984	
3.	x xxxx xxxxx xx x Assistant Professor Dr. Amornrat Naranuntarat Jensen	Ph.D. (Toxicology) Johns Hopkins University, USA : 2009 B.Sc. (Pharmaceutical Sciences) Chulalongkorn University : 2000	Department of Pathobiology, Faculty of Science, Mahidol University
4.	x xxxx xxxxx xx x Assistant Professor Dr. Pornthip Chaichompoo	Ph.D. (Immunology) Mahidol University : 2010 M.Sc. (Immunology) Mahidol University : 2007 B.Sc. (Medical Technology) Chiang Mai University : 2004	Department of Pathobiology, Faculty of Science, Mahidol University
5.	x xxxx xxxxx xx x Lecturer Dr. Niwat Kangwanrangsan	Ph.D. (Medical Sciences) Ehime University, Japan : 2013 M.Sc. (Anatomy) Mahidol University : 2004 B.Sc. (Biology) Mahidol University : 1998	Department of Pathobiology, Faculty of Science, Mahidol University

3.2.2 Full time instructors (Please see Appendix B2)

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1	x xxxx xxxxx xx x Lecturer Dr. Nisamanee Charoenchon	Ph.D. (Medicine) University of Manchester, United Kingdom : 2016 M.Sc. (Biotechnology) Chulalongkorn University : 2012 B.Sc. (Biology) Khon Kaen University : 2009	Department of Pathobiology, Faculty of Science, Mahidol University
2	x xxxx xxxxx xx x Lecturer Dr. Titipatima Sakulterdkiat	M.D. Mahidol University : 2019 Ph.D. (Pathobiology) Mahidol University : 2013 B.Sc. (Biological Sciences) California State University San Marcos, USA : 2007	Department of Pathobiology, Faculty of Science, Mahidol University
3	x xxxx xxxxx xx x Lecturer Dr. Witchuda Payuhakrit	Ph.D. (Pathobiology) Mahidol University : 2015 B.Sc. (Medical Technology) Walailuk University : 2007	Department of Pathobiology, Faculty of Science, Mahidol University
4	x xxxx xxxxx xx x Lecturer Dr. Yaowarin Nakornpakdee	Ph.D. (Medical Microbiology) Khon Kaen University: 2018 M.Sc. (Medical Microbiology) Khon Kaen University : 2011	Department of Pathobiology, Faculty of Science, Mahidol University

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
		B.Sc. (Biology) Khon Kaen University: 2008	

4. Details of Practicum

-None-

5. Dissertation requirement

5.1 Short Description

Identifying research topic related to the field of pathobiology, developing research proposal related to the topic in 3.1.4 conducting the research including research ethics, data collection, synthesis, analysis, interpretation of the result and dissertation report, presenting and publishing research in the international peer-reviewed journal.

5.2 Standard Learning Outcomes

Students are able to analyze core knowledge in the field of pathobiology and develop research proposal to be presented and published in the international peer-reviewed journal.

5.3 Time Frame

Plan 1 : Research only

Plan 1.1 : For Student's with Master's degree

Semester 1 of the 1st Academic Year

Plan 2 : Course work and Research

Plan 2.1 : For Student's with Master's degree

Semester 1 of the 2nd Academic Year

Plan 2.2 : For Student's with Bachelor's degree

Semester 1 of the 2nd Academic Year

5.4 Number of credits

Plan 1 : Research only

Plan 1.1 : For Student's with Master's degree

48 credits

Plan 2 : Course work and Research

Plan 2.1 : For Student's with Master's degree

36 credits

Plan 2.2 : For Student's with Bachelor's degree

48 credits

5.5 Preparation

Advising time must be provided including advice from advisors. Dissertation information from official document or website must be continually revised and up-to-date.

5.6 Evaluation Process

The research process shall be evaluated by the advisor of student's Dissertation every time of consultation during conducting the research. The final oral examination is systematically evaluated by the graduate committee following the standards of the Faculty of Graduate Studies, Mahidol University. In addition, the research work or part(s) of the student's Dissertation must be published in an international peer-reviewed journal.

Section 4 Learning Outcome, Teaching Strategies and Evaluation

1. Development of Students' Specific Qualifications

Special Characteristics	Teaching Strategies or Student Activities
Altruism	Various types of volunteer activities such as teaching assistance for medical students at least twice a year, being speaker/demonstrator for national science fair once a year, staff for National Children's Day activities once a year. After the activity, students will summarize, evaluate, and make recommendations/plans for the next round of activity.
Creativity	Creation of ideas for various events such as Student Orientation, Graduation Party, and Mahidol Open House Day. Most of these

Special Characteristics	Teaching Strategies or Student Activities
	activities are yearly activities. Students will express their creative ideas, for example, event planning, ceremony, and decorations. After the activity, students will summarize, evaluate, and make recommendations/plans for the next round of activity.
Well-rounded	Weekly journal club at least for two months during each semester, special seminars from invited speakers with an average of one special seminar per month. Students are encouraged to participate during question and answer session and discussion.
Unity and harmony	Various teamwork activities such as annual Sport Day and Big Cleaning Day. Students will join the activity together and gain values through these activities, for example, development of team trust, team planning, and team spirit.

2. Development of Learning Outcome in Each Objective

Expected Outcome	Teaching Strategies	Evaluation Strategies
1. Morality and Ethics 1.1 Be disciplined and punctual. 1.2 Be honest and deeply concern that all public and presenting data in research is no plagiarized data. 1.3 Be respectful of the rights of class members and instructors. 1.4 Follow the rules and regulations of the	1) Class attendance check 2) Lecture, seminar, discuss or case studies 3) Group assignment 4) New student orientation	1) Behavioral observation 2) Quality of assignment 3) Quality report from seminar, discuss or case studies 4) Student evaluation

Expected Outcome	Teaching Strategies	Evaluation Strategies
organization.		
<p>2. Knowledge</p> <p>2.1 Perform and operate scientific instruments with special skill and effectiveness.</p> <p>2.2 Describe principle and theory of pathobiology and how to integrate knowledge in pathobiology with other subjects.</p> <p>2.3 Apply principle and theory in pathobiology to innovative or discovery scientific research.</p> <p>2.4 Self-directed and life-long learning of current scientific knowledge in Pathobiology and other academic subjects.</p>	<p>1) Lecture, seminar, discuss or case studies</p> <p>2) Group assignment</p> <p>3) Laboratory practice</p> <p>4) Academic visit</p> <p>5) Thesis proposal, progress report and defense</p> <p>6) Conference or seminar meeting</p>	<p>1) Examination</p> <p>2) Quality report from seminar, assignment</p> <p>3) Presentation</p> <p>4) Quality report from academic visit</p> <p>5) Student evaluation</p>
<p>3. Intellectual Development</p> <p>3.1 Create novel scientific research.</p> <p>3.2 Apply an appropriate scientific equipment for specific research aims.</p> <p>3.3 Investigate scientific</p>	<p>1) Lecture, seminar, discuss or case studies</p> <p>2) Group assignment</p> <p>3) Laboratory practice</p> <p>4) Academic visit</p> <p>5) Dissertation proposal, progress report and defense</p>	<p>1) Examination</p> <p>2) Quality report from seminar, assignment</p> <p>3) Presentation</p> <p>4) Quality report from academi visit</p> <p>5) Student evaluation</p>

Expected Outcome	Teaching Strategies	Evaluation Strategies
<p>problems with logical thinking.</p> <p>3.4 Critique data based on scientific evidence.</p>	<p>6) Conference or seminar meeting</p>	
<p>4. Interpersonal Relationship and Responsibility</p> <p>4.1 Perform academic study and activities as assigned.</p> <p>4.2 Be able to act as a project leader.</p> <p>4.3 Be a good listener and open-minded to combine the ideas from others for a final consensus.</p> <p>4.4 Be able to work with others with unity and with responsibility.</p>	<p>1) Group participation</p> <p>2) Group discussion</p> <p>3) Group assignment</p> <p>4) Progress report</p>	<p>1) Behavioral Observation</p> <p>2) Quality report from seminar, assignment</p> <p>3) Student evaluation</p>
<p>5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills</p> <p>5.1 Apply proper statistics for data analysis.</p> <p>5.2 Judge appropriate information technology for data searching.</p>	<p>1) Assignments for students to search and present</p> <p>2) Dissertation proposal, progress report and</p>	<p>1) Applying media for presentation</p> <p>2) Quality of report</p> <p>3) Student evaluation</p>

Expected Outcome	Teaching Strategies	Evaluation Strategies
5.3 Be able to communicate idea and knowledge through written and oral presentation of scientific research in international academic setting.	defense	

3. Curriculum Mapping

Please see Appendix C.

Section 5 Criteria for Student Evaluation

1. Grading System

Grading system and graduation shall be complied with the criteria stated in Regulations of Mahidol University on Graduate studies.

2. Evaluation Process for the Learning Outcome of Students

2.1 Provide the evaluating process from both students and board of curriculum committee towards each course based on the learning

2.2 Provide students' learning outcome from overall curriculum evaluation from employers' comments, and alumni's opinion.

3. Graduation Requirement

Plan 1 : Research only

Plan 1.1 : For Student's with Master's degree

1) Total time of study should not exceed the study plan.

2) Students must complete their Dissertation 48 credits and in the case where the advisors requires the student to take additional non-credit courses. The total is at least 48 credits.

3) Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.

4) Students must pass the Qualifying Examination.

5) Students must participate in skill development activities of the Graduate Studies, Mahidol University

6) Students must submit Dissertation and pass the Dissertation defense by following Regulations of Mahidol University on Graduate Studies. The Dissertation examination must be an examination open to a general audience.

7) Dissertation or a part of the Dissertation is required to publish or accept to publish in an international peer-reviewed academic journal in compliance with Announce of the Higher Education Commission on the subject of Criteria and Regulation of Publishing at least 2 articles, and that is listed by the Faculty of Graduate Studies, Mahidol University.

Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

1) Total time of study should not exceed the study plan.

2) Students must complete their courses as stated in the curriculum with at least 12 credits and Dissertation 36 credits. The total is at least 48 credits.

3) Students must have a minimum CUM-GPA of 3.00.

4) Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.

5) Students must pass the Qualifying Examination.

6) Students must participate in skill development activities of the Graduate Studies, Mahidol University

7) Students must submit Dissertation and pass the Dissertation defense examination by following Regulations of Mahidol University on Graduate Studies. The Dissertation examination must be an examination open to a general audience.

8) Dissertation or a part of the Dissertation is required to publish or accept to publish in an international peer-reviewed academic journal in compliance with Announce of the Higher Education Commission on the subject of Criteria and Regulation of Publishing and that is listed by the Faculty of Graduate Studies, Mahidol University.

Plan 2.2 : For Student's with Bachelor's degree

- 1) Total time of study should not exceed the study plan.
- 2) Students must complete their courses as stated in the curriculum with at least 24 credits and Dissertation 48 credits. The total is at least 72 credits.
- 3) Students must have a minimum CUM-GPA of 3.00.
- 4) Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.
- 5) Students must pass the Qualifying Examination.
- 6) Students must participate in skill development activities of the Graduate Studies, Mahidol University
- 7) Students must submit Dissertation and pass the Dissertation defense examination by following Regulations of Mahidol University on Graduate Studies. The Dissertaion examination must be an examination open to a general audience.
- 8) Dissertation or a part of the Dissertation is required to publish or accept to publish in an international peer-reviewed academic journal in compliance with the Announce must of the Higher Education Commission on the subject of Criteria and Regulation of Publsihing and that is listed by the Faculty of Graduate Studies, Mahidol University.

Section 6 Faculty Development

1. The Orientation for New Faculty Members

- 1.1 First orientation is required for the new faculty members to know and understand policies, philosophy of the university and faculties.
- 1.2 To understand the process of teaching and research, the academic mentoring program is required for the new faculty member (s).

2. Skill and Knowledge Development for Faculty Members

2.1 Skills Development in Teaching and Evaluation

- 2.1.1 Full-time instructors must attend and/or training the teaching and evaluation improvement at least once a year.

2.1.2 Allow the instructor to participate in the evaluation and revision of the curriculum, courses, and research implemented by the university or other organizations to participate in the international conferences.

2.2 Other Academic and Professional Skill Development

2.2.1 Support instructors to do research, produce and present academic projects and continue their studies.

2.2.2 Support instructors to attend meetings, training sessions, seminars and studies at other institutes and organizations.

Section 7 Quality Assurance

1. Regulatory Standard

Program management are continuously developed and complied with Thailand Qualification Framework (TQF) throughout the period of 5 years' adjustment. The management consist of meeting to set up the policy, implement of the plan, evaluation and taking evaluation results into consideration to improve the curriculum in the next year.

2. Graduates

Graduates from the program have a qualification follow by Thailand Qualification Framework (TQF). The process of quality control covers all the course of study, beginning from student admission to graduation. The process consists of meeting to set up criteria for student admission throughout the criteria and qualification for gradated. Moreover, program monitor inputs and feedback from the satisfactory of stakeholders in order to improve curriculum to meet the need of stakeholders. The satisfactory of stakeholders to graduates should be more than 3.5 from 5.

3. Students

In order to reach the appropriate quality standards, program have meetings to assess procedures for monitoring performance of student include the following:

3.1 New student admission. Program have meetings to set up criteria for potential students to ensure that the qualification of students is follow by Thailand Qualification Framework (TQF).

- 3.2 Academic advice. Program has program orientation for first year students by the program director. Program orientation including the information of the rules and activities of program, academic staff, supporting staff, facilities and infrastructure. Program also support the first year students to participate the orientation arranged by Faculty of Science and Graduated studies level.
- 3.3 Student monitoring. The first year students are monitored by program director and all academic staff continuously during the first year. Once the students have their own major advisor from the second year onward, the advices are direct responsibility of Dissertation Committee. Program also monitor the overall process of the students monthly in program administrative committee meeting. Moreover, program monitor the progress of Dissertation via a progress report on their research advancement every semester by using online monitoring tool offered by Graduate Studies. Before graduation, external committee who has more experience in regarding field of research is invited for a chair in dissertation examination to monitor the quality of graduated students.
- 3.4 Appeal procedures. Students have ready access to appeal for academic issue or their problem to program director or Dean of Faculty of Graduate Studies directly or submits as an appeal form. Program director or a Dean of Faculty of Graduate Studies will proceed with consideration of appeal from student.

4. Instructors

The process of management and development of lecturer(s) include the following:

- 4.1 In the process of recruiting new lecturer, the program will hold a meeting to determine the process and criteria for employment selection of new lecturer(s). The qualifications possessed by recruit(s) should coincide with the current goal, philosophy and vision of the program and adhere by the regulation and criteria of the Faculty of Science and Mahidol University. Additionally, the selection process to determine qualified, knowledge eable and expert individual within the specified field should meet the standard criteria set by the Office of Higher Education Commission.
- 4.2 The program must organize orientation to inform and prepare lecturer of his/her role as an educator. Additionally, the program must encourage new lecturer(s) to also attend orientation organized by the Faculty of Science and Mahidol University.

4.3 In providing support and development of lecturer(s), the program must hold meeting to determine appropriate funding available for professional development so that lecturer(s) meet expected standard criteria and reach his/her full potential. The program should also award additional stipend for academic publication(s) to encourage lecturer(s) to continue producing quality academic work and personal self-development.

5. Program, Study and Student Assessment

Management to maintain effective and efficient curriculum should include the following:

- 5.1 Meeting to determine plan of management for each academic course regarding respective course coordinator, course content and responsible lecturer(s) to determine course outline and purpose of each course as well as determine method of examination as criteria for knowledge assessment, method of evaluation and review validity of student achievement.
- 5.2 Quality control of the educational process by assessment of every course and conduct teaching evaluation of every lecturer.
- 5.3 Conduct annual evaluation of academic curriculum for future improvement and further development of curriculum to maintain academic excellence according to standard qualifications set by the National Higher Education Committee.

6. Learning Support

Program have meeting(s) to consult and determine plan of management for academic budget from various funding. Graduate school and lecturer(s) within each program are responsible for determining appropriate usage of funding and resources according to this plan. The program must provide resources to aid in audiovisual learning and technological equipment such as computer and internet that are up-to-date for educational purposes within each classroom, laboratory and student common room. The program should allocate funding for purchasing educational textbooks that are available in the department library to support active learning and self-study by graduate students.

7. Key Performance Indicators

The Doctor of Philosophy Program in Pathobiology (International Program), divides key performance based on the curriculum that meets the standards of Thai Qualifications

Framework following conditions: (1) the compulsory performance indicators (numbers 1-5) must achieve the goal for at least two consecutive years and (2) the total number of performance indicators must reach their goal by no less than 80 percent each year. The Key Performance Indicators are as follows:

Key Performance Indicators	Academic Year				
	2022	2023	2024	2025	2026
1. At least 80% of all Faculty in charge the program have to participate in meetings that set up plans to evaluate and revise the curriculum.	/	/	/	/	/
2. The program must have the details of the curriculum according to TQF2 which is associated with the Thai Qualifications Framework or the standards of the program	/	/	/	/	/
3. The program must have course specifications according to TQF3 before the beginning of each semester	/	/	/	/	/
4. Instructors must produce course reports according to TQF5 within 30 days after the end of the semester.	/	/	/	/	/
5. Instructors must produce program reports according to TQF7 within 60 days after the end of the academic year	/	/	/	/	/
6. Instructors must revise the grading of students according to learning standards indicated in TQF3 for at least 25 percent of courses that are offered each academic year.	/	/	/	/	/
7. Instructors must assess the development and/or improvement of teaching methods, teaching techniques or the grading system from the evaluation results in TQF 7 of the previous year.	-	/	/	/	/
8. Every new instructor has to participate in the	/	/	/	/	/

Key Performance Indicators	Academic Year				
	2022	2023	2024	2025	2026
orientation and receive adequate information on the college's teaching requirements.					
9. Full-time instructors must demonstrate academic and/or profession improvement at least once a year.	/	/	/	/	/
10. The number of supporting staff who demonstrate academic and/or professional improvement by at least 50 percent each year.	/	/	/	/	/
11. The level of satisfaction from the previous year's students and new graduates toward curriculum quality, with an average score of at least 3.5 out of 5	-	-	/	/	/
12. The level of satisfaction from employers of new graduates with an average score of at least 3.5 out of 5	-	-	-	/	/

Section 8 Evaluation and Improvement of the Curriculum Implementation

1. Evaluation on the Teaching Efficiency

1.1 Evaluation of Teaching Strategies

1.1.1 Analysis from students' evaluation towards courses and instructors

1.1.2 Analysis from the faculty meeting to exchange ideas or comments

1.1.3 Questionnaires from students

1.2 Evaluation of Instructors' Skills in Using Teaching Strategies

1.2.1 Analysis students' evaluation towards courses and instructors

1.2.2 Evaluation from instructors themselves and colleagues.

2. Overall Evaluation of the Curriculum

2.1 Survey instructors' opinions toward students and vice versa

หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

- 2.2 Survey on jobs of graduates
- 2.3 Curriculum evaluation from external expertise
- 2.4 Survey on employers' satisfaction with graduates

3. Evaluation of Curriculum Implementation in Accordance with the Curriculum

Evaluation is made annually by the chairman and instructors according to the key performance indicators of section 7, item 7. The curriculum committee must comprise 3 persons. The criteria of curriculum revision are

- “Fair” means the program does not cover the first 10 Key Performance Indicators,
- “Good” means the program shows all first 10 Key Performance Indicators,
- “Excellent” means the program has all Key Performance Indicators.

4. Review of the Evaluation and Plans for Improvement

- 4.1 Collecting all information, advices, and evaluations of the newly graduates, users/stakeholders, and experts
- 4.2 Review and analyze the above information by the faculty member in-charge of the program
- 4.3 Presenting the improvement plan for the program

APPENDIX A
Course Description

Appendix A Course Description

(1) Required Courses

		Credits (lecture – practice – self-study)
SCPA 501 วทพย ๕๐๑	General Pathology พยาธิวิทยาทั่วไป Basic mechanism and morphological changes due to cellular injury, death, adaptation, inflammation, healing, immunopathology, infection, genetic abnormality, and neoplasia กลไกพื้นฐานและการเปลี่ยนแปลงรูปร่างเนื่องจากการบาดเจ็บของเซลล์ การตาย การปรับตัว การอักเสบ การหาย พยาธิวิทยาภูมิคุ้มกัน การติดเชื้อ ความผิดปกติทางพันธุกรรม และเนื้องอก	2(1-2-3)
SCPA 502 วทพย ๕๐๒	Systemic Pathology พยาธิวิทยาระบบ Macroscopic and microscopic studies of pathological changes due to cell injury, inflammation, neoplasia, immunological deficiency, infection, and other diseases affecting various systems of the human body การเปลี่ยนแปลงทางพยาธิสภาพทั้งทางมหภาคและจุลภาคของอวัยวะในร่างกายมนุษย์ จากสาเหตุการบาดเจ็บของเซลล์ การอักเสบ การเป็นเนื้องอก มีภาวะภูมิคุ้มกันบกพร่อง การติดเชื้อ และโรคอื่นๆ ในระบบต่างๆ ของร่างกาย	2(1-2-3)
SCPA 602 วทพย ๖๐๒	Anatomical Basis for Pathological Study พื้นฐานทางกายวิภาคสำหรับการศึกษาพยาธิวิทยา Structure and organization at molecular and cellular levels of organelle, cell, tissue and organ; structure and function of epithelial tissue, connective tissue, muscle, bone, blood, tegumental system, cardiovascular system, immune system, nervous system, endocrine system, respiratory system, digestive system, urinary system, and reproductive system; observation of normal tissues under the microscope; examination of structural changes of abnormal organs and tissues โครงสร้างและการจัดเรียงของออร์แกเนล เซลล์ เนื้อเยื่อและอวัยวะ ความสัมพันธ์ระหว่างโครงสร้างและหน้าที่ของเนื้อเยื่อบุผิว เนื้อเยื่อเกี่ยวพัน กล้ามเนื้อ กระดูก เลือด ระบบห่อหุ้มร่างกาย ระบบ	2(1-2-3)

หัวใจและหลอดเลือด ระบบภูมิคุ้มกัน ระบบประสาท ระบบต่อมไร้ท่อ ระบบหายใจ ระบบย่อยอาหาร ระบบขับถ่ายของเสียและระบบสืบพันธุ์ การสังเกตเนื้อเยื่อปกติภายใต้กล้องจุลทรรศน์ การตรวจสอบการเปลี่ยนแปลงเชิงโครงสร้างของอวัยวะและเนื้อเยื่อที่ผิดปกติ

SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3)

วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย

Histopathological techniques for the routine work in pathology; tissue collection and preparation, paraffin embedding technique, basic tissue staining; modified techniques for research, frozen staining, immunological staining, photomicrography

เทคนิคทั่วไปที่ใช้ในงานประจำทางด้านจุลพยาธิวิทยา การคัดเลือกและเตรียมตัวอย่างเนื้อเยื่อ เทคนิคพาราฟิน การย้อมสี เทคนิคเพิ่มเติมสำหรับงานวิจัย การตัดย้อมเนื้อเยื่อสภาวะแช่แข็ง การย้อมทางอิมมูโนวิทยา การถ่ายภาพจากกล้องจุลทรรศน์

SCPA 614 Seminar in Advanced Pathobiology I 1(1-0-2)

วทพย ๖๑๔ สัมมนาทางพยาธิชีววิทยาขั้นสูง ๑

Disease emergence and control; infectious diseases; heavy metal toxicopathology; aging and regenerative science; hematopoietic disorders; cancer biology, cancer immunology and cancer stem cells; nanoparticle for therapeutic procedures and potential drug discovery

การเกิดโรคและการควบคุมโรค โรคติดเชื้อ พืชวิทยาของโลหะหนัก วิทยาศาสตร์การชราภาพและการฟื้นฟู โรคทางพันธุกรรมของเม็ดเลือด ชีววิทยามะเร็ง ภูมิคุ้มกันวิทยามะเร็งและเซลล์ต้นกำเนิด มะเร็ง อนุภาคนาโนสำหรับการรักษาและการค้นพบยาที่มีความน่าจะเป็นในการรักษา

SCPA 615 Seminar in Advanced Pathobiology II 1(1-0-2)

วทพย ๖๑๕ สัมมนาทางพยาธิชีววิทยาขั้นสูง ๒

Bacterial genome editing; tropical infectious diseases; cellular pathology of nanoparticles; aging control in dermatology; pathogenesis of genetic disorders; oxidative stress and cancer, hypoxia induced multidrug resistance; immunotherapy and targeted cancer for diagnosis and therapy

การแก้ไขจีโนมของแบคทีเรีย โรคติดเชื้อเขตร้อน พยาธิวิทยาระดับเซลล์ของอนุภาคนาโน การควบคุมความชราในตจวิทยา พยาธิกำเนิดของโรคทางพันธุกรรม ภาวะเครียดออกซิเดชันและมะเร็ง ภาวะขาดออกซิเจนเหนี่ยวนำความต้านทานต่อยา ภูมิคุ้มกันบำบัดและมะเร็งเป้าหมายสำหรับการวินิจฉัยและการบำบัด

SCPA 616 วทพย ๖๑๖	Current Research in Pathobiology งานวิจัยในปัจจุบันทางพยาธิชีววิทยา	2(1-2-3)
	New knowledge and technology in pathobiology or medical science, infectious disease, genetic disorder, toxicology, cancer ความรู้ใหม่และเทคโนโลยีที่ทันสมัยในงานวิจัยทางพยาธิชีววิทยาหรือวิทยาศาสตร์การแพทย์ โรคติดเชื้อ ความผิดปกติทางพันธุกรรม พิษวิทยา มะเร็ง	
SCPA 617 วทพย ๖๑๗	Integrative Systemic Pathology พยาธิวิทยาระบบบูรณาการ	2(2-0-4)
	Integrative knowledge of pathophysiology, histopathology, clinical manifestation and correlation to common diseases in major organ systems leading to the application of researches in aspect of pathomechanism, treatment and prevention บูรณาการความรู้ทางพยาธิสรีรวิทยา จุลพยาธิวิทยา อาการแสดง และความเกี่ยวข้องกับโรคจำเพาะในระบบอวัยวะหลัก นำไปสู่การประยุกต์ในงานวิจัย ทางกลไกทางพยาธิ การรักษา และการป้องกัน	
SCPA 622 วทพย ๖๒๒	Molecular and Cellular Pathology พยาธิวิทยาระดับโมเลกุลและระดับเซลล์	2(2-0-4)
	Molecular and cellular mechanisms of disease processes; major biochemical mechanisms of cell injury; molecular and cellular pathology of various types of infections กลไกระดับโมเลกุลและระดับเซลล์ในกระบวนการของโรค กลไกหลักทางชีวเคมีของการบาดเจ็บของเซลล์ พยาธิวิทยาระดับโมเลกุลและระดับเซลล์ของการติดเชื้อประเภทต่างๆ	
SCID 518 วทคร ๕๑๘	Generic Skills in Science Research ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	1(1-0-2)
	Qualities of a good researcher, effective searching of the scientific information, laboratory safety, biosafety, chemical safety, radiation safety and electrical safety, ethics of research in human subjects and experimental animals in science, intellectual property rights, research misconduct attribution of credit and responsibility, techniques in formulating and writing thesis proposals, research projects, grant applications, research reports and manuscript for publication คุณสมบัติของนักวิจัยที่ดี การค้นหาข้อมูลในฐานข้อมูลทางวิทยาศาสตร์อย่างมีประสิทธิภาพ ความปลอดภัยในห้องปฏิบัติการ ความปลอดภัยทางชีวภาพ เคมี รังสี และไฟฟ้า จริยธรรมในการวิจัย ใน	

มนุษย์ และการทดลองสัตว์ในด้านวิทยาศาสตร์ สิทธิในทรัพย์สินทางปัญญา การกระทำผิดคุณลักษณะของ ความรับผิดชอบและการอ้างอิงผลงานวิจัย เทคนิคการสร้างและการเขียน โครงร่าง โครงการวิจัยการเขียนขอ ทุนวิจัย การเขียนรายงานวิจัย และต้นฉบับเพื่อส่งตีพิมพ์

(2) Elective Course

Credits (lecture – practice – self-study)

SCPA 604 Clinical Pathology 2(1-2-3)

วทพย ๖๐๔ พยาธิวิทยาคลินิก

Pathological laboratory tests for disease diagnosis and research, interpretation in hematology, immunology, clinical microscopy and clinical chemistry

การตรวจทางห้องปฏิบัติการพยาธิวิทยา เพื่อการวินิจฉัยและการวิจัย การแปลผลในทาง โลหิตวิทยา อิมมูโนวิทยา คลินิกคัลไมโครสโคปี และเคมีคลินิก

SCPA 606 Selected Topic in Pathobiology 2(1-2-3)

วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา

Basic knowledge and skill in pathobiology for studying the response of variable factors particularly of noxious materials in human body, the analysis of biochemical changes and morphologic alteration grossly and histologically in the main target organs, naturally exposure or laboratory animal induction and by alternative to non-living model study

ความรู้พื้นฐานและทักษะทางพยาธิชีววิทยา ในการศึกษาความผิดปกติที่เกิดในระบบต่างๆ ของร่างกายจากการตอบสนองสารที่เป็นพิษ การเปลี่ยนแปลงทางชีวเคมี รูปร่างทางกายวิภาคและจุลภาค ของอวัยวะเป้าหมายที่สำคัญ การเลียนแบบธรรมชาติที่เกิดขึ้นในสัตว์หรือหลอดทดลอง ตรวจสอบเนื้อเยื่อ และสารชีวภาพที่เปลี่ยนแปลงไป

SCPA 609 Systems Immunology 1(1-0-2)

วทพย ๖๐๙ ภูมิคุ้มกันวิทยาเชิงระบบ

Systems immunology, immunothrombosis, skin immunity, gut immunity, osteoimmunology, blood-brain barrier

ภูมิคุ้มกันวิทยาเชิงระบบแบบบูรณาการ ภาวะหลอดเลือดมีลิ่มเลือด ที่เกิดจากระบบ ภูมิคุ้มกัน ภูมิคุ้มกันของผิวหนัง ภูมิคุ้มกันทางเดินอาหาร ภูมิคุ้มกันของกระดูก ตัวกั้นระหว่างเลือดกับสมอง

SCPA 618 Research for Anti-aging and Regenerative Medicine 2(2-0-4)
วทพย ๖๑๘ การวิจัยสำหรับเวชศาสตร์และฟื้นฟูการชราภาพ

Molecular and cellular aspects of aging and its correlation to other fields cosmetic dermatology, oxidative stress, photoaging, prebiotic and probiotic, nutrition, stem cell and experimental techniques models for the anti-aging research

มุมมองในระดับโมเลกุลและระดับเซลล์ของความชรา และความเชื่อมโยงต่อสาขาอื่นๆ เวชศาสตร์ผิวหนังความงาม ภาวะเครียดออกซิเดชัน ความชราจากแสงแดด พรไบโอติกและโพรไบโอติก โภชนาการ เซลล์ต้นกำเนิด และเทคนิครูปแบบการทดลองสำหรับงานวิจัยด้านชรา

SCPA 619 Toxicopathology 2(2-0-4)
วทพย ๖๑๙ พยาธิพิษวิทยา

Pathological changes in cells, tissues and organs induced by toxicants; pathomechanisms of the defects in major organ systems; basic and special techniques in toxicopathological research

การเปลี่ยนแปลงทางพยาธิวิทยาในเซลล์ เนื้อเยื่อและอวัยวะที่ถูกเหนี่ยวนำโดยสารที่มีความเป็นพิษ กลไกทางพยาธิของความผิดปกติในระบบอวัยวะหลัก เทคนิคพื้นฐานและเทคนิคพิเศษในการวิจัยทางพยาธิพิษวิทยา

SCPA 620 Global Impact of Infectious Disease 2(2-0-4)
วทพย ๖๒๐ ผลกระทบทั่วโลกของโรคติดเชื้อ

Infectious disease and human population; emerging, reemerging and transmission of disease; antimicrobial drug resistance; prevention and control of major infectious diseases including severe acute respiratory syndrome, hiv/aids, tuberculosis, vector-borne disease, neglected tropical disease, and zoonotic disease; current research on infectious disease

โรคติดเชื้อและประชากรมนุษย์ การอุบัติใหม่ การอุบัติซ้ำ และการแพร่กระจายของโรค การดื้อยาต้านจุลชีพ การป้องกันและควบคุมโรคติดต่อหลัก โรคทางเดินหายใจรุนแรงเฉียบพลัน โรคเอดส์ วัณโรค โรคติดต่อโดยพาหะ โรคเขตร้อนที่ถูกกละเลย โรคติดต่อจากสัตว์ งานวิจัยโรคติดเชื้อในปัจจุบัน

SCPA 621 Pathology of Cancer and Research 2(2-0-4)

วทพย ๒๒๑ พยาธิวิทยาของมะเร็งและการวิจัย

Molecular basis of cancer, mechanisms of cancer development and progression, cancer and biomarkers, pathological changes, tumor microenvironment, host defense against tumors, chemotherapy and the development of novel therapeutics, stem cells and epigenetics in cancer, experimental models for cancer research

อณูชีวโมเลกุลของมะเร็ง กลไกการเกิดและการลุกลามของมะเร็ง มะเร็งและชีววิทยาตัวบ่งชี้ การเปลี่ยนแปลงทางพยาธิสภาพ ภาวะแวดล้อมของมะเร็ง กลไกการป้องกันมะเร็ง ยาเคมีบำบัดและการ พัฒนาการรักษาแบบใหม่ เซลล์ต้นกำเนิดและอีพีเจเนติกส์ในมะเร็ง การทดลองเพื่อการศึกษาวิจัยมะเร็ง

SCID 500 Cell and Molecular Biology 3(3-0-6)

วทคร ๕๐๐ ชีววิทยาระดับเซลล์และโมเลกุล

Cell structure and function, life and information flow in cell, energy flow in biosystem, cell signaling, cell division, cellular differentiation, cell death and development

โครงสร้างและหน้าที่ของเซลล์ ชีวิตและการส่งผ่านข้อมูลภายในเซลล์ การส่งผ่านพลังงานในระบบชีวภาพ การส่งสัญญาณของเซลล์ การแบ่งตัวของเซลล์ การพัฒนาเป็นเซลล์ชนิดจำเพาะ การตายและการพัฒนาของเซลล์

SCID 502 Cell Science 2(2-0-4)

วทคร ๕๐๒ วิทยาศาสตร์เรื่องเซลล์

Mechanism of cellular trafficking and processing among organelles, cellular communication, recognition, adhesion and interaction, cell cycle and controls of cellular differentiation and cancer, cellular signal transduction, cellular response to stress, cell injury, senescence, and cell death, cell-microbe interaction, cellular immune responses, molecular pathogenesis of some diseases

กลไกของเซลล์ในการขนส่งและแปรรูปชีวโมเลกุลไปยังอวัยวะ เซลล์ การติดต่อสื่อสาร การรับรู้ การเกาะเกี่ยวกัน และการปฏิสัมพันธ์ระหว่างเซลล์ วัฏจักรของเซลล์และการควบคุม การเปลี่ยนสภาพของเซลล์และมะเร็ง การส่งสัญญาณภายในเซลล์ การตอบสนองของเซลล์ต่อภาวะเครียด การบาดเจ็บ การชรา และการตายของเซลล์ การปฏิสัมพันธ์ระหว่างเซลล์กับจุลชีพ การตอบสนองของระบบภูมิคุ้มกันของเซลล์ พยาธิกำเนิดในระดับโมเลกุลของโรคบางชนิด

SCID 503 Systemic Bioscience 3(3-0-6)

วทศร ๕๐๓ วิทยาศาสตร์ชีวภาพเชิงระบบ

Homeostasis, integumentary and immune systems, nervous system, musculoskeletal system, cardiovascular system, respiratory system, urinary system, the digestive system, endocrine system, reproductive system, integration of systemic bioscience

สภาวะสมดุลของร่างกาย ระบบผิวหนังและภูมิคุ้มกัน ระบบประสาท ระบบโครงร่างกล้ามเนื้อ ระบบหัวใจและหลอดเลือด ระบบทางเดินหายใจ ระบบทางเดินปัสสาวะ ระบบย่อยอาหาร ระบบต่อมไร้ท่อ ระบบสืบพันธุ์ บูรณาการของวิทยาศาสตร์ชีวภาพเชิงระบบ

SCID 506 Concepts of Molecular Bioscience 2(2-0-4)

วทศร ๕๐๖ หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล

Biochemical and biophysical knowledge underlying various processes of living systems, structures and functions of biological molecules, manipulation of energy and metabolites in biological systems, regulation and expression process of genetic materials

ความรู้ทางชีวเคมีและชีวฟิสิกส์ของกระบวนการต่างๆ ในสิ่งมีชีวิต โครงสร้างและหน้าที่ของชีวโมเลกุล การสร้างและการใช้พลังงานในกระบวนการต่างๆ ของสิ่งมีชีวิต กระบวนการควบคุมและการแสดงออกของสารพันธุกรรม

SCID 507 Microscopic Technique 1(0-2-1)

วทศร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์

Structure and operation of light microscope, phase, dark field and differential interference contrast microscopes, confocal microscope, fluorescence microscope, transmission electron microscope, scanning electron microscope, specimen collection, fixation, sectioning, basic staining and immunocytochemical methods for microscopic examination, photography and interpretation of the results, laboratory rules and regulations

โครงสร้างและการใช้งานกล้องจุลทรรศน์แบบธรรมดา แบบเฟส แบบพื้นมืด และแบบดิฟเฟอเรนเชียล อินเตอร์เฟอเรนซ์ คอนทราสต์ กล้องคอนโฟคัล กล้องฟลูออเรสเซนซ์ กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องผ่าน กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องกราด การเก็บตัวอย่าง การตรึง การตัดชิ้นเนื้อให้บาง การย้อมสีขั้นพื้นฐานและการย้อมสีเซลล์โดยใช้วิธีทางเคมีที่เกี่ยวข้องกับวิทยาภูมิคุ้มกัน การตรวจสอบการถ่ายภาพและการแปลผลภาพ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 508 **Biomolecular and Spectroscopy Techniques** 1(0-2-1)

วทศร ๕๐๘ **เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี**

Absorbance and fluorescence spectroscopy, mass spectroscopy, nuclear magnetic resonance spectroscopy and biomolecular spectroscopy, laboratory rules and regulations

สเปกโทรสโกปีชนิดดูดกลืนแสงและฟลูออเรสเซนซ์ แมสสเปกโทรสโกปี สเปกโทรสโกปี ชนิดนิวเคลียร์แมกเนติกเรโซแนนซ์ และสเปกโทรสโกปีทางชีวโมเลกุลคู่ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 509 **Separation Techniques** 1(0-2-1)

วทศร ๕๐๙ **เทคนิคการแยกสาร**

Separation of biomolecules and biochemicals, based on size, shape, charge and state, using centrifugation, chromatography, electrophoresis and dialysis, laboratory rules and regulations

การแยกสารชีวโมเลกุลและสารชีวเคมี ตามขนาดรูปร่างประจุ และสถานะ โดยใช้วิธีการหมุนเหวี่ยง โครมาโทกราฟี การเคลื่อนย้ายสู่ขั้วไฟฟ้า และการแยกสารผ่านเยื่อ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 510 **Immunological Methods** 1(0-2-1)

วทศร ๕๑๐ **ระเบียบวิธีวิทยาภูมิคุ้มกัน**

Basic principles and applications of immunological methods enzyme-linked immunosorbent assay, SDS-PAGE and immunoblotting, direct and indirect immunofluorescence assays, immunoelectron microscopy, immunoprecipitation, peripheral blood mononuclear cell preparation, flow cytometry and cell sorting, laboratory rules and regulations

หลักการพื้นฐานและการประยุกต์ระเบียบวิธีทางวิทยาภูมิคุ้มกัน เอนไซม์ลิงค์อิมมูโนโนสอร์เบนต์ เอสดีเอส-เพจ และการทำอิมมูโนบลอต การทำอิมมูโนฟลูออเรสเซนส์ ตรงและอ้อม การทำอิมมูโนอิเล็กตรอนไมโครสโคปี การทำอิมมูโนพรีซิพิเทชัน ปฏิบัติการเตรียมเซลล์นิวเคลียสเดี่ยวจากเลือด ปฏิบัติการโพลีไซโตเมทรี และการแยกเซลล์ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 511 Gene Technology 1(0-2-1)

วทศร ๕๑๑ เทคโนโลยีด้านยีน

Gene manipulation and recombinant DNA techniques, principles of gene technology; mini-projects involving handling of nucleic acid and proteins; evaluation of the quality of data generated, laboratory rules and regulations

เทคนิคการจัดการยีนและการตัดต่อยีน หลักการเทคโนโลยีด้านยีน โครงการทดลองย่อยที่เกี่ยวข้องกับกรดนิวคลีอิกและโปรตีน การประเมินคุณภาพของข้อมูลจากผลการทดลอง กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 513 Animal Cell Culture Techniques 1(0-2-1)

วทศร ๕๑๓ เทคนิคการเพาะเลี้ยงเซลล์สัตว์

Basic techniques for cultivation of anchorage-dependent and anchorage - independent cells, mass production of animal cells, propagation, determination of cell growth and maintenance of cell lines, cryo-preservation of cells and determination of cell survival after cold storage, effect of certain parameters on the growth of anchorage independent cell line, laboratory rules and regulations

เทคนิคขั้นพื้นฐานในการเพาะเลี้ยงเซลล์ชนิดที่เจริญแบบเกาะติด และที่เจริญแบบไม่เกาะติด การเพาะเลี้ยงเซลล์สัตว์ในปริมาณสูง การขยายพันธุ์เซลล์ การเจริญของเซลล์และการคงสภาพสายพันธุ์เซลล์ การถนอมเซลล์โดยใช้ความเย็น และการตรวจเซลล์ที่รอดชีวิตหลังแช่แข็ง ผลของตัวแปรบางอย่าง ต่อการเจริญของสายพันธุ์เซลล์แบบไม่เกาะติด กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 514 Animal Experimentation in Biomedical Research 1(0-2-1)

วทศร ๕๑๔ การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์

Ethics on animal experimentation, selection of animal model, standard animal care, basic techniques for animal experimentation, special techniques in animal experiments, laboratory rules and regulations

จริยธรรมการทดลองโดยใช้สัตว์ การเลือกรูปแบบสัตว์ มาตรฐานการดูแลสัตว์ เทคนิคพื้นฐานสำหรับการทดลองที่ใช้สัตว์ เทคนิคพิเศษในการทดลองในสัตว์ กฎและระเบียบการใช้ห้องปฏิบัติการ

เก็บรักษาข้อมูล การนำข้อมูลมาใช้ การเข้าถึงและการใช้ข้อมูลร่วมกัน การลอกเลียนโดยมิชอบ

(3) Dissertation

Credits (lecture – practice – self-study)

SCPA 898	Dissertation	48(0-144-0)
วทพย ๘๙๘	วิทยานิพนธ์	
SCPA 799	Dissertation	48(0-144-0)
วทพย ๗๙๙	วิทยานิพนธ์	
SCPA 699	Dissertation	36(0-108-0)
วทพย ๖๙๙	วิทยานิพนธ์	

Creating new knowledge from scientific research in pathobiology under ethical concern; designing research project, composing scientific report and dissertation without plagiarism and copyright infringement; presenting and publishing research in the international peer-reviewed journal

สร้างองค์ความรู้ใหม่จากงานวิจัยทางวิทยาศาสตร์ในสาขาพยาธิชีววิทยาภายใต้จริยธรรมงานวิจัย ออกแบบโครงการวิจัย เขียนงานวิจัยทางวิทยาศาสตร์และเล่มวิทยานิพนธ์โดยปราศจากการคัดลอกผลงานและการละเมิดลิขสิทธิ์ การนำเสนอรายงานวิจัย การเผยแพร่ผลงานวิจัยในวารสารวิชาการระดับนานาชาติ

APPENDIX B

Curriculum Vitae of the Faculty in Charge of the Program

Appendix B

Curriculum Vitae of the Faculty in Charge of the Program

1. Name Associate Professor Dr. Prasit Suwannalert

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Pathobiology	Mahidol University	2010
M.Sc.	Medical Biochemistry	Khon Kaen University	2006
B.Sc.	Medical Technology	Naresuan University	2003

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Pathology and Oxidative Stress
2. Cancer Biology
3. Anti-melanogenesis

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rodboon T, Sirilun S, Okada S, Kariya R, Chontanarith T, Suwannalert P* (2020). Modified Riceberry rice extract suppresses melanogenesis-associated cell differentiation through tyrosinase-mediated MITF downregulation on B16 cells and in vivo zebrafish embryos.	12/1	2020

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Research in Pharmaceutical Sciences, 15(5): 491-502		
Published research work	Rodboon T, Palipoch S, Okada S, Charoenchon N, Nakornpakdee Y, Suwannalert P. (2020). Oxyresveratol inhibits cellular tyrosinase-related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci 10(4), 8-13.	12/1	2020
Published research work	Rodboon T, Okada S, Suwannalert P* . (2020). Germinated riceberry rice enhanced protocatechuic acid and vanillic acid to suppress melanogenesis through cellular oxidant-related tyrosinase activity in B16 cells. Antioxidants 9(3):247.	12/1	2020
Published research work	Panichakul T, Rodboon T, Suwannalert P , Tripetch C, Rungruang R, Boohuad N, Youdee P. (2020). Additive effect of a combination of Artocarpus akoocha and Glycyrrhiza glabra extracts on tyrosinase inhibition in melanoma B16 cells. Pharmaceut 13, 310. doi:10.3390/ph13100310	12/1	2020
Published research work	Aladhraei M, Al-Salami E, Pongvarin N, Suwannalert P. (2019). The roles of p53 and XPO1 on colorectal cancer progression in Yemeni patients. J	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Gastrointest Oncol 10(3), 437-444.		
Published research work	Palipoch S, Koomhin P, Punsawad C, Suwannalert P. (2019). Effect of aqueous leaf extract of <i>Thunbergia laurifolia</i> on alcohol-induced liver injury in rats. Trop J Pharm Res 18(4): 823-828.	12/1	2019
Published research work	Aladhraei M, Al-Thobhani AK, Pongvarin N, Suwannalert P* . (2019). Association of XPO1 overexpression with NF- κ B and Ki67 in colorectal cancer. Asian Pac J Cancer Preven 20(12): 3747-3754.	12/1	2019
Published research work	Aimvijarn P, Rodboon T, Payuhakrit W, Suwannalert P* . (2018). <i>Nymphaea pubescens</i> induces apoptosis, suppresses cellular oxidants-related cell invasion in b16 melanoma cells. Pharm Sci 24(3):199-206.	12/1	2018
Published research work	Aimvijarn P, Palipoch S, Okada S, Suwannalert P* . (2018). Thai water lily extract induces B16 melanoma cell apoptosis and inhibits cellular invasion through the role of cellular oxidants. Asian Pac J Cancer Preven 19(1): 149-153.	12/1	2018
Published research work	Chaiyasut C, Pattananandecha T, Sirilun S, Suwannalert P , Peerajan S, Sivamaruthi BS. (2017). Synbiotic preparation with lactic acid bacteria and inulin as a functional food: In vivo evaluation of	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	microbial activities, and preneoplastic aberrant crypt foci. Food Sci Technol 37(2): 328-336.		
Published research work	Koomhin P, Punsawad C, Suwannalert P , Palipoch S. (2017). Effect of a heme oxygenase-1 inducer on NADPH oxidase expression in alcohol-induced liver injury in male wistar rats. Trop J Pharm Res 16(5): 1039-1044.	12/1	2017
Published research work	Pengkumsri N, Sivamaruthi BS, Sirilun S, Suwannalert P , Rodboon T, Prasitpuriprecha C, Peerajan S, Butrungrud W, Chaiyasut C. (2017). Dietary supplementation of Thai black rice bran extract and yeast beta-glucan protects the dextran sodium sulphate mediated colitis induced rat. RSC Adv 7(1): 396-402.	12/1	2017

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)

หลักสูตรปรับปรุงแก้ไขนี้ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCID 500	Cell and Molecular Biology	3(3-0-6)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCID 500	Cell and Molecular Biology	3(3-0-6)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

2. Name: Associate Professor Dr. Wannee Jiraungkoorskul

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Biology	Mahidol University	2002
M.Sc.	Physiology	Mahidol University	1992
B.Sc.	Medical Technology	Mahidol University	1984

Affiliation: Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

Aquatic toxicopathology and efficiency of traditional medicinal plants and natural products research

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Somala N, Senarat S, Para C, Jiraungkoorskul W , Kaneko G, Poonpet T, Poolprasert P. (2020). Systemic organization of <i>Tetraponera rufonigra</i> Jerdon, 1851 (Hymenoptera: Formicidae): Histological observation. <i>Serangga</i> 25(1): 53-67.	12/1	2020
Published research work	Senarat S, Thongboon L, Jiraungkoorskul W , Kettratad J, Pongsakul T, Mongkolchaichana E, Kaneko G, Poolprasert P. (2020). Field comprehension the female reproductive maturation of economically important catfish, <i>Arius maculatus</i> that inhabited in	12/1	2020

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Estuarine Pranburi River, Thailand. Thai J Agric Sci 50(1): 1-10.		
Published research work	Thongboon L, Senarat S, Kettratad J, Jiraungkoorskul W , Pongsakul T, Wangkulangkul S, Uribe MC, Plumley FG, Wongkamhaeng K, Kaneko G. (2020). Morphology and histology of female reproductive tract of the dog-faced water snake <i>Cerberus rynchops</i> (Schneider, 1799). Maejo Int J Sci Technol 14(1): 11-26.	12/1	2020
Published research work	Senarat S, Boonyoung P, Kettratad J, Jiraungkoorskul W , Poolprasert P, Huang S, Pongsakul T, Mongkolchaichana E, Para C. (2020). The identification and distribution of the mucous secreting cells in the integument of the Schaap's dragonet, <i>Callionymus schappii</i> , Bleeker, 1852. Vet Integr Sci 18(1): 23-32.	12/1	2020
Published research work	Senarat S, Poolprasert P, Kettratad J, Boonyoung P, Jiraungkoorskul W , Huang S, Pongsakul T, Kosiyachinda P, Sudtongkong C. (2020). Histological observation of digestive system of malayan halfbeak, <i>Dermogenys pusilla</i> (Kuhl & van Hasselt, 1823) during juvenile stage from Thailand. Vet Integr Sci 18(1): 33-41.	12/1	2020
Published research work	Lampang P, Palasai A, Senarat S, Kettratad J, Jiraungkoorskul W , Boonyoung P. (2020).	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	The existence of argyrophilic endocrine cells in the digestive system of snake eels (<i>Pisodonophis boro</i> , Hamilton, 1822). <i>Vet Integr Sci</i> 18(2): 75-83.		
Published research work	Senarat S, Thongboon L, Kettratad J, Jiraungkoorskul W* , To-orn N, Sudtongkong C, Wongkamhaeng K, Uribe MC. (2020). The ovarian structure and oogenesis of the pea crab <i>Pinnotheres cyclinus</i> Gordon, 1932: A histological investigation. <i>Agric Nat Resour</i> 54(2): 211-216.	12/1	2020
Published research work	Mang P, Jiraungkoorskul W* . (2020). Comparative analysis of morphometric characteristics and mucous cell distribution between <i>Pangasius hypophthalmus</i> and <i>Clarias batrachus</i> . <i>Egyptian J Aquat Biol Fish</i> 24(3): 351-364.	12/1	2020
Published research work	Boonyoung P, Senarat S, Kettratad J, Jiraungkoorskul W , Thaochan N, Sing KW, Pengsakul T, Poolprasert P. (2020). Mature gonadal histology and gametogenesis of the golden tortoise beetle, <i>Aspidimorpha sanctaegrucis</i> (Fabricius, 1792) (Coleoptera: Chrysomelidae: Cassidinae): Histological observation. <i>Songklanakarin J Sci Technol</i> 42(4): 873-878.	12/1	2020
Published	Palasai A, Senarat S, NaLampang P,	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
research work	Kangwanrangsang N, Jiraungkoorskul W , Siqueira-Silva DH, Kettratad J. (2020). Reproductive development of the priapium fish <i>Neostethus lankesteri</i> Regan, 1916 (Atheriniformes: Phallostethidae) from Pranburi river estuary, Thailand using the histological approach. Asia Pacific J Mol Biol Biotechnol 28(2): 92-104.		
Published research work	Senarat S, Kettratad J, Siriwong W, Bunsomboonsakul S, Kenthao A, Kaneko G, Sopon A, Sudtongkong C, Jiraungkoorskul W* . (2020). Oogenesis and ovarian health problems in economically important fishes from different habitats potentially affected by pollution in Thailand. Asian Fish Sci 33(3): 274-286.	12/1	2020
Published research work	Senarat S, Kettratad J, Plumley FG, Wangkulangkul S, Jiraungkoorskul W , Boonyoung P, Poolprasert P. (2019). Pathological microscopy in liver parenchyma of gray-eel catfish, <i>Plotosus canius</i> from Ang-Sila area, Chonburi Province, Thailand: A case study. Vet Integr Sci 17(3): 255-261.	12/1	2019
Published research work	Thongboon L, Senarat S, Kettratad J, Jiraungkoorskul W , Wangkulangkul S, Poolprasert P, Para C, Kaneko G, Pongsakul T. (2019). Gastrointestinal tract and accessory organs in the spotted bent-toed	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	gecko, <i>Cyrtodactylus peguensis</i> (Boulenger, 1893): A histological and histochemical study. <i>J Morphol Sci</i> 36(4): 223-230.		
Published research work	Senarat S, Jiraungkoorskul W , Kettratad J, Kaneko G, Poolprasert P, Para C. (2019). Histological analysis of reproductive system of <i>Dermogenys pusilla</i> (Kuhl & van Hasselt, 1823) from Thailand: Sperm existence in ovary indicates viviparous reproductive mode. <i>Maejo Int J Sci Technol</i> 13(3): 185-195.	12/1	2019
Published research work	Senarat S, Kettratad J, Kangwanrangsan N, Jiraungkoorskul W , Plumley FG, Amano M, Boonyoung P, Kaneko G. (2019). Immunoreactivity of estrogen receptor alpha in brain and ovary of the short mackerel <i>Rastrelliger brachysoma</i> (Bleeker, 1851). <i>Asia Pac J Mol Biol Biotechnol</i> 27(3): 53-60.	12/1	2019
Published research work	Boonyoung P, Senarat S, Jiraungkoorskul W , Kettratad J, Yenchum W, Poolprasert P, Pengsakul T. (2019). Natural gonadal compartmentalizing of economical important <i>Hemirahamphus far</i> from Thailand by visual observation and histological technique. <i>Songklanakarin J Sci Technol</i> 41(3): 639-699.	12/1	2019
Published	Jiraungkoorskul W* . (2019). Efficiency of <i>Tinospora</i>	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
research work	<i>crispa</i> against <i>Culex quinquefasciatus</i> larva. Environ Sci Pollut Res Int 26: 14712-14716.		
Published research work	Kachenton S, Jiraungkoorskul W* , Kangwanransan N, Tansatit T. (2019). Cytotoxicity and histopathological analysis of titanium nanoparticles via <i>Artemia salina</i> Environ Sci Pollut Res Int 26: 14706-14711.	12/1	2019
Published research work	Senarat S, Kettratad J, Kangwanransan N, Jiraungkoorskul W , Amano M, Shimizu A, Plumley FG, Tipdomrongponge S. (2019). The sbGnRH -GTH system in the female short mackerel, <i>Rastrelliger brachysoma</i> (Bleeker, 1851), during breeding season: Implications for low gamete production in captive broodstock. Fish Physiol Biochem 45(1): 1-18.	12/1	2019
Published research work	Senarat S, Kettratad J, Jiraungkoorskul W , F. Gerald Plumley, Tongmitr K, Poolprasert P, Kangwanransan N, Amano M, Shimizu A, Boonyoung P. (2018). Identification of sbGnRH-GTHs system and estrogen receptor α (ER α) immunoreactivities in the mature testicular tissue in <i>Rastrelliger brachysoma</i> (Bleeker, 1851). Eurasia J Biosci 12(2): 385-392.	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Senarat S, Jiraungkoorskul W , Kettratad J. (2018). Testicular structure and spermatogenesis of short mackerel, <i>Rastrelliger brachysoma</i> (Bleeker, 1851) in Upper Gulf of Thailand. Asia Pac J Mol Biol Biotechnol 26(2): 30-43.	12/1	2018
Published research work	Senarat S, Kettratad J, Tipdomrongpong S, F Geral Plumley, Jiraungkoorskul W , Poolprasert P. (2018). Health status in wild and captive short mackerel, <i>Rastrelliger brachysoma</i> from Thailand: Histopathology. Songklanakarin J Sci Technol 40(5): 1090-1097.	12/1	2018
Published research work	Kachenton S, Whangpurikul V, Kangwanrangsan N, Tansatit T, Jiraungkoorskul W* . (2018). Silver nanoparticles toxicity in brine shrimp and its histopathological analysis. Int J Nanosci 17(6): 185007.	12/1	2018
Published research work	Senarat S, Kettratad J, Tipdomrongpong S, Pengsakul T, Jiraungkoorskul W , Boonyoung P, Huang S. (2018). Histopathology of kidney and liver in the captive broodstock (<i>Rastrelliger brachysoma</i>) during its juvenile stage. Vet Integr Sci 16(2): 87-93.	12/1	2018
Published research work	Thongboon L, Senarat S, Kettratad J, Poolprasert P, Wangkulangkul S, Jiraungkoorskul W , Mongkolchaichana E, Pengsakul T, Huang S, Para C. (2018). Structure of the heart wall	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	and existence of the blood cells in the heart of the dog-faced water snake <i>Cerberus rynchops</i> (Schneider, 1799). <i>Vet Integr Sci</i> 16(2): 79-86.		
Published research work	Charoenphon N, Kangwanrangan N, Jiraungkoorskul W* . (2018). <i>Artemia salina</i> lethality and histopathological studies on <i>Bacopa monnieri</i> leaf extract. <i>Indian J Anim Res</i> 52(4): 610-614.	12/1	2018
Published research work	Boonyoung P, Senarat S, Kettratad J, Jiraungkoorskul W , Poolprasert P, Wangkulangkul S, Pengsakul T, Yenchum W, Sulieman Y. (2017). Esophagogastric region and liver tissue in dog-faced water snake <i>Cerberus rynchops</i> : Histology and histochemistry. <i>Agric Nat Resour</i> 51(6): 538-543.	12/1	2017
Published research work	Senarat S, Kettratan J, Jiraungkoorskul W* . (2017). Structure and ultrastructure of oogenic stage in short mackerel <i>Rastrelliger brachysoma</i> (Teleostei: Scombidae). <i>J Morphol Sci</i> 34(1): 23-30.	12/1	2017
Published research work	Senarat S, Jiraungkoorskul W , Kettratad J. (2017). Ovarian histology and reproductive health of short mackerel, <i>Rastrelliger brachysoma</i> (Bleeker, 1851), as threatened marine fish in Thailand. <i>Songklanakarin J Sci Technol</i> 39(2): 225-235.	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rungruangmaitree R, Jiraungkoorskul W* . Pea, <i>Pisum sativum</i> , and its anticancer activity. <i>Pharmacogn Rev.</i> 2017; 11(21): 39-42.	12/1	2017
Published research work	Sirinthipaporn A, Jiraungkoorskul W* . (2017). Wound healing property review of Siam weed, <i>Chromolaena odorata</i> . <i>Pharmacogn Rev</i> 11(21): 35-38.	12/1	2017
Published research work	Poolperm S, Jiraungkoorskul W* . (2017). An update review on the anthelmintic activity of bitten gourd, <i>Momordica charantia</i> . <i>Pharmacogn Rev</i> 11(21): 31-34.	12/1	2017
Published research work	Ongwisepaiboon O, Jiraungkoorskul W* . (2017). Fingerroot, <i>Boesenbergia rotunda</i> and its aphrodisiac activity. <i>Pharmacogn Rev</i> 11(21): 27-30.	12/1	2017
Published research work	Narang N, Jiraungkoorskul W* , Jamrus P. (2017). Current understanding of antiobesity property of capsaicin. <i>Pharmacogn Rev</i> 11(21): 23-26.	12/1	2017
Published research work	Ghogar A, Jiraungkoorskul W* . (2017). Antifertility effect of <i>Bougainvillea spectabilis</i> or paper flower. <i>Pharmacogn Rev</i> 11(21): 19-22.	12/1	2017
Published research work	Kettratad J, Senarat S, Boonyoung P, Jiraungkoorskul W. (2017). Tongue anathology of the oceanodromous adult <i>Rastrelliger brachysoma</i> (Bleeker, 1851) with a nite on the comparison with the	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	tongue structure of adult <i>R. kanagurta</i> (Cuvier, 1816). Songklanakarin J Sci Technol 39(1): 117-121.		

Current Teaching Load

SCPA 501	General Pathology		2(1-2-3)
SCPA 502	Systemic Pathology		2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study		2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research		2(1-2-3)
SCPA 604	Clinical Pathology		2(1-2-3)
SCPA 605	Essential Pathobiology		2(1-2-3)
SCPA 606	Selected Topic in Pathobiology		2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer		2(2-0-4)
SCPA 608	Nutritional Pathology		2(2-0-4)
SCPA 610	Cellular Pathology		2(2-0-4)
SCPA 613	Research Rotation in Pathobiology		1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I		1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II		1(1-0-2)
SCPA 616	Current Research in Pathobiology		2(1-2-3)
SCPA 699	Dissertation		36(0-108-0)
SCPA 799	Dissertation		48(0-144-0)
SCPA 898	Dissertation		48(0-144-0)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology		2(1-2-3)
SCPA 502	Systemic Pathology		2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study		2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research		2(1-2-3)

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

3. Name: Assistant Professor Dr. Amornrat Naranuntarat Jensen

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Toxicology	Johns Hopkins University, USA	2009
B.Sc.	Pharmaceutical Sciences	Chulalongkorn University	2000

Affiliation

Department of Pathobiology, Faculty of Science, Mahidol University

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Interesting Research Topics or Specialties

1. Screening of anti-cancer or anti-aging compounds using cell-based assays
2. Molecular pathogenesis of genetic disorders
3. Molecular mechanism of anti-malarial drug actions

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Jain A, Nilatawong P, Mamak N, Jensen LT, Jensen AN . (2020). Disruption in iron homeostasis and impaired activity of iron-sulfur cluster containing proteins in the yeast model of Shwachman-Diamond syndrome. Cell Biosci 10: 105. https://doi.org/10.1186/s13578-020-00468-2	12/1	2020
Published research work	Chalermwat C, Thosapornvichai T, Wongkittichote P, Phillips JD, Cox JE, Jensen AN , Wattanasirichaigoon D, Jensen LT. (2019). Over-expression of the peroxin Pex34p suppresses impaired acetate utilization in yeast lacking the mitochondrial aspartate/glutamate carrier Agc1p. FEMS Yeast Rese 19(8): pii: foz078	12/1	2019
Published research work	Pongwattanakewin O, Phyu T, Suesattayapirom S, Jensen LT, Jensen AN . (2019). Possible Role of the Ca(2+)/Mn(2+) P-	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Type ATPase Pmr1p on artemisinin toxicity through an induction of intracellular oxidative stress. <i>Molecules</i> 24(7): 1233.		
Published research work	Jensen LT, Phyu T, Jain A, Kaewwana C, Jensen AN . (2019). Decreased accumulation of superoxide dismutase 2 within mitochondria in the yeast model of Shwachman-Diamond syndrome. <i>J Cell Biochem</i> 120(8): 13867-13980	12/1	2019
Published research work	Aung HM, Huangteerakul C, Panvongsa W, Jensen AN , Chairoungdua A, Sukrong S, Jensen LT. (2018). Interrogation of ethnomedicinal plants for synthetic lethality effects in combination with deficiency in the DNA repair endonuclease RAD1 using a yeast cell-based assay. <i>J Ethnopharmacol</i> 223: 10-21.	12/1	2018

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)

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 หลักสูตรปรับปรุงแก้ไขนี้ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)
SCID 500	Cell and Molecular Biology	3(3-0-6)
SCID 502	Cell Science	2(2-0-4)
SCID 506	Concept of Molecular Biosciences	2(2-0-4)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

4. Name Assistant Professor Dr. Pornthip Chaichompoo

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Immunology	Mahidol University	2010
M.Sc.	Immunology	Mahidol University	2007
B.Sc.	Medical Technology	Chiang Mai University	2004

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Mechanism of hematopoietic cells and their extracellular vesicles on coagulation and inflammation in thalassemia.
2. Infection and immune cell function in thalassemia.
3. Effect of oxidative stress and iron status on anatomical pathology of thalassemic blood cells.
4. Biomarkers for disease severity and complications in thalassemia.
5. Novel hemoglobin F inducers for therapeutics in thalassemia.

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Thiengtavor C, Siriworadetkun S, Paiboonsukwong K, Fucharoen S, Pattanapanyasat K, Vadolas J, Svasti S, Chaichompoo P* . (2020). Increased ferritin levels in non-transfusion-dependent β^0 -thalassaemia/HbE are	12/1	2020

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	associated with reduced CXCR2 expression and neutrophil migration. Br J Haematol 189(1): 187-198.		
Published research work	Chaichompoo P* , Qillah A, Sirankapracha P, Kaewchuchuen J, Rimthong P, Paiboonsukwong K, Fucharoen S, Svasti S, Worawichawong S. (2019). Abnormal red blood cell morphological changes in thalassemia associated with iron overload and oxidative stress. J Clin Pathol 72(8): 520-524.	12/1	2019
Published research work	Manakeng K, Prasertphol P, Phongpao K, Chuncharunee S, Tanyong D, Worawichawong S, Svasti S, Chaichompoo P* . (2019). Elevated levels of platelet and red cell-derived extracellular vesicles in transfusion dependent β -thalassemia/HbE patients with pulmonary arterial hypertension. Ann Hematol 98(2): 281-288.	12/1	2019
Published research work	Kheansaard W, Phongpao K, Paiboonsukwong K, Pattanapanyasat K, Chaichompoo P , Svasti S. (2018). Microparticles from β -thalassaemia/HbE patients induce endothelial cell dysfunction. Sci Rep 8(1): 13033.	12/1	2018
Published research work	Siwaponanan P, Siegers JY, Ghazali R, Ng T, McColl B, Thientavor C, Fucharoen S,	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Chaichompoo P , Svasti S, Wijburg OL, Vadolas J. (2017). Reduced PU.1 expression underlies aberrant neutrophil maturation and function in β -thalassemia mice and patients. Blood 129(23): 3087-3099.		
Published research work	Leecharoenkiat K, Tanaka Y, Harada Y, Chaichompoo P , Sarakul O, Abe Y, Smith DR, Fucharoen S, Svasti S, Umemura T. (2017). Plasma microRNA-451 as new hemolytic marker in β^0 -thalassemia/HbE disease. Mol Med Rep 15: 2495-2502.	12/1	2017
Published research work	Klaihmon P, Phongpao K, Kheansaard W, Noulsri E, Khuhapinant A, Fucharoen S, Morales NP, Svasti S, Pattanapanyasat K, Chaichompoo P* . (2017). Microparticles from splenectomized β -thalassemia/HbE patients play roles on procoagulant activities with thrombotic potential. Ann Hematol 96(2): 189-198.	12/1	2017

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)

หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 609	Systems Immunology	1(1-0-2)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

5. Name: Lecturer Dr. Niwat Kangwanrangsan

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Medical Sciences	Ehime University, Japan	2013
M.Sc.	Anatomy	Mahidol University	2004
B.Sc.	Biology	Mahidol University	1998

Affiliation: Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Molecular and cellular parasitology and infectious diseases
2. Antimalarial drug and vaccine development

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Schäfer C, Roobsoong W, Kangwanrangsan N , Bardelli M, Rawlinson TA, Dambrauskas N, Trakhimets O, Parthiban C, Goswami D, Reynolds LM, Kennedy SY, Flannery EL, Murphy SC, Sather DN, Draper SJ, Sattabongkot J, Mikolajczak SA, Kappe SHI. (2020). A humanized mouse model for <i>Plasmodium vivax</i> to test interventions that block liver stage to blood stage transition and blood stage infection. <i>iScience</i> 23(8): 101381.	12/1	2020

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 หลักสูตรปรับปรุงแก้ไขนี้ ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Palasai A, Senarat S, NaLampang P, Kangwanrangsan N , Jiraungkoorskul W, Siqueira-Silva DH, Kettratad J. (2020). Reproductive development of the priapium fish <i>Neostethus lankesteri</i> Regan, 1916 (Atheriniformes: Phallostethidae) from Pranburi river estuary, Thailand using the histological approach. <i>Asia Pacific J Mol Biol Biotechnol</i> 28(2): 92-104.	12/1	2020
Published research work	Gupta DK, Dembele L, Voorberg-van der Wel A, Roma G, Yip A, Chuenchob V, Kangwanrangsan N , Ishino T, Vaughan AM, Kappe SH, Flannery EL, Sattabongkot J, Mikolajczak S, Bifani P, Kocken CH, Diagana TT. (2019). The <i>Plasmodium</i> liver-specific protein 2 (LISP2) is an early marker of liver stage development. <i>Elife</i> 8. pii: e43362.	12/1	2019
Published research work	Senarat S, Kettratad J, Kangwanrangsan N , Jiraungkoorskul W, Amano M, Shimizu A, Plumley FG, Tipdomrongpong S. (2019). The sbGnRH-GTH system in the female short mackerel, <i>Rastrelliger brachysoma</i> (Bleeker, 1851), during breeding season: implications for low gamete production in captive broodstock. <i>Fish Physiol Biochem</i> 45(1): 1-18.	12/1	2019
Published	Senarat S, Kettratad J, Kangwanrangsan N ,	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
research work	Jiraungkoorskul W, Plumley FG, Amano M, Shimizu A, Boonyoung P, Kaneko G. (2019). Immunoreactivities of estrogen receptor alpha in brain and ovary of the short mackerel <i>Rastrelliger brachysoma</i> (Bleeker, 1851). Asian-Pac J Mol Biol Biotechnol .27(3): 50-63.		
Published research work	Kachenton S, Jiraungkoorskul W, Kangwanrangsan N , Tansatit T. (2019). Cytotoxicity and histopathological analysis of titanium nanoparticles via <i>Artemia salina</i> . Environ Sci Pollut Res Int 26(15): 14706-14711.	12/1	2019
Published research work	Jenwithisuk R, Kangwanrangsan N , Tachibana M, Thongkukiatkul A, Otsuki H, Sattabongkot J, Tsuboi T, Torii M, Ishino T. (2018). Identification of a PH domain-containing protein which is localized to crystalloid bodies of <i>Plasmodium ookinetes</i> . Malar J 17(1): 466.	12/1	2018
Published research work	Bertschi NL, Voorberg-van der Wel A, Zeeman AM, Schuierer S, Nigsch F, Carbone W, Knehr J, Gupta DK, Hofman SO, van der Werff N, Nieuwenhuis I, Klooster E, Faber BW, Flannery EL, Mikolajczak SA, Chuenchob V, Shrestha B, Beibel M, Bouwmeester T, Kangwanrangsan N , Sattabongkot J, Diagana TT, Kocken CH,	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Roma G. (2018). Transcriptomic analysis reveals reduced transcriptional activity in the malaria parasite <i>Plasmodium cynomolgi</i> during progression into dormancy. <i>Elife</i> 7. pii: e41081.		
Published research work	Bunthitsakda W, Leelayuwapan H, Paha J, Kangwanrangsan N , Chawengkirttikul R, Ponpuak M, Ruchirawat S, Boonyarattanakalin S. (2018). Controlled rapid synthesis and in vivo immunomodulatory effects of LM $\alpha(1,6)$ mannan with an amine linker. <i>Carbohydr Polym</i> 195: 420-431.	12/1	2018
Published research work	Charoenphon N, Kangwanrangsan N , Jiraungkoorskul W. (2018). <i>Artemia salina</i> lethality and histopathological studies on <i>Bacopa monnieri</i> leaf extract. <i>Indian J Anim Res</i> 52(4): 610-614.	12/1	2018
Published research work	Senarat S, Kettratad J, Jiraungkoorskul W, Plumley FG, Tongmit K, Poolprasert P, Kangwanrangsan N , Amano M, Shimizu A, Boonyoung P. (2018). Identification of sbGnRH-GTHs system and estrogen receptor α (ER α) immunoreactivities in the mature testicular tissue in <i>Rastrelliger brachysoma</i> (Bleeker, 1851). <i>EurAsia J Biosci</i> 12(2): 385-392.	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Gualdrón-López M, Flannery EL, Kangwanrangsang N , Chuenchob V, Fernandez-Orth D, Segui-Barber J, Royo F, Falcón-Pérez JM, Fernandez-Becerra C, Lacerda MVG, Kappe SHI, Sattabongkot J, Gonzalez JR, Mikolajczak SA, Del Portillo HA. (2018). Characterization of <i>Plasmodium vivax</i> Proteins in Plasma-Derived Exosomes from Malaria-Infected Liver-Chimeric Humanized Mice. <i>Front Microbiol</i> 9: 1271.	12/1	2018
Published research work	Arredondo SA, Swearingen KE, Martinson T, Steel R, Dankwa DA, Harupa A, Camargo N, Betz W, Vigdorovich V, Oliver BG, Kangwanrangsang N , Ishino T, Sather N, Mikolajczak S, Vaughan AM, Torii M, Moritz RL, Kappe SHI. (2018). The Micronemal Plasmodium Proteins P36 and P52 Act in Concert to Establish the Replication-Permissive Compartment Within Infected Hepatocytes. <i>Front Cell Infect Microbiol</i> 8: 413.	12/1	2018
Published research work	Leelayuwapan H, Kangwanrangsang N , Chawengkirttikul R, Ponpuak M, Charlermroj R, Boonyarattanakalin K, Ruchirawat S, Boonyarattanakalin S. (2017). Synthesis and immunological studies of the lipomannan backbone glycans found	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	on the surface of <i>Mycobacterium tuberculosis</i> . J of Org Chem 82: 7190-7199.		

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)
SCID 507	Microscopic Technique	1(0-2-1)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 609	Systems Immunology	1(1-0-2)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)

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SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCID 507	Microscopic Technique	1(0-2-1)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

Curriculum Vitae of the Full Time Instructors

1. Name Lecturer Dr. Nisamane Charoenchon

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Medicine	University of Manchester, United Kingdom	2016
M.Sc.	Biotechnology	Chulalongkorn University	2012
B.Sc.	Biology	Khon Kaen University	2009

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

Biological responses and mechanism due to photoageing in the integumentary system.

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rodboon T, Palipoch S, Okada S, Charoenchon N Nakornpakdee Y., Suwannalert P. (2020). Oxyresveratol inhibits cellular tyrosinase-related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci 10(4), 8-13.	12/1	2020

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Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)

2. Name Lecturer Dr. Titipatima Sakulterdkiat

Education

Degree	Degree Name	Institute	Year of Graduation
M.D.	Doctor of Medicine	Mahidol University	2019
Ph.D.	Pathobiology	Mahidol University	2013
B.Sc.	Biological Sciences	California State University San Marcos, USA	2007

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Hypoxia
2. Cancer Biology and molecular mechanism
3. Proteomics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Doungchawee D, Sutdan D, Niwatayakul K, Inwisai T, Sitthipunya A, Boonsathorn N, Sakulterdkiat T , Sirawaraporn W, Thongboonkerd V. (2017). Development and evaluation of an immunochromatographic assay to detect serum anti-leptospiral lipopolysaccharide IgM in acute leptospirosis. Sci Rep 7(1): 2309.	12/1	2017

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Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 609	Systems Immunology	1(1-0-2)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)

3. Name Lecturer Dr. Witchuda Payuhakrit

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Pathobiology	Mahidol University	2015
B.Sc.	Medical Technology	Walailuk University	2007

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Tumor microenvironment and cancer angiogenesis, metastasis and drug resistance
2. Inflammation and oxidative stress in photoaging
3. Natural product for anti-cancer and anti-aging

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years * (2015-2020)

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Aimvijarn P, Rodboon T, Payuhakrit W , Suwannalert P. (2018). Nymphaea pubescens induces apoptosis, suppresses cellular oxidants-related cell invasion in b16 melanoma cells. Pharm Sci 24(3):199-206.	12/1	2018
Published research work	Suwannalert P, Payuhakrit W , Koomsang T. (2017). Anti-Oxidant, Pro-Oxidant and Anti-Inflammatory Effects of Unpolished Rice Relevant to Colorectal Cancer. Asian Pac J Cancer Prev 12: 5047-5056.	12/1	2017

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 502	Systemic Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 609	Systems Immunology	1(1-0-2)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)
SCPA 619	Toxicopathology	2(2-0-4)

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SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 699	Dissertation	36(0-108-0)
SCPA 799	Dissertation	48(0-144-0)
SCPA 898	Dissertation	48(0-144-0)

4. Name Lecturer Dr. Yaowarin Nakornpakdee

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Medical Microbiology	Khon Kaen University	2018
M.Sc.	Medical Microbiology	Khon Kaen University	2011
B.Sc.	Biology	Khon Kaen University	2008

Faculty/Institute/College

Department of Pathobiology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Bacterial infection and host immune response
2. Vaccine development against *Leptospira interrogans*
3. Toxicopathology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rodboon T, Palipoch S, Okada S, Charoenchon N, Nakornpakdee Y , Suwannalert P. (2020). Oxyresveratol inhibits cellular tyrosinase-related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci 10(4), 8-13.	12/1	2020

Current Teaching Load

SCPA 501	General Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)

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SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 605	Essential Pathobiology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 608	Nutritional Pathology	2(2-0-4)
SCPA 610	Cellular Pathology	2(2-0-4)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)

Assigned Teaching Load for the Proposed Program

SCPA 501	General Pathology	2(1-2-3)
SCPA 602	Anatomical Basis for Pathological Study	2(1-2-3)
SCPA 603	Histopathological Techniques for Routine and Research	2(1-2-3)
SCPA 604	Clinical Pathology	2(1-2-3)
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 609	Systems Immunology	1(1-0-2)
SCPA 614	Seminar in Advanced Pathobiology I	1(1-0-2)
SCPA 615	Seminar in Advanced Pathobiology II	1(1-0-2)
SCPA 616	Current Research in Pathobiology	2(1-2-3)
SCPA 617	Integrative Systemic Pathology	2(1-2-3)
SCPA 619	Toxicopathology	2(2-0-4)
SCPA 620	Global Impact of Infectious Disease	2(2-0-4)
SCPA 621	Pathology of Cancer and Research	2(2-0-4)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)

APPENDIX C
Curriculum Mapping

Appendix C
Curriculum Mapping

● Major responsibility ○ Minor responsibility

Subjects	Morality and Ethics				Knowledge				Intellectual skills				Interpersonal relationship and Responsibility				Mathematical Analytical thinking		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
1.Required courses																			
SCPA 501 General Pathology	○	○	●		●	●	○	○	●	●	○	○	●	○		●		○	●
SCPA 502 Systemic Pathology	○	●	●	●	○	●	●		○	●	●	●	○	●	●	●	○	●	●
SCPA 602 Anatomical Basis for Pathological Study	●	●	○	○	●	●		○			○	●	●	○	●	○		●	○
SCPA 603 Histopathological Techniques for Routine and Research	●	●	○	●	●	●	●			○	●	●	●	○	○	○		●	●
SCPA 614 Seminar in Advanced Pathobiology I		●	●				○	●		●		○		●	●		●	●	●
SCPA 615 Seminar in Advanced		●	●				○	●		●		●		○	●	●	●	●	●

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Subjects	Morality and Ethics				Knowledge				Intellectual skills				Interpersonal relationship and Responsibility				Mathematical Analytical thinking		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
Pathobiology II																			
SCPA 616 Current Research in Pathobiology	●	●	●	●			●	●	●		●		●	●	●		○	●	●
SCPA 617 Integrative Systemic Pathology			●	●		●		●			●	●	●		●	●		●	●
SCPA 622 Molecular and Cellular Pathology	●	○	●	○	●		○	●			○	●	●		●			●	●
SCID 518 Generic Skills in Science Research	●	○	●	○	●		○	●			○	●	●		●			●	●
2. Elective courses																			
SCPA 604 Clinical Pathology	○	●	●		●	●	○	○		●	●		●		●	●		●	○
SCPA 606 Selected Topic in Pathobiology	○	●	●	○	○	○	●	●		○	●	●	●	○	○	○	○	●	●
SCPA 609 Systems Immunology	○	●	●	●			●	●		●	○	●	●		○		●		

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Subjects	Morality and Ethics				Knowledge				Intellectual skills				Interpersonal relationship and Responsibility				Mathematical Analytical thinking		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
SCPA 618 Research for Anti-aging and Regenerative Medicine		●	●				●	○	●	●		○		●	●		○	○	●
SCPA 619 Toxicopathology			●	●		●	●				●	●	●	●	●	●		●	●
SCPA 620 Global Impact of Infectious Disease	●	●	○	○		●	○	●			●	●	●	○	●	○		●	●
SCPA 621 Pathology of Cancer and Research			●	●		●	●				●	●	●	●	●	●		●	●
SCID 500 Cell and Molecular Biology	●	○	●	○	●		○	●			○	●	●		●			●	●
SCID 502 Cell Science		●	●	●		●	○			○	●				●	●			●
SCID 503 Systemic Bioscience	●		●	●		●	●				●	●			●	●			●
SCID 506 Concepts of Molecular Bioscience	●	○	●	○	●		○	●			○	●	●		●			●	●
SCID 507 Microscopic Technique	○	●		●	○	●			●	○			●			●	○	●	
SCID 508 Biomolecular and	○	●		●	○	●			●	○			●			●	○	●	

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Subjects	Morality and Ethics				Knowledge				Intellectual skills				Interpersonal relationship and Responsibility				Mathematical Analytical thinking		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
Spectroscopy Techniques																			
SCID 509 Separation Techniques	○			●	○	●			●	○			●			●	○	●	
SCID 510 Immunological Methods	○	●		●	○	●			●	○			●			●	○	●	
SCID 511 Gene Technology	○			●	○	●			●	○			●			●	○	●	
SCID 513 Animal Cell Culture Techniques	○	●		●	○	●			●	○			●	○		●	○	●	
SCID 514 Animal Experimentation in Biomedical Research	○	●		●	○	●			●	○			●	○		●	●		
SCID 516 Biostatistics			●	●	●	●			●	●			●				●	●	●
GRID 521 Research Ethics	●			●		●				●			●				●	●	●
3. Dissertation																			
SCPA 699 Dissertation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 799 Dissertation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 898 Dissertation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

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Table of Relationship between Learning Outcomes of the Program and Core Value of Mahidol University

Learning Outcomes (as stated in Section 5, item no. 2)	Core value of Mahidol University
1. Morality and Ethics	
1.1 Be disciplined and punctual.	Altruism
1.2 Be honest and deeply concern that all public and presenting data in research is no plagiarized data.	Integrity
1.3 Be respectful of the rights of class members and instructors.	Altruism
1.4 Follow the rules and regulations of the organization.	Harmony
2. Knowledge	
2.1 Perform and operate scientific instruments with special skill and effectiveness.	Mastery
2.2 Describe principle and theory of pathobiology and how to integrate knowledge in pathobiology with other subjects.	Mastery
2.3 Apply principle and theory in pathobiology to innovative or discovery scientific research.	Mastery
2.4 Self-directed and life-long learning of current scientific knowledge in Pathobiology and other academic subjects.	Determination
3. Intellectual Skills	
3.1 Create novel scientific research.	Mastery
3.2 Apply an appropriate scientific equipment for specific research aims.	Originality
3.3 Investigate scientific problems with logical thinking.	Leadership

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Learning Outcomes (as stated in Section 5, item no. 2)	Core value of Mahidol University
3.4 Critique data based on scientific evidence.	Originality
4. International Relationship and responsibility	
4.1 Perform academic study and activities as assigned.	Determination
4.2 Be able to act as a project leader.	Leadership
4.3 Be a good listener and open-minded to combine the ideas from others for a final consensus.	Altruism
4.4 Be able to work with others with unity and with responsibility.	Harmony
5. Mathematical Analytical Thinking, Communication Skills, and Information	
5.1 Apply proper statistics for data analysis.	Mastery
5.2 Judge appropriate information technology for data searching.	Mastery
5.3 Be able to communicate idea and knowledge through written and oral presentation of scientific research in international academic setting.	Mastery

APPENDIX D

Program Learning Outcome

Appendix D
Program Learning Outcomes

Table 1: Comparison between before and after revised objective of the program

Objective of the Program	Revised Objective of the Program
๑. ยึดมั่นในคุณธรรม จริยธรรมและจรรยาบรรณ วิชาชีพและวิชาการและการปฏิบัติงาน	1.Integrate the moral standards and research ethics into academic and scientific works;
๒. มีความรู้รอบด้านในสาขาวิชาพยาธิวิทยาและ ศาสตร์ที่เกี่ยวข้อง	2.Hypothesize the knowledge in pathobiology and other related fields, conduct self-directed and life-long learning;
๓. สามารถประมวลความรู้ คิดวิเคราะห์ แก้ปัญหา อย่างถูกต้องและศึกษาค้นคว้าเพื่อพัฒนาตนเองอย่างต่อเนื่อง สร้างสรรค์ความรู้ใหม่โดยงานวิจัยและการ ปฏิบัติงาน	3.Design novel research project and synthesize new knowledge in pathobiology and other related fields
๔. มีความเป็นผู้นำและผู้ตามที่ดี มีความรับผิดชอบ สามารถทำงานร่วมกับผู้อื่นและประพฤติตนให้เป็น ประโยชน์ต่อสังคม	4. Work as a team in the role of leadership in professional and academic research;
๕. มีทักษะด้านการวิเคราะห์เชิงตัวเลข การใช้ เทคโนโลยีสารสนเทศในการทำงานวิชาการและวิจัย การสื่อสาร การนำเสนอผลงานได้อย่างเหมาะสม	5. Apply appropriate information technology for data searching, data analysis, and presentation in both academic setting and scientific research

Table 2: Relationship between objective of the program and program learning outcome

Objective of the Program	Program Learning Outcome*							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
1. Integrate the moral standards and research ethics into academic and scientific works;	✓							
2. Hypothesize the knowledge in pathobiology and other related fields, conduct self-directed and life-long learning;		✓	✓					
3. Design novel research project and synthesize new knowledge in pathobiology and other related fields				✓	✓	✓		
4. Work as a team in the role of leadership in professional and academic research;							✓	
5. Apply appropriate information technology for data searching, data analysis, and presentation in both academic setting and scientific research								✓

Note*

PLO1: Judge proper usage of scientific citation

PLO2: Analyze basis of anatomical pathology, histological technique and pathophysiology to clinical correlation

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PL03: Analyze pathology at molecular, cellular and organ levels

PL04: Develop new research questions and design scientific technique in research

PL05: Integrate basic knowledge with clinical correlations

PL06: Design novel research proposal with innovation using advanced techniques in pathobiology

PL07: Judge good teamwork and express roles in the workgroup appropriately and with cultural sensitivity

PL08: Judge proper information technology for scientific communication and statistical analysis in pathobiology

Table 3: Standard domains of learning outcome and Program Learning Outcomes

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes							
		PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
Morality and Ethics	1.1 Be disciplined and punctual.		√	√	√	√	√	√	
	1.2 Be honest and deeply concern that all public and presenting data in research is no plagiarized data.	√						√	
	1.3 Be respectful of the rights of class members and instructors.	√						√	
	1.4 Follow the rules and regulations of the organization.	√						√	
Knowledge	2.1 Perform and operate scientific instruments with special skill and effectiveness.		√	√					
	2.2 Describe principle and		√	√					

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes							
		PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
	theory of pathobiology and how to integrate knowledge in pathobiology with other subjects.								
	2.3 Apply principle and theory in pathobiology to innovative or discovery scientific research.		√	√					
	2.4 Self-directed and life-long learning of current scientific knowledge in Pathobiology and other academic subjects.		√	√					
Intellectual Development	3.1 Create novel scientific research.				√	√	√		
	3.2 Apply an appropriate scientific equipment for specific research aims.				√	√	√		
	3.3 Investigate scientific problems with logical thinking.				√	√	√		
	3.4 Critique data based on scientific evidence.				√	√	√		
Interpersonal Relationship and Responsibility	4.1 Perform academic study and activities as assigned.							√	
	4.2 Be able to act as a project leader.							√	
	4.3 Be a good listener and open-minded to combine the							√	

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes							
		PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
	ideas from others for a final consensus.								
	4.4 Be able to work with others with unity and with responsibility.							√	
Math, Communication, IT Skills	5.1 Apply proper statistics for data analysis.								√
	5.2 Judge appropriate information technology for data searching.								√
	5.3 Be able to communicate idea and knowledge through written and oral presentation of scientific research in international academic setting.								√

Table 4: Learning and Assessment Strategies for Program Learning Outcomes Evaluation

PLOs	Learning Method	Assessment
PLO1: Judge proper usage of scientific citations	Lecture Discussion Assignment	Short answer test Written test Practical test Presentation Rubric
PLO2: Analyze basis of anatomical pathology, histological technique and	Lecture Discussion Assignment	Short answer test Written test Practical test

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PLOs	Learning Method	Assessment
pathophysiology to clinical correlation	Questions	Presentation Rubric
PLO3: Analyze pathology at molecular, cellular and organ levels	Lecture Discussion Assignment Questions Demonstration and practice	Short answer test Written test Practical test Presentation Rubric
PLO4: Develop new research questions and design scientific technique in research	Lecture Discussion Assignment Questions Group project Case study	Written test Practical test Work assignment Presentation Rubric
PLO5: Integrate basic knowledge with clinical correlations	Lecture Discussion Assignment Questions Group project Case study	Written test Practical test Work assignment Presentation Rubric
PLO6: Design novel research proposal with innovation using advanced techniques in pathobiology	Discussion Assignment Group project Research	Practical test Work assignment Presentation Research Rubric
PLO7: Judge good teamwork and express roles in the workgroup appropriately and with cultural sensitivity	Lecture Discussion Assignment	Short answer test Written test Practical test Presentation Rubric
PLO8: Judge proper information technology for	Lecture Discussion	Short answer test Written test

PLOs	Learning Method	Assessment
scientific communication and statistical analysis in pathobiology	Assignment Questions Research	Practical test Presentation Research Rubric

Table 5: Relationship between Courses of the Program and Program Learning Outcomes

1. Plan 1 : Research only

Year/ Semester	Code	Name	Credits	PLOs								
				1	2	3	4	5	6	7	8	
	SCPA898	Dissertation	48(0-144-0)	M	M	M	M	M	M	M	M	M

2. Required Course

2.1 Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

Year/ Semester	Code	Name	Credits	PLOs								
				1	2	3	4	5	6	7	8	
1 st year/ 1 st semester	SCPA614	Seminar in Advanced Pathobiology I	1(1-0-2)	I						I		I
1 st year/ 2 nd semester	SCPA615	Seminar in Advanced Pathobiology II	1(1-0-2)	R				R	R			R
	SCPA616	Current Research in Pathobiology	2(1-2-3)	R					R			M
	SCPA617	Integrative Systemic Pathology	2(1-2-3)	M	M	M		M	R			M
2 nd year/ 1 st semester	SCPA699	Dissertation	36(0-108-0)	M	M	M	M	M	M	M	M	M

Plan 2.2 For Student with Bachelor's degree

Year/ Semester	Code	Name	Credits	PLOs								
				1	2	3	4	5	6	7	8	
1 st year/ 1 st semester	SCPA602	Anatomical Basis for Pathological Study	2(1-2-3)		I/P	I/P		I				I
	SCPA603	Histopathological Techniques for Routine and Research	2(1-2-3)	I	I/P	I/P						I
	SCPA614	Seminar in Advanced Pathobiology I	1(1-0-2)	I						I		I
	SCPA622	Molecular and Cellular Pathology	2(2-0-4)		R	R		I			I	
	SCPA501	General Pathology	2(1-2-3)	R	R/P	R/P		R				R
	SCID518	Generic Skills in Science Research	1(1-0-2)	R				I			I	R
1 st year/ 2 nd semester	SCPA615	Seminar in Advanced Pathobiology II	1(1-0-2)	R				R	R			R
	SCPA502	Systemic Pathology	2(1-2-3)		M/P	M/P		R				M
	SCPA616	Current Research in Pathobiology	2(1-2-3)	R						R		M
	SCPA617	Integrative Systemic Pathology	2(1-2-3)	M	M	M		M	R			M
2 nd year	SCPA799	Dissertation	48(0-144-0)	M	M	M	M	M	M	M	M	M

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3. Elective Course

Code	Name	Credits	PLOs							
			1	2	3	4	5	6	7	8
SCPA 604	Clinical Pathology	2(1-2-3)	R	I/P	R/P		R/P			R
SCPA 606	Selected Topic in Pathobiology	2(1-2-3)	R		R/P	R/P	R/P			R
SCPA 609	Systems Immunology	1(1-0-2)	R		R	R		M		M
SCPA 618	Research for Anti-aging and Regenerative Medicine	2(2-0-4)		R	R		M	M		M
SCPA 619	Toxicopathology	2(2-0-4)	R	R	R	R	M	M		
SCPA 620	Global Impact of Infectious Disease	2(2-0-4)			R	R	M			M
SCPA 621	Pathology of Cancer and Research	2(2-0-4)	R	R	R	R	M	M		
SCID 500	Cell and Molecular Biology	3(3-0-6)	I	I	I				I	I
SCID 502	Cell Science	2(2-0-4)	I	I	I				I	I
SCID 503	Systemic Bioscience	3(3-0-6)	I	I	I				I	I
SCID 506	Concepts of Molecular Bioscience	2(2-0-4)	I	I	I				I	I
SCID 507	Microscopic Technique	1(0-2-1)	R					R/P	R/P	R
SCID 508	Biomolecular and Spectroscopy Techniques	1(0-2-1)	R					R/P	R/P	R
SCID 509	Separation Techniques	1(0-2-1)	R					R/P	R/P	R
SCID 510	Immunological Methods	1(0-2-1)	R					R/P	R/P	R
SCID 511	Gene Technology	1(0-2-1)	R					R/P	R/P	R
SCID 513	Animal Cell Culture Techniques	1(0-2-1)	R					R/P	R/P	R
SCID 514	Animal Experimentation in Biomedical Research	1(0-2-1)	R					R/P	R/P	R
SCID 516	Biostatistics	3(3-0-6)	I	I	I				I	I
GRID 521	Research Ethics	1(1-02)	R			I		I	R	P

I = ELO is introduced & assessed

R = ELO is reinforced & assessed

P = ELO is practiced & assessed

M = Level of Mastery is assessed

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Table 6: The expectation of learning outcomes at the end of the academic year

Plan 1 : Research only

Year of study	Knowledge, skills, and any other expected learning outcomes
1 st	Create knowledge in pathobiology and related subjects for Qualifying Examination. Hypothesize and design novel research proposal. Proper usage of scientific citations and statistic, English and information technology in communication.
2 nd	Develop scientific technique in research and evaluate the novel results.
3 rd	Published scientific articles in pathobiology and related subjects to create the new scientific research. Judge good teamwork and express roles in the workgroup.

Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

Year of study	Knowledge, skills, and any other expected learning outcomes
1 st	Integrate knowledge in pathobiology and related subjects with clinical correlations at molecular, cellular and organ levels. Proper usage of scientific citations and statistic, English and information technology in communication.
2 nd	Create knowledge in pathobiology and related subjects for Qualifying Examination. Hypothesize and design novel research proposal. Develop scientific technique in research and evaluate the novel results.
3 rd	Published scientific articles in pathobiology and related subjects to create the new scientific research. Judge good teamwork and express roles in the workgroup.

Plan 2.2 : For Student's with Bachelor's degree

Year of study	Knowledge, skills, and any other expected learning outcomes
1 st	Integrate knowledge in pathobiology and related subjects with clinical correlations at molecular, cellular and organ levels. Proper usage of scientific citations and statistic, English and information technology in communication.
2 nd	Create knowledge in pathobiology and related subjects for Qualifying Examination. Hypothesize and design novel research proposal.
3 ^d	Develop scientific technique in research and evaluate the novel results.
4 th	Published scientific articles in pathobiology and related subjects to create the new scientific research. Judge good teamwork and express roles in the workgroup.

APPENDIX E

The revised of Program

Appendix E
The Revision of Doctor of Philosophy Program in Pathobiology
(International Program)
Volume 2016
Faculty of Science and Faculty of Graduate Studies,
Mahidol University

1. The Curriculum was approved by the Office of the Higher Education Commission
Pending consideration and approval from the Office of the Higher Education Commission
2. The Mahidol University Council has approved this revised curriculum in the meeting 566 on 17 March 2021
3. The revised curriculum will be effective with student class class 2022 from the 1st semester of the Academic Year 2022 onwards.
4. Rationale of revision
 - 4.1 The curriculum is revised to be in accordance with Thai Qualification Framework for Higher Education 2015.
 - 4.2 The curriculum is revised to keep it up-to-date and fit the needs of stakeholders.
5. The details of the revision
 - 5.1 Philosophy and Justification of the Curriculum are revised to update.
 - 5.2 Required and Elective courses are revised.
 - 5.3 The new courses are added.

The Comparison Table of Courses between the Current Program and Revising Program

1. Plan 1 : Research only

1.1 : For Student's with Master's degree

Courses of the Current Program	Courses of the Revising Program	Remark
SCPA 898 Dissertation 48(0-144-0) วทพย ๘๙๘ วิทยานิพนธ์	SCPA 898 Dissertation 48(0-144-0) วทพย ๘๙๘ วิทยานิพนธ์	Course description changed

2. Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

Courses of the Current Program	Courses of the Revising Program	Remark
1. Required Courses (6 credits)	1. Required Courses (6 credits)	
SCPA 614 Seminar in Advanced Pathobiology I 1(1-0-2) วทพย ๖๑๔ สัมนาทางพยาธิชีววิทยาชั้นสูง ๑	SCPA 614 Seminar in Advanced Pathobiology I 1(1-0-2) วทพย ๖๑๔ สัมนาทางพยาธิชีววิทยาชั้นสูง ๑	Course description changed
SCPA 615 Seminar in Advanced Pathobiology II 1(1-0-2) วทพย ๖๑๕ สัมนาทางพยาธิชีววิทยาชั้นสูง ๒	SCPA 615 Seminar in Advanced Pathobiology II 1(1-0-2) วทพย ๖๑๕ สัมนาทางพยาธิชีววิทยาชั้นสูง ๒	Course description changed
SCPA 616 Current Research in Pathobiology 2(1-2-3) วทพย ๖๑๖ งานวิจัยในปัจจุบันทางพยาธิชีววิทยา	SCPA 616 Current Research in Pathobiology 2(1-2-3) วทพย ๖๑๖ งานวิจัยในปัจจุบันทางพยาธิชีววิทยา	unchanged
SCID 502 Cell Science 2(2-0-4) วทคร ๕๐๒ วิทยาศาสตร์เรื่องเซลล์	-	canceled
-	SCPA 617 Integrative Systemic Pathology 2(1-2-3) วทพย ๖๑๗ พยาธิวิทยาระบบบูรณาการ	New Course
2. Elective courses (6 credits)	2. Elective courses (6 credits)	
SCPA 602 Anatomical Basis for Pathological Study 2(1-2-3)	-	canceled

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Courses of the Current Program	Courses of the Revising Program	Remark
วทพย ๖๐๒ พื้นฐานทางกายวิภาคสำหรับการเรียนพยาธิวิทยา		
SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3) วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย	-	canceled
SCPA 604 Clinical Pathology 2(1-2-3) วทพย ๖๐๔ พยาธิวิทยาคลินิก	-	canceled
SCPA 606 Selected Topic in Pathobiology 2(1-2-3) วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา	-	canceled
SCPA 607 Pathobiology and Mechanisms of Cancer 2(2-0-4) วทพย ๖๐๗ พยาธิชีววิทยาและกลไกของมะเร็ง	SCPA 621 Pathology of Cancer and Research 2(2-0-4) วทพย ๖๒๑ พยาธิวิทยาของมะเร็งและการวิจัย	Code, Name and Course description changed
SCPA 608 Nutrition Pathology 2(2-0-4) วทพย ๖๐๘ พยาธิวิทยาโภชนาการ	-	canceled
-	SCPA 609 Systems Immunology 1(1-0-2) วทพย ๖๐๙ ภูมิคุ้มกันวิทยาเชิงระบบ	New Course
-	SCPA 618 Research for Anti-aging and Regenerative Medicine 2(2-0-4) วทพย ๖๑๘ การวิจัยสำหรับเวชศาสตร์และฟื้นฟูการชราภาพ	New Course
-	SCPA 619 Toxicopathology 2(2-0-4) วทพย ๖๑๙ พยาธิพิษวิทยา	New Course
-	SCPA 620 Global Impact of Infectious Disease 2(2-0-4)	New Course

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Courses of the Current Program	Courses of the Revising Program	Remark
	วทพย ๖๒๐ ผลกระทบทั่วโลกของโรคติดเชื้อ	
GRID 603 Biostatistics 3(3-0-6) บคพร ๖๐๓ ชีวสถิติ	-	canceled
SCID 500 Cell and Molecular Biology 3(3-0-6) วทคร ๕๐๐ ชีววิทยาระดับเซลล์และโมเลกุล	-	canceled
3. Dissertaion	3. Dissertation	
SCPA 699 Dissertation 36(0-108-0) วทพย ๖๙๙ วิทยานิพนธ์	SCPA 699 Dissertation 36(0-108-0) วทพย ๖๙๙ วิทยานิพนธ์	Course description changed

3. Plan 2.2 : For Student's with Bachelor's degree

Courses of the Current Program	Courses of the Revising Program	Remark
1. Required Courses (17 credits)	1. Required Courses (17 credits)	
SCPA 501 General Pathology 2(1-2-3) วทพย ๕๐๑ พยาธิวิทยาทั่วไป	SCPA 501 General Pathology 2(1-2-3) วทพย ๕๐๑ พยาธิวิทยาทั่วไป	Course description changed
SCPA 502 Systemic Pathology 2(1-2-3) วทพย ๕๐๒ พยาธิวิทยาระบบ	SCPA 502 Systemic Pathology 2(1-2-3) วทพย ๕๐๒ พยาธิวิทยาระบบ	Course description changed
SCPA 610 Cellular Pathology 2(2-0-4) วทพย ๖๑๐ พยาธิวิทยาระดับเซลล์	SCPA 622 Molecular and Cellular Pathology 2(2-0-4) วทพย ๖๒๒ พยาธิวิทยาระดับโมเลกุลและ ระดับเซลล์	Code, Name and Course description changed
SCPA 605 Essential Pathobiology 2(1-2-3) วทพย ๖๐๕ พยาธิชีววิทยาที่จำเป็น	-	canceled
SCPA 613 Research Rotation in Pathobiology 1(0-2-1) วทพย ๖๑๓ การเวียนศึกษางานวิจัยทางพยาธิ ชีววิทยา	-	canceled

หลักสูตรปรับปรุงแก้ไขนี้ได้รับความเห็นชอบจากสภามหาวิทยาลัยมหิดล ในคราวประชุมครั้งที่ ๕๖๖ เมื่อวันที่ ๑๗ มีนาคม พ.ศ.๒๕๖๔

Courses of the Current Program	Courses of the Revising Program	Remark
SCPA 614 Seminar in Advanced Pathobiology I 1(1-0-2) วทพย ๖๑๔ สัมมนาทางพยาธิชีววิทยาชั้นสูง ๑	SCPA 614 Seminar in Advanced Pathobiology I 1(1-0-2) วทพย ๖๑๔ สัมมนาทางพยาธิชีววิทยาชั้นสูง ๑	Course description changed
SCPA 615 Seminar in Advanced Pathobiology II 1(1-0-2) วทพย ๖๑๕ สัมมนาทางพยาธิชีววิทยาชั้นสูง ๒	SCPA 615 Seminar in Advanced Pathobiology II 1(1-0-2) วทพย ๖๑๕ สัมมนาทางพยาธิชีววิทยาชั้นสูง ๒	Course description changed
SCID 502 Cell Science 2(2-0-4) วทคร ๕๐๒ วิทยาศาสตร์เรื่องเซลล์	-	Move to Elective course
SCID 503 Systemic Bioscience 3(3-0-6) วทคร ๕๐๓ วิทยาศาสตร์ชีวภาพเชิงระบบ	-	Move to Elective course
SCID 518 Generic Skills in Science Research 1(1-0-2) วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทาง วิทยาศาสตร์	SCID 518 Generic Skills in Science Research 1(1-0-2) วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทาง วิทยาศาสตร์	unchanged
-	SCPA 602 Anatomical Basis for Pathological Study 2(1-2-3) วทพย ๖๐๒ พื้นฐานทางกายวิภาคสำหรับการ ศึกษาพยาธิวิทยา	Add courses Change in Thai name and Course description changed
-	SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3) วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับ งานประจำและงานวิจัย	Add courses and Course description changed
-	SCPA 616 Current Research in Pathobiology 2(1-2-3) วทพย ๖๑๖ งานวิจัยในปัจจุบันทางพยาธิ ชีววิทยา	Add courses
-	SCPA 617 Integrative Systemic Pathology 2(1-2-3)	New Course

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Courses of the Current Program	Courses of the Revising Program	Remark
	วทพย ๖๑๗ พยาธิวิทยาาระบบบูรณาการ	
2. Elective courses (7 credits)	2. Elective courses (7 credits)	
SCPA 602 Anatomical Basis for Pathological Study 2(1-2-3) วทพย ๖๐๒ พื้นฐานทางกายวิภาคสำหรับการ เรียนพยาธิวิทยา	-	Move to Required course, Change in Thai name and Course description changed
SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3) วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับ งานประจำและงานวิจัย	-	Move to Required course and Course description changed
SCPA 604 Clinical Pathology 2(1-2-3) วทพย ๖๐๔ พยาธิวิทยาคลินิก	SCPA 604 Clinical Pathology 2(1-2-3) วทพย ๖๐๔ พยาธิวิทยาคลินิก	Course description changed
SCPA 606 Selected Topic in 2(1-2-3) Pathobiology วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิ ชีววิทยา	SCPA 606 Selected Topic in 2(2-1-3) Pathobiology วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิ ชีววิทยา	Course description changed
SCPA 607 Pathobiology and Mechanisms of Cancer 2(2-0-4) วทพย ๖๐๗ พยาธิชีววิทยาและกลไกของมะเร็ง	SCPA 621 Pathology of Cancer and Research 2(2-0-4) วทพย ๖๒๑ พยาธิวิทยาของมะเร็งและการวิจัย	Code, Name and Course description changed
SCPA 608 Nutrition Pathology 2(2-0-4) วทพย ๖๐๘ พยาธิวิทยาโภชนาการ	-	canceled
-	SCPA 609 Systems Immunology 1(1-0-2) วทพย ๖๐๙ ภูมิคุ้มกันวิทยาเชิงระบบ	New Course
-	SCPA 618 Research for Anti-aging and Regenerative Medicine 2(2-0-4)	New Course

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Courses of the Current Program	Courses of the Revising Program	Remark
	วทพย ๖๑๘ การวิจัยสำหรับเวชศาสตร์และ ฟื้นฟูการชราภาพ	
-	SCPA 619 Toxicopathology 2(2-0-4) วทพย ๖๑๙ พยาธิพิษวิทยา	New Course
-	SCPA 620 Global Impact of Infectious Disease 2(2-0-4) วทพย ๖๒๐ ผลกระทบทั่วโลกของโรคติดเชื้อ	New Course
GRID 603 Biostatistics 3(3-0-6) บคทร ๖๐๓ ชีวสถิติ	-	canceled
SCID 500 Cell and Molecular Biology 3(3-0-6) วทคร ๕๐๐ ชีววิทยาระดับเซลล์และโมเลกุล	SCID 500 Cell and Molecular Biology 3(3-0-6) วทคร ๕๐๐ ชีววิทยาระดับเซลล์และโมเลกุล	unchanged
-	SCID 502 Cell Science 2(2-0-4) วทคร ๕๐๒ วิทยาศาสตร์เรื่องเซลล์	Move from Required course
-	SCID 503 Systemic Bioscience 3(3-0-6) วทคร ๕๐๓ วิทยาศาสตร์ชีวภาพเชิงระบบ	Add course
-	SCID 506 Concepts of Molecular Bioscience 2(2-0-4) วทคร ๕๐๖ หลักการทางวิทยาศาสตร์ชีวภาพ ระดับโมเลกุล	Add course
-	SCID 507 Microscopic Technique 1(0-2-1) วทคร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์	Add course
-	SCID 508 Biomolecular and pectroscopy Techniques 1(0-2-1) วทคร ๕๐๘ เทคนิคด้านชีวโมเลกุลและด้าน สเปกโทรสโกปี	Add course
-	SCID 509 Separation Techniques 1(0-2-1) วทคร ๕๐๙ เทคนิคการแยกสาร	Add course

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Courses of the Current Program	Courses of the Revising Program	Remark
-	SCID 510 Immunological Methods 1(0-2-1) วทศร ๕๑๐ ระเบียบวิธีวิทยาภูมิคุ้มกัน	Add course
-	SCID 511 Gene Technology 1(0-2-1) วทศร ๕๑๑ เทคโนโลยีด้านยีน	Add course
-	SCID 513 Animal Cell Culture 1(0-2-1) Techniques วทศร ๕๑๓ เทคนิคการเพาะเลี้ยงเซลล์สัตว์	Add course
-	SCID 514 Animal Experimentation in Biomedical Research 1(0-2-1) วทศร ๕๑๔ การใช้สัตว์ทดลองในงานวิจัยทาง ชีวการแพทย์	Add course
-	SCID 516 Biostatistics 3(3-0-6) วทศร ๕๑๖ ชีวสถิติ	Add course
-	GRID 521 Research Ethics 1(1-0-2) บพศร ๕๒๑ จริยธรรมการวิจัย	Add course
3. Dissertaion	3. Dissertation	
SCPA 799 Dissertation 48(0-108-0) วทพย ๗๙๙ วิทยานิพนธ์	SCPA 799 Dissertation 48(0-108-0) วทพย ๗๙๙ วิทยานิพนธ์	Course description changed

6. The Comparison Table of the Curriculum Structure between the Current Program and Revised Program Based on Criteria on Graduate Studies B.E. 2558 (set by Ministry of Education)

6.1 Plan 1 : Research only

Plan 1.1 : For Student's with Master's degree

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
Dissertation	Not less than 48 credits	48	48
Total credits (not less than)	48	48	48

6.2 Plan 2 : Courses work and Research

Plan 2.1 : For Student's with Master's degree

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required courses	} Not less than 12 credits	6	6
2. Elective courses		Not less than 6	Not less than 6
3. Dissertation	36	36	36
Total credits (not less than)	48	48	48

Plan 2.2 : For Student's with Bachelor's degree

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required courses	} Not less than 24 credits	17	17
2. Elective courses		Not less than 7	Not less than 7
3. Dissertation	48	48	48
Total credits (not less than)	72	72	72