หลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาพยาธิชีววิทยา
(หลักสูตรนานาชาติ / หลักสูตรปรับปรุง พ.ศ. ๒๕๖๗)

MASTER OF SCIENCE PROGRAM
IN
PATHOBIOLOGY
(INTERNATIONAL PROGRAM / REVISED PROGRAM B.E. 2567)

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

CONTENT

Appendix

Master of Science Program in Pathobiology
(International Program / Revised Program in 2024)

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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 หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิชาพยาธิชีววิทยา (หลักสูตรนานาชาติ)

English Master of Science Program in Pathobiology (International Program)

2. Name of Degree and Major

Full Title	Thai	:	วิทยาศาสตรมหาบัณฑิต (พยาธิชีววิทยา)
Abbreviation	Thai	:	วท.ม.(พยาธิชีววิทยา)
Full Title	English	:	Master of Science (Pathobiology)
Abbreviation	English	:	M.Sc. (Pathobiology)

3. Major Subjects : None

4. Required Credits not less than 36 credits

5. Curriculum Characteristics

5.1 Curriculum type/model : Master's Degree

5.2 Language : English

5.3 Recruitment : Both Thai and international students

5.4 Collaoration with Other Universities: This program is Mahidol University's program.

5.5 Graduate Degrees Offered to the Graduates : One degree

6. Curriculum Status and Curriculum Approval

6.1 Program beginning in 2024

6.2 Starting in semester 1, academic year 2024 onwards

6.3 Curriculum committee approved the program in its meeting 38/2022 on September 26, 2022 and 7/2023 on May 19, 2023

6.4 The Mahidol University Council approved the program in its meeting 596 on September 20, 2023

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 2026 (2 years after implementation).

8. Career Opportunities of the Graduates

8.1 A researcher in pathobiology and biomedical science

8.2 A specialist in life sciences equipment and biomedical science-related companies

8.3 A biomedical scientist or 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 xxx Associate 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
2.	x xxxx xxxxx xxx Associate 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
3.	x xxxx xxxxx xxx 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
4.	x xxxx xxxxx xxx Assistant Professor Dr. Witchuda Payuhakrit	Ph.D. (Pathobiology) Mahidol University: 2015 B.Sc. (Medical Technology)	Department of Pathobiology, Faculty of

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
		Walailuk University : 2007	Science, Mahidol University
5.	x xxxx xxxxx xxx 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

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

The goal of Thailand becoming a “Hub of Wellness and Medial 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. 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 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.

Additionally, the growing concern for higher education in this century indicates that learners prefer non-degree certification programs over certificate programs since they are faster and more targeted. As a result, the curriculum should be enhanced by encouraging learners with a foundation in pathology to enroll in a non-coursework program called Plan 1.1 Research only. Students enrolled in Plan 1.1 will be able to concentrate on and receive intensive training in scientific research that has a greater influence on a specific field.

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 Master of Science 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. Additionally, students enrolled in Plan 1.2 should also be able to conduct and deliver high-impact scientific research within a specified timeframe.

12.2 Relevance to the Missions of the University

This curriculum supports the mission of the university on part 2: Academic and entrepreneurial education, Flagship 2.1: Flexible education and credit unit bank system and part 1: Global research and innovation. The program aims to develop students'

ability to apply their knowledge in sciences and innovation with integrity in order to contribute to world-class research and creative invention for Thailand's Sustainable Development Goals (SDGs).

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 pathobiological knowledge and research skills in fields of pathobiology under a moral obligation and ethics for social impact and improvement of quality of life for mankind

1.2 Objectives of the Program

After graduation from this program, graduates will have qualifications in accordance with Thailand Qualification Standard for Higher Education as follows;

1.2.1 Understand the theories related to the fields of pathobiology including pathogenesis, pathophysiology, anatomical pathology and histopathology in human diseases;

1.2.2 Possess proficiency in numerical analysis, formal and informal listening, speaking, reading, and writing, and the use of information technology for searching, collecting, processing, compiling, creating, analyzing, communicating, and presentation;

1.2.3 Think critically, analyze and provide solutions to problems, and solve the problems;

1.2.4 Possess the moral standards and ethics within academic and scientific works;

1.2.5 Work effectively and responsibly as a team member and leader as well as on personal work, and maintain positive interpersonal relationships, altruism, harmony and a commitment to self-development.

1.3 Program Learning Outcomes (PLOs)

At the end of studies in this program, students will be able to;

1.3.1 PLO1: Explain the basis of anatomical pathology, histological technique and disease pathophysiology

1.3.2 PLO2: Show cognitive and intellectual ability skills including

PLO2.1: Interpretation and identify pathology at molecular, cellular and organ levels

PLO2.2: Apply basic knowledge on pathobiology to integrate basic science and clinical finding

PLO2.3: Create new research questions and use scientific methodology to discovery new knowledge or innovation that specific to the field such as thesis research proposal

1.3.3 PLO3: Demonstrate proficiency in critical thinking, scientific communication, numerical analysis, and the application of information technology

1.3.4 PLO4: Demonstrate correct use of scientific citations, accuracy in referencing, and avoid plagiarism

1.3.5 PLO5: Demonstrate leadership, altruism, harmony, awareness of social and environmental responsibility, good teamwork and responsibility on both individual and group assignments

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 continuosly 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

Plan for Development/Revision	Strategies	Evidences/Indexes
3. Assessment analysis	Rubrics for assessment of some courses will be discussed at the curriculum meeting and will be added or modified accordingly	Satisfactory rubric form
4. The curriculum is to be revised every five years based on the policy of the Commission on Higher Education Standards (CHES).	Evaluate and revise the curriculum every five years on a part of - Satisfaction of employer or those who hire graduates - 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 1.1 : Academic (Research only)

(1) Holding a Bachelor's degree in Medicine, Veterinary Medicine, Dentistry or Biomedical Science.

(2) Holding a Bachelor's degree in Biomedical Science. Applicants must have a minimum of one publication in an international journal or of one patent or have passed minimum of 6 credits with at least a B grade in pathology or pathobiology course such as molecular pathology, cellular pathology, general pathology and systemic pathology.

(3) Other requirements shall follow those that specified by the Faculty of Graduate Studies

(4) Qualifications different from 3) may be considered by the Program Administrative Committee and the Dean of the Faculty of Graduate Studies.

Plan 1.2 : Academic (Course work and research)

(1) Holding a Bachelor's degree or equivalent in Biology, Biological Science, Dental Surgery, Medicine, Medical Science, Medical Technology, Microbiology, Pharmacy, Veterinary Medicine, Public Heath, Nurse or other related fields.

(2) Other requirements shall follow those that specified by the Faculty of Graduate Studies

(3) Qualifications different from (2) may be considered by the Program Administrative Committee and the Dean of the Faculty of Graduate Studies.

2.3 Problems of New Students

2.3.1 Students with no prior pathobiology/pathology training may have difficulty catching up to those with foundational knowledge.

2.3.2 Inadequate English proficiency

2.4 Strategies for Problem Solving from 2.3

Problems of New Students	Strategies for Problem Solving
Difficult for teaching and learning in class that mix between students who holding Bachelor's degree in Medicine, Veterinary Medicine, Dentistry or Biomedical Science who has passed at least 6 credits in pathology/pathobiology and other students who holding Bachelor's degree in basic science such as Biology	Separate class between students who holding a Bachelor's degree in Medicine, Veterinary Medicine, Dentistry or Biomedical Science who has passed at least 6 credits in pathology/pathobiology into Plan 1.1 while students who holding a Bachelor's degree in other programs into Plan 1.2.
Inadequate English proficiency	Students with poor English skills could be solved by 1) Enroll in the Graduate Studies Faculty's English listening, speaking, and comprehension courses. 2) Attend the English tutoring provided by program personnel.

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

Plan 1.1 : Academic (Research only)

Academic Year	2024	2025	2026	2027	2028
1st	3	3	3	3	3
2nd	-	3	3	3	3
Cumulative numbers	3	6	6	6	6
Expected number of students graduated	**-**	**3**	**3**	**3**	**3**

Plan 1.2 : Academic (Course work and research)

Academic Year	2024	2025	2026	2027	2028
1st	5	5	5	5	5
2nd	-	5	5	5	5
Cumulative numbers	5	10	10	10	10
Expected number of students graduated	**-**	**5**	**5**	**5**	**5**

2.6 Budget based on the plan

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

Estimated income per student in Plan 1.1 : Academic (Research only)

Registration fee		
Thesis 36 credits	xxxxx	Baht
Thesis research fee	xxxxx	Baht
Total income per student	xxxxx	**Baht**

Estimated expenses

Variable expenses per student		
Position allowance of thesis advisor and committee	xxxxx	Baht
Thesis research fee	xxxxx	Baht
Total variable expenses per student	xxxxx	**Baht**

Number of students at break-even point	1	persons
Cost of students at break-even point	204,000	Baht
Expenses per student per academic year	204,000	Baht

NOTE: Plan 1.1 Academic (Research only) is the program that serves the National policy and strategy framework on the strategy framework no. 4: Manpower development in the higher education to driving the economic and social development of the country in a leap forward and sustainably. Therefore, the research supplies fee including utility fee and equipment fee will be supported by major advisor who hold the research grant, Department of Pathobiology, Faculty of Science and Mahidol University. The staffs are supported by Mahidol University. The outputs of this Plan 1.1 produce manpower with master's degrees in science and the international publication.

Estimated income per student in Plan 1.2 : Academic (Course work and research)

Registration fee		
Tuition 24 credits (1,800 baht per credit)	xxxxx	Baht
Thesis 12 credits	xxxxx	Baht
Thesis research fee	xxxxx	Baht
Total income per student	xxxxx	**Baht**

Estimated expenses

Variable expenses per student		
Position allowance of thesis advisor and committee	xxxxx	Baht
Thesis research fee	xxxxx	Baht
Total variable expenses per student	xxxxx	**Baht**

Fixed expenses

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

Number of students at break-even point	1 persons
Cost of students at break-even point	208,000 Baht
Expenses per student per academic year	208,000 Baht

NOTE: The staffs are supported by Mahidol University.

2.7 Educational System: Classroom mode in the format of classroom, online and hybrid education

2.8 Transfer of Credits, Courses and Cross University Registration (If any)

Credits transferring must be in compliance with Mahidol University's regulations on Graduate Studies.

Curriculum and Instructors

3.1 Curriculum

3.1.1 Number of credits : not less than 36 credits

3.1.2 Curriculum Structure

The curriculum structure is set in compliance with the Announcement of The Commission on Higher Education Standards on the subject of Criteria and Standards of Graduate Studies 2022, Master's Degree, Plan 1.1 Academic (Research only) and Plan 1.2 Academic (Course work and research) as below:

Plan 1.1 : Academic (Research only)

Thesis	36 credits
Total not less than	**36 credits**

Plan 1.2 : Academic (Course work and research)

1) Required courses	15 credits
2) Elective courses not less than	9 credits
3) Thesis	12 credits
Total not less than	**36 credits**

3.1.3 Courses in the curriculum

(1) Plan 1.1 : Academic (Research only)

	Credits (lecture – practice – self-study)
SCPA 798* Thesis	36(0-108-0)
วทพย ๗๙๘ วิทยานิพนธ์	

หมายเหตุ * New course

(2) Plan 1.2 : Academic (Course work and research)

(1) Required Courses : 15 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	

Credits (lecture – practice – self-study)

SCPA	603	Histopathological Techniques for Routine and Research	2(1-2-3)
วทพย	๖๐๓	เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย	
SCPA	611	Seminar in Pathobiology I	1(1-0-2)
วทพย	๖๑๑	สัมมนาทางพยาธิชีววิทยา ๑	
SCPA	612	Seminar in Pathobiology II	1(1-0-2)
วทพย	๖๑๒	สัมมนาทางพยาธิชีววิทยา ๒	
SCPA	622	Molecular and Cellular Pathology	2(2-0-4)
วทพย	๖๒๒	พยาธิวิทยาระดับโมเลกุลและระดับเซลล์	
SCPA	623	Current Techniques for Pathobiological Research	2(1-2-3)
วทพย	๖๒๓	เทคนิคปัจจุบันสำหรับงานวิจัยทางพยาธิชีววิทยา	
SCID	518	Generic Skills in Science Research	1(1-0-2)
วทคร	๕๑๘	ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	

(2) Elective Courses not less than 9 credits

Credits (lecture – laboratory – self-study)

SCPA	604	Clinical Pathology	2(1-2-3)
วทพย	๖๐๔	พยาธิวิทยาคลินิค	
SCPA	606	Selected Topic in Pathobiology	2(1-2-3)
วทพย	๖๐๖	หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา	
SCPA	613	Research Rotation in Pathobiology	1(0-2-1)
วทพย	๖๑๓	การเวียนศึกษางานวิจัยทางพยาธิชีววิทยา	
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	

			Credits (lecture – laboratory – self-study)
SCID	508	Biomolecular and Spectroscopy Techniques	1(0-2-1)
วทคร	๕๐๘	เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	
SCID	509	Separation Techniques	1(0-2-1)
วทคร	๕๐๙	เทคนิคการแยกสาร	
SCID	510	Immunological Methods	1(0-2-1)
วทคร	๕๑๐	ระเบียบวิธีวิทยาภูมิคุ้มกัน	
SCID	511	Gene Technology	1(0-2-1)
วทคร	๕๑๑	เทคโนโลยีด้านยีน	
SCID	513	Animal Cell Culture Techniques	1(0-2-1)
วทคร	๕๑๓	เทคนิคการเพาะเลี้ยงเซลล์สัตว์	
SCID	514	Animal Experimentation in Biomedical Research	1(0-2-1)
วทคร	๕๑๔	การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์	
SCID	516	Biostatistics	3(3-0-6)
วทคร	๕๑๖	ชีวสถิติ	
GRID	521	Research Ethics	1(1-0-2)
บฑคร	๕๒๑	จริยธรรมการวิจัย	

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) Thesis 12 credits

			Credits (lecture – laboratory – self-study)
SCPA	698	Thesis	12(0-36-0)
วทพย	๖๙๘	วิทยานิพนธ์	

3.1.4 Research Project of the Program

Guidelines for conducting a research project are as follows:

(1) Infectious diseases

(2) Cancer, Aging and Stem cell

(3) Toxicological pathology

(4) 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.

GR means Faculty of Graduate Studies

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.

3 digits of number are 5XX, 6XX and 7XX indicate that the courses are in the graduate study level.

3.1.6 Study Plan

Plan 1.1 : Academic (Research only)

Year	Semester 1	Semester 2
1	SCPA 798 Thesis 9(0-27-0) Literature review and laboratory practice **Total 9 credits**	SCPA 798 Thesis 9(0-27-0) Proposal examination Lab progress report **Total 9 credits**
2	SCPA 798 Thesis 9(0-27-0) Lab progress report **Total 9 credits**	SCPA 798 Thesis 9(0-27-0) Manuscript preparation and submission Academic conferrence Thesis examination **Total 9 credits**

During program study, there are extracurricular activities such as Orientation for New student; Current student Meeting; Teacher's Day ceremony; Training for Biosafety and Biosecurity; Training for Chemical safety; Big Clening Day; Site visit to investigate on working at Institute, Company or Industry in the part of Science, Technology and Innovation; Be a teaching assistant to train undergraduate students on subjects related to pathobiology such as general pathology, systemic pathology and clinical pathology; Be a scientist assistant on

Workshop on routine and special techniques in pathobiology; Pathobiology Retreat to built up the relationship between students and staffs; SWOT analysis for students and staffs criticize the program and Department management; and Ceremony for Graduation.

Plan 1.2 : Academic (Course work and research)

Year	Semester 1	Semester 2
1	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 611 Seminar in Pathobiology I 1(1-0-2) SCPA 622 Molecular and Cellular Pathology 2(2-0-4) SCID 518 Generic Skills in Science Research 1(1-0-2) Elective course 3 credits **Total 13 credits**	SCPA 502 Systemic Pathology 2(1-2-3) SCPA 612 Seminar in Pathobiology II 1(1-0-2) SCPA 623 Current Techniques for Pathobiological Research 2(1-2-3) Elective course 6 credits **Total 11 credits**
2	SCPA 698 Thesis 9(0-27-0) Literature review and laboratory practice Proposal examination **Total 9 credits**	SCPA 698 Thesis 3(0-9-0) Academic conferrence Thesis examination **Total 3 credits**

During program study, there are extracurricular activities such as Orientation for New student; Current student Meeting; Teacher's Day ceremony; Training for Biosafety and Biosecurity; Training for Chemical safety; Big Clening Day; Site visit to investigate on working at Institute, Company or Industry in the part of Science, Technology and Innovation; Be a teaching assistant to train undergraduate students on subjects related to pathobiology such as general pathology, systemic pathology and clinical pathology; Be a scientist assistant on Workshop on routine and special techniques in pathobiology; Pathobiology Retreat to built up the relationship between students and staffs; SWOT analysis for students and staffs criticize the program and Department management; and Ceremony for Graduation.

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 xxx Associate 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
2.	x xxxx xxxxx xxx Associate Professor Dr. Nathawut Sibmooh	Ph.D. (Pharmacology) Mahidol University : 1999 M.D. (Medicine) Mahidol University : 2001 B.Sc. (Medical Science) Mahidol University : 1993	Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
3.	x xxxx xxxxx xxx Associate 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
4.	x xxxx xxxxx xxx Associate Professor Dr. Prasit Suwannalert	Ph.D. (Pathobiology)	Department of

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
		Mahidol University : 2010 M.Sc. (Medical Biochemistry) Khon Kaen University : 2006 B.Sc. (Medical Technology) Naresuan University : 2003	Pathobiology, Faculty of Science, Mahidol University
5.	x xxxx xxxxx xxx Assistant professor Dr. Witchuda Payuhakrit	Ph.D. (Pathobiology) Mahidol University : 2015 B.Sc. (Medical Technology) Walailuk University : 2007	Department of Pathobiology, Faculty of Science, Mahidol University
6.	x xxxx xxxxx xxx 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
7.	x xxxx xxxxx xxx 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

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
8.	x xxxx xxxxx xxx Lecturer Dr. Yaowarin Nakornpakdee	Ph.D. (Medical Microbiology) Khon Kaen University : 2018 M.Sc. (Medical Microbiology) Khon Kaen University : 2011 B.Sc. (Biology) Khon Kaen University: 2008	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 xxx Lecturer Dr. Titipatima Sakulterdkiat	M.D. (Medicine) 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 Details of Practicum

-None-

4 Thesis requirement

4.1 Short Description

Identifying research topic related to the field of pathobiology, developing research proposal related to the research groups in this program i.e., infectious diseases, cancer, aging, stem cell, toxicological pathology and genetic diseases, conducting the research

including research ethics, data collection, synthesis, analysis, interpretation of the result and research report, presenting and publishing research in the international peer-reviewed journal.

4.2 Standard Learning Outcomes

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

4.3 Time Frame

Plan 1.1 : Academic (Research only)

Semester 1 of the 1st Academic Year

Plan 1.2 : Academic (Course work and research)

Semester 1 of the 2nd Academic Year

4.4 Number of credits

Plan 1.1 : Academic (Research only)

36 Credits

Plan 1.2 : Academic (Course work and research)

12 Credits

4.5 Preparation

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

4.6 Evaluation Process

The research process shall be evaluated by the advisor of student's thesis 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 thesis 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 assitance 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 event sush as Student Orientation, Graduation Party, and Mahidol Open House Day. Most of these activities are yearly activites. Students will express their creative ideas, for example, event planning, ceremony, and decrorations. 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. Knowledge		
1.1 Describe principle and theory of pathobiology. 1.2 Be able to operate	1) Lecture, seminar, discuss or case studies 2) Group assignment	1) Examination 2) Quality report from seminar, assignment

Expected Outcome	Teaching Strategies	Evaluation Strategies
scientific instruments under standard protocol. 1.3 Apply knowledge in pathobiology for planning and conducting scientific research.	3) Laboratory practice 4) Academic visit 5) Thesis proposal, progress report and defense 6) Conference or seminar meeting	3) Presentation 4) Quality report from academic visit 5) Student evaluation
2. Skills 2.1 Create scientific research questions and integrate knowledge in pathobiology and related fields to develop experimental design and interpretation. 2.2 Solve scientific problems with logical thinking. 2.3 Discuss the basic knowledge and unknown knowledge to develop the hypothesis, develop the methods to prove the hypothesis, and compare the results to those of previously published publications. 2.4 Be able to determine appropriate statistical analysis for scientific research. 2.5 Utilize suitable information technology	1) Lecture, seminar, discuss or case studies 2) Group assignment 3) Laboratory practice 4) Academic visit 5) Thesis proposal, progress report and defense 6) Conference or seminar meeting	1) Examination 2) Quality report from seminar, assignment 3) Presentation 4) Quality report from academic visit 5) Student evaluation

Expected Outcome	Teaching Strategies	Evaluation Strategies
for a variety of applications. 2.6 Be able to communicate ideas and knowledge through written and oral presentations.		
3. Ethics 3.1 Be disciplinarian and punctuality. 3.2 Be honesty in academic and scientific works. 3.3 Be respectful of the rights of class members and instructors. 3.4 Follow the rules and regulations of the organization.	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
4. Character 4.1 Be competent as both a leader and a follower with reasonableness and implement the direction and problem solve. 4.2 Be able to work with others without anticipation of rewards and unity. 4.3 Perform academic study and activities as assigned and responsibility to social and environment.	1) Group participation 2) Group discussion 3) Group assignment 4) Thesis research progress report 5) Academic activity	1) Behavioral Observation 2) Quality report from seminar, assignment, thesis 3) Staffs and Student evaluation

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

3.1 Plan 1.1 : Academic (Research only)

(1) Students must achieve learning outcomes that meet graduate qualifications.

(2) Propose thesis to the committee appointed by the Faculty of Graduate Studies and to the public and pass oral thesis examination as the final stage.

(3) The complete or part of the thesis has to be published as a review article, accepted as an innovation, acknowledged as a creative product, or accepted as an academic article that can be searched.

(4) Other requirements shall follow those that specified by the Faculty of Graduate Studies.

3.2 Plan 1.2 : Academic (Course work and research)

(1) Students must complete their courses as stated in the curriculum with a minimum CUM-GPA of 3.00.

(2) Students must achieve learning outcomes that meet graduate qualifications.

(3) Propose thesis to the committee appointed by the Faculty of Graduate Studies and to the public and pass oral thesis examination as the final stage.

(4) The complete or part of the thesis has to be published as a review article, accepted as an innovation, acknowledged as a creative product, or accepted as an academic article that can be searched.

(5) Other requirements shall follow those that specified by the Faculty of Graduate Studies

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 new faculty number (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 Standard for Higher Education 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 Standard for Higher Education. 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 to improve curriculum reach to 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 Standard for Higher Education.

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 supports 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 advisors are direct responsibility of thesis committee. Program also monitors the overall process of the students monthly in program

administrative committee meeting. Moreover, program monitor the progress of thesis via a progress report on their research advancement every semester by using online monitoring tool offered by Faculty of Graduate Studies. Before graduation, external committee who has more experience in regarding field of research is invited for a chair in defense thesis examination to monitor the quality of graduate 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 submit 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 and expert individual within the specified field should meet the criteria and standards set by the Commission on Higher Education Standards (CHES).

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 the qualification standards set by the Commission on Higher Education Standards (CHES)

6. Learning Support

Program has 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 Master of Science 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				
	2024	2025	2026	2027	2028
1. At least 80% of all Faculty in Charge of the Program have to participate in meetings that set up plans to evaluate and revise the curriculum.	/	/	/	/	/

Key Performance Indicators	Academic Year				
	2024	2025	2026	2027	2028
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 (if any) has to participate in the 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.	/	/	/	/	/

Key Performance Indicators	Academic Year				
	2024	2025	2026	2027	2028
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 of 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

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, advice 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

Plan 1.1: Academic (Research only)

Credits (lecture – practice – self-study)

SCPA 798* **Thesis** **36(0-108-0)**

วทพย ๗๙๘ วิทยานิพนธ์

Conducting high-impact scientific research in pathobiology with an ethical conscience; writing research proposal, scientific report, dissertation, and publication without plagiarism and copyright infringement; presenting research project in an academic conference or meeting

ดำเนินการวิจัยทางวิทยาศาสตร์ในสาขาพยาธิชีววิทยาที่มีผลกระทบสูง ภายใต้จริยธรรมงานวิจัย เขียนโครงร่างวิจัย รายงานการวิจัยทางวิทยาศาสตร์ เล่มวิทยานิพนธ์และผลงานตีพิมพ์โดยปราศจากการคัดลอกผลงานและการละเมิดลิขสิทธิ์ นำเสนอโครงการวิจัยในการประชุมวิชาการ

หมายเหตุ * New course

Plan 1.2: Academic (Course work and Research)

(1) Required Courses

Credits (lecture – practice – self-study)

SCPA 501 **General Pathology** **2(1-2-3)**

วทพย ๕๐๑ พยาธิวิทยาทั่วไป

Basic mechanism and morphological changes due to cellular injury; cell death; cell adaptation; inflammation; reparinf and healing; immunopathology; infectious; genetic abnormality; and neoplasia

กลไกพื้นฐานและการเปลี่ยนแปลงรูปร่างเนื่องจากการบาดเจ็บของเซลล์ การตาย การปรับตัว การอักเสบ การหาย พยาธิวิทยาภูมิคุ้มกัน การติดเชื้อ ความผิดปกติทางพันธุกรรม และเนื้องอก

SCPA 502 **Systemic Pathology** **2(1-2-3)**

วทพย ๕๐๒ พยาธิวิทยาระบบ

Macroscopic and microscopic studies of pathological changes due to cell injury; inflammation; neoplasia; immunological deficiency; infectious; and other diseases affecting various systems of the human body

การเปลี่ยนแปลงทางพยาธิสภาพทั้งทางมหภาคและจุลภาคของอวัยวะในร่างกายมนุษย์จากสาเหตุการบาดเจ็บของเซลล์ การอักเสบ การเป็นเนื้องอก มีภาวะภูมิคุ้มกันบกพร่อง การติดเชื้อ และโรคอื่นๆ ในระบบต่างๆ ของร่างกาย

Credits (lecture – practice – self-study)

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

วทพย ๖๐๒ 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

โครงสร้างและการจัดเรียงของออร์กาเนล เซลล์ เนื้อเยื่อและอวัยวะ ความสัมพันธ์ระหว่างโครงสร้างและหน้าที่ของเนื้อเยื่อบุผิว เนื้อเยื่อเกี่ยวพัน กล้ามเนื้อ กระดูก เลือด ระบบห่อหุ้มร่างกาย ระบบหัวใจและหลอดเลือด 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, and photomicrography

เทคนิคทั่วไปที่ใช้ในงานประจำทางด้านจุลพยาธิชีววิทยา การคัดเลือกและเตรียมตัวอย่างเนื้อเยื่อ เทคนิคพาราฟิน การย้อมสี เทคนิคเพิ่มเติมสำหรับงานวิจัย การตัดย้อมเนื้อเยื่อสภาวะแช่แข็ง การย้อมทางอิมมูโนวิทยา การถ่ายภาพจากกล้องจุลทรรศน์

SCPA 611 Seminar in Pathobiology I 1(1-0-2)

วทพย ๖๑๑ สัมมนาทางพยาธิชีววิทยา ๑

Presentation of research article in pathobiology or related fields including research rational and problem, experimental approach, criticism of the result, statistical analysis, and research ethics, discussion and suggestion

นำเสนอบทความวิจัยทางพยาธิชีววิทยาหรือสาขาอื่นๆ ที่เกี่ยวข้อง ถึงที่มาประเด็นปัญหา วิธีการวิจัย วิพากษ์ผลการวิจัย การวิเคราะห์ข้อมูลทางสถิติและจรรณยาบรรณของงานวิจัย อภิปรายให้ข้อคิดเห็นและข้อเสนอแนะ

Credits (lecture – practice – self-study)

SCPA 612 Seminar in Pathobiology II 1(1-0-2)

วทพย ๖๑๒ สัมมนาทางพยาธิชีววิทยา ๒

Presentation of research article in pathobiology or related fields including research rational and problem, experimental approach, criticism of the result, statistical analysis, and research ethics, critical thinking, application and comment

นำเสนอบทความวิจัยทางพยาธิชีววิทยาหรือสาขาอื่นๆ ที่เกี่ยวข้อง โดยรายงานถึงที่มาประเด็นปัญหา วิธีการวิจัย วิพากษ์ผลการวิจัย การวิเคราะห์ข้อมูลทางสถิติและจรรณยาบรรณของงานวิจัย อภิปรายให้ข้อคิดเห็น วิเคราะห์ในเชิงลึก การประยุกต์และข้อเสนอแนะ

SCPA 622 Molecular and Cellular Pathology 2(2-0-4)

วทพย ๖๒๒ พยาธิวิทยาระดับโมเลกุลและระดับเซลล์

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

SCPA 623 Current Techniques for Pathobiological Research 2(1-2-3)

วทพย ๖๒๓ เทคนิคปัจจุบันสำหรับงานวิจัยทางพยาธิชีววิทยา

Experimental models for pathobiological research; advance techniques for research, the toxicity assay, the fluorescent technique, molecular pathology, proteomics, genome editing; the image analysis and the statistical analysis for pathobiology; research ethics in pathobiology

รูปแบบการทดลองในการวิจัยทางพยาธิชีววิทยา เทคนิคขั้นสูงสำหรับงานวิจัย การทดสอบความเป็นพิษ เทคนิคฟลูออเรสเซนต์ พยาธิวิทยาทางอณูชีวโมเลกุล โปรตีโอมิกส์ การปรับแต่งจีโนม การวิเคราะห์ภาพและการวิเคราะห์ทางสถิติในงานทางพยาธิชีววิทยา จริยธรรมงานวิจัยในพยาธิชีววิทยา

Credits (lecture – practice – self-study)

SCID 518 Generic Skills in Science Research 1(1-0-2)

วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์

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 จริยธรรมในการวิจัยในมนุษย์ และการทดลองสัตว์ในด้านวิทยาศาสตร์ สิทธิในทรัพย์สินทางปัญญา การกระทำผิด คุณลักษณะของความรับผิดชอบและการอ้างอิงผลงานวิจัย เทคนิคการสร้างและการเขียนโครงร่างโครงการวิจัย การเขียนขอทุนวิจัย การเขียนรายงานวิจัย และต้นฉบับเพื่อส่งตีพิมพ์

(2) Elective Courses

Credits (lecture – practice – self-study)

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

วทพย ๖๐๔ พยาธิวิทยาคลินิค

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

การตรวจทางห้องปฏิบัติการพยาธิวิทยาเพื่อการวินิจฉัยและการวิจัย การแปลผลในทางโลหิตวิทยา อิมมูโนวิทยา คลินิกคัลไมโครสโคปีและเคมีคลินิก

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

Credits (lecture – practice – self-study)

ความรู้พื้นฐานและทักษะทางพยาธิชีววิทยาในการศึกษาความผิดปกติที่เกิดในระบบต่างๆ ของร่างกายจากการตอบสนองสารที่เป็นพิษ การเปลี่ยนแปลงทางชีวเคมี รูปร่างทางกายวิภาคและจุลภาคของอวัยวะเป้าหมายที่สำคัญ การเลียนแบบธรรมชาติ ที่เกิดขึ้นในสัตว์หรือหลอดทดลอง ตรวจสอบเนื้อเยื่อและสารชีวภาพที่เปลี่ยนแปลงไป

SCPA 613 Research Rotation in Pathobiology 1(0-2-1)

วทพย ๖๑๓ การเวียนศึกษางานวิจัยทางพยาธิชีววิทยา

Yeast model system for studying human genetic diseases; bacterial genome editing; chimeric mouse model for Plasmodium infection; anatomical pathology; aquatic toxicopathology; pathophysiology of blood cells in thalassemia; photobiology and tissue repairing; hypoxia and cancer biology; tumor biology and innovative medicine; anticancer and immunotherapeutic agents in malignant melanoma

ระบบแบบจำลองยีสต์สำหรับศึกษาโรคทางพันธุกรรมของมนุษย์ การแก้ไขจีโนมของแบคทีเรีย แบบจำลองหนูทดลองสำหรับการศึกษาโรคติดเชื้อพลาสโมเดียม พยาธิวิทยาทางกายวิภาค พยาธิวิทยาของน้ำและสัตว์น้ำ พยาธิสรีรวิทยาของเม็ดเลือดในโรคธาลัสซีเมีย ชีววิทยาของโรคที่เกิดจากรังสีและการซ่อมแซมเนื้อเยื่อ ภาวะขาดออกซิเจนและชีววิทยาของมะเร็ง ชีววิทยาของเนื้องอกและการรักษาแบบใหม่ สารต้านมะเร็งและภูมิคุ้มกันบำบัดในมะเร็งผิวหนัง

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

Credits (lecture – practice – self-study)

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 วัฏจักรของเซลล์และการควบคุมการเปลี่ยนสภาพของเซลล์และมะเร็ง การส่งสัญญาณภายในเซลล์ การตอบสนองของเซลล์ต่อภาวะเครียด การบาดเจ็บ การชราและการตายของเซลล์ การปฏิสัมพันธ์ระหว่างเซลล์กับจุลชีพ การตอบสนองของระบบภูมิคุ้มกันของเซลล์ พยาธิกำเนิดในระดับโมเลกุลของโรคบางชนิด

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

วทคร 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 บูรณาของวิทยาศาสตร์ชีวภาพเชิงระบบ

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

วทคร ๕๐๖ หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล

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

ความรู้ทางชีวเคมีและชีวฟิสิกส์ของกระบวนการต่างๆ ในสิ่งมีชีวิต โครงสร้างและหน้าที่ของชีวโมเลกุล การสร้างและการใช้พลังงานในกระบวนการต่างๆ ของสิ่งมีชีวิต กระบวนการควบคุมและการแสดงออกของสารพันธุกรรม

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

วทคร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์

Structure and operation of light microscope, phase, dark field and differential interference contrast microscopes, confocal microscope, fluorescence

Credits (lecture – practice – self-study)

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 คอนทราสท์ กล้องคอนโฟคัล กล้องฟลูออเรสเซนต์ กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องผ่าน กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องกราด การเก็บตัวอย่าง การตรึง การตัดชิ้นเนื้อให้บาง การย้อมสีขั้นพื้นฐานและการย้อมสีเซลล์โดยใช้วิธีทางเคมีที่เกี่ยวกับวิทยาภูมิคุ้มกัน การตรวจสอบการถ่ายภาพและการแปลผลภาพ กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร ๕๐๘ เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี

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

สเปกโทรสโกปีชนิดดูดกลืนแสงและฟลูออเรสเซนท์ แมสสเปคโทรโสกปี สเปกโทรสโกปีชนิดนิวเคลียร์แมกเนติกเรโซแนนซ์ และสเปกโทรสโกปีทางชีวโมเลกุลคู่ กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร 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 ตามขนาด รูปร่าง ประจุ และสถานะ โดยใช้วิธีการหมุนเหวี่ยง โครมาโทกราฟี การเคลื่อนย้ายสู่ขั้วไฟฟ้า และการแยกสารผ่านเยื่อ กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร 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

Credits (lecture – practice – self-study)

preparation; flow cytometry and cell sorting; laboratory rules and regulations

หลักการพื้นฐานและการประยุกต์ระเบียบวิธีทางวิทยาภูมิคุ้มกัน เอนไซม์ลิงค์อิมมูนโนสอร์เบนท์ เอสดีเอส-เพจ และ การทำอิมมูนโนบลอท การทำอิมมูนโนฟลูโอเรสเซน ตรงและอ้อม การทำอิมมูนโนอิเล็กตรอนไมโครสโคปี การทำอิมมูนโนพรีซิพพิเทชั่น ปฏิบัติการเตรียมเซลล์นิวเคลียสเดี่ยวจากเลือด ปฏิบัติการโฟลไซโตเมททรี และ การแยกเซลล์ กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร 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 โครงการทดลองย่อยที่เกี่ยวข้องกับกรดนิวคลิอิกและโปรตีน การประเมินคุณภาพของข้อมูลจากผลการทดลอง กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร 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

เทคนิคขั้นพื้นฐานในการเพาะเลี้ยงเซลล์ชนิดที่เจริญแบบเกาะติดและที่เจริญแบบไม่เกาะติด การเพาะเลี้ยงเซลล์สัตว์ในปริมาณสูง การขยายพันธุ์เซลล์ การเจริญของเซลล์และการคงสภาพสายพันธุ์เซลล์ การถนอมเซลล์โดยใช้ความเย็น และการตรวจเซลล์ที่รอดชีวิตหลังแช่แข็ง ผลของตัวแปรบางอย่างต่อการเจริญของสายพันธุ์เซลล์แบบไม่เกาะติด กฎและระเบียบการใช้ห้องปฏิบัติการ

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

วทคร ๕๑๔ การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์

Ethics on animal experimentation; selection of animal model; standard animal care; basic techniques for animal experimentation; special techniques in animal

Credits (lecture – practice – self-study)

experiments; laboratory rules and regulations

จริยธรรมการทดลองโดยใช้สัตว์ การเลือกรูปแบบสัตว์ มาตรฐานการดูแลสัตว์ เทคนิคพื้นฐานสำหรับการทดลองที่ใช้สัตว์ เทคนิคพิเศษในการทดลองในสัตว์ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 516 Biostatistics 3(3-0-6)

วทคร ๕๑๖ ชีวสถิติ

Scientific methods and biostatistical analysis; principles and application of statistical methods to design experimental protocols and analyse data; probability distributions; estimation; hypothesis testing; chi-square test and analysis of frequencies; regression and correlation analysis; analysis of variance; analysis of covariance; probit analysis; non-parametric statistics; use of statistical packages

ระเบียบวิธีวิทยาศาสตร์และการวิเคราะห์ข้อมูลเชิงชีวสถิติ หลักการทางสถิติเพื่อประยุกต์ในการวางแผนและวิเคราะห์ข้อมูลที่ได้จากการทดลอง การแจกแจงความน่าจะเป็น การประมาณค่า การทดสอบสมมุติฐาน การทดสอบด้วยไคกำลังสองและการวิเคราะห์ความถี่ การวิเคราะห์การถดถอยและสหสัมพันธ์ การวิเคราะห์ความแปรปรวน การวิเคราะห์ความแปรปรวนร่วมเกี่ยว การวิเคราะห์การเบี่ยงเบนของเส้นโค้งปรกติ สถิติศาสตร์ไม่อิงพารามิเตอร์ และการใช้โปรแกรมสำเร็จรูปสถิติ

GRID 521 Research Ethics 1(1-0-2)

บฑคร ๕๒๑ จริยธรรมการวิจัย

Regulations of research ethics; principle of ethics in human research; participant recruitment and informed consent process; vulnerability group and additional safeguard; privacy protection and confidential assurance; authorship; responsibilities of authorship; components of publishable research; process for review of manuscripts; responsible conduct of reviewer and editors; errata in previous research; research misconducts; responsible conduct of research and participation; conflict of interest; research management; intellectual property; data acquisition and record keeping; data processing and responsible conduct; data ownership and control; data retention and storage; data access and sharing; plagiarism

หลักเกณฑ์จริยธรรมการวิจัย หลักการจริยธรรมการวิจัยในคน การรับเข้าเป็นอาสาสมัครและกระบวนการบอกกล่าวเพื่อขอความยินยอม กลุ่มเปราะบางและการปกป้องเพิ่มเติม การปกป้องการเป็นส่วนตัว และการประกันความลับ ความเป็นผู้นิพนธ์ในผลงานตีพิมพ์ ประเด็นต่างๆ ที่เกี่ยวกับผู้ที่มีคุณสมบัติเป็นผู้นิพนธ์ความรับผิดชอบของผู้นิพนธ์ องค์ประกอบของผลงานวิจัยเพื่อตีพิมพ์ กระบวนการการประเมินผลงานโดยผู้เชี่ยวชาญ ความรับผิดชอบของผู้ประเมินและบรรณาธิการวารสาร การเผยแพร่ผลงานซ้ำหรือผลงาน

Credits (lecture – practice – self-study)

ที่ผิดพลาด การประพฤติมิชอบด้านการวิจัย ความรับผิดชอบของผู้วิจัยและการมีส่วนร่วม ผลประโยชน์ทับซ้อน การร้องเรียน การบริหารงานวิจัย ทรัพย์สินทางปัญญา การควบคุมความถูกต้องของข้อมูล กระบวนการเก็บรวบรวมข้อมูล การประมวลผลข้อมูลและความรับผิดชอบ ความเป็นเจ้าของข้อมูลและการควบคุม การเก็บรักษาข้อมูล การนำข้อมูลมาใช้ การเข้าถึงและการใช้ข้อมูลร่วมกัน การลอกเลียนโดยมิชอบ

(3) Thesis

Credits (lecture – practice – self-study)

SCPA 698 Thesis 12(0-36-0)

วทพย ๖๙๘ วิทยานิพนธ์

Conducting scientific research in pathobiology under ethical concern; writing research proposal, scientific report and thesis book without plagiarism and copyright infringement; presenting research project in an academic conference or meeting

ดำเนินการวิจัยทางวิทยาศาสตร์ในสาขาพยาธิชีววิทยาภายใต้จริยธรรมงานวิจัย เขียนโครงร่างวิจัย รายงานการวิจัยทางวิทยาศาสตร์ และเล่มวิทยานิพนธ์โดยปราศจากการคัดลอกผลงานและการละเมิดลิขสิทธิ์ นำเสนอโครงการวิจัยในการประชุมวิชาการ

Appendix B

Curriculum Vitae of the Faculty in Charge of the Program

Appendix B

Curriculum Vitae of the Faculty in Charge of the Program

Full time instructors of the Curriculum

1. Name: Associate 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

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	Thosapornvichai T, Huangteerakul C, **Jensen AN**, Jensen LT. Mitochondrial dysfunction from malathion and chlorpyrifos exposure is associated with degeneration of GABAergic neurons in Caenorhabditis elegans. Environ Toxicol Pharmacol. 2022;96:104000.	12/1	2022

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Huangteerakul C, Aung HM, Thosapornvichai T, Duangkaew M, **Jensen AN**, Sukrong S, Ingkaninan K, Jensen LT. Chemical-genetic interactions of bacopa monnieri constituents in cells deficient for the dna repair endonuclease RAD1 appear linked to vacuolar disruption. Molecules. 2021; 26(5):1207.	12/1	2021
Published research work	Jain A, Nilatawong P, Mamak N, Jensen LT, **Jensen AN**. Disruption in iron homeostasis and impaired activity of iron-sulfur cluster containing proteins in the yeast model of Shwachman-Diamond syndrome. Cell Biosci. 2020;10: 105.	12/1	2020

Current Teaching Load

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 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)
SCPA 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)
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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
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)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

2. Name: Associate Professor Dr. Nathawut Sibmooh

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Pharmacology	Mahidol University	1999
M.D.	Medicine	Mahidol University	2001
B.Sc.	Medical Science	Mahidol University	1993

Affiliation: Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand

Interesting Research Topics or Specialties

1. Nitric oxide
2. Platelet and vascular biology
3. 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	Srihirun S, Sriwantana T, Srichatrapimuk S, Vivithanaporn P, Kirdlarp S, Sungkanuparph S, Phusanti S, Nanthatanti N, Suwannalert P, **Sibmooh N**. Increased platelet activation and lower platelet-monocyte aggregates in COVID-19 patients with severe pneumonia. PLoS One. 2023;18:e0282785.	12/1	2023

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Thongin S, Den-Udom T, Uppakara K, Sriwantana T, **Sibmooh N**, Laolob T, Boonthip C, Wichai U, Muta K, Ketsawatsomkron P. Beneficial effects of capsaicin and dihydrocapsaicin on endothelial inflammation, nitric oxide production and antioxidant activity. Biomed Pharmacother. 2022;154:113521.	12/1	2022
Published research work	Sasiprapha T, Pussadhamma B, **Sibmooh N,** Sriwantana T, Pienvichit P, Chuncharunee S, Yingchoncharoen T. Efficacy and safety of inhaled nitrite in addition to sildenafil in thalassemia patients with pulmonary hypertension: a 12- week randomized, double-blind placebo-controlled clinical trial. Nitric Oxide. 2022;120:38-43.	12/1	2022
Published research work	Uttarawichien T, Khumsri W, Suwannalert P, **Sibmooh N,** Payuhakrit W. Onion peel extract inhibits cancer cell growth and progression through the roles of L1CAM, NF-κB, and angiogenesis in HT-29 colorectal cancer cells. Prev Nutr Food Sci. 2021;26(3):330-7.	12/1	2021
Published research work	Uttarawichien T, Kamnerdnond C, Inwisai T, Suwannalert P, **Sibmooh N,** Payuhakrit W. Quercetin inhibits colorectal cancer cells induced-angiogenesis in both colorectal cancer cell and endothelial cell through downregulation of VEGF-A/VEGFR2. Sci Pharm. 2021;89(2):23.	12/1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Lumbikananda S, Sriwantana T, Rattanawonsakul K, Parakaw T, Phruksaniyom C, Rattanasuwan K, Vivithanaporn P, Thonabulsombat C, **Sibmooh N,** Srihirun S. Nitrite in paraffin-stimulated saliva correlates with blood nitrite. Nitric Oxide. 2021;116:1-6.	12/1	2021
Published research work	Yubolphan R, Phuagkhaopong S, Sangpairoj K, **Sibmooh N**, Power C, Vivithanaporn P. Intracellular nickel accumulation induces apoptosis and cell cycle arrest in human astrocytic cells. Metallomics. 2021;13(1):mfaa006.	12/1	2021
Published research work	Sriboonyong T, Kawamatawong T, Sriwantana T, Srihirun S, Titapiwatanakun V, Vivithanaporn P, Pornsuriyasak P, **Sibmooh N**, Kamalaporn H. Efficacy and safety of inhaled nebulized sodium nitrite in asthmatic patients. Pulm Pharmacol Ther. 2021;66:101984.	12/1	2021
Published research work	Lumbikananda S, Sriwantana T, Rattanawonsakul K, Parakaw T, Phruksaniyon C, Rattanasuwan K, Vivithanaporn P, Thonabulsombat C, **Sibmooh N**, Srihirun S. Nitrite in paraffin-stimulated saliva correlates with blood nitrite. Nitric Oxide. 2021;116:1-6.	12/1	2021
Published research work	Aekthammarat D, Tangsucharit P, Pannangpetch P, Sriwantana T, **Sibmooh**	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	N. Moringa oleifera leaf extract enhances endothelial nitric oxide production leading to relaxation of resistance artery and lowering of arterial blood pressure. Biomed Pharmacother. 2020;130:110605.		
Published research work	Chamchoi A, Srihirun S, Paiboonsukwong K, Sriwantana T, Kongkaew P, Fucharoen S, Pattanapanyasat K, **Sibmooh N**. Hemoglobin-bound platelets correlate with the increased platelet activity in hemoglobin E/β-thalassemia. Int J Lab Hematol. 2020;42(5):518-25.	12/1	2020

Current Teaching Load

SCPA 698 Thesis 12(0-36-0)

SCPA 798 Thesis 36(0-108-0)

Assigned Teaching Load for the Proposed Program

SCPA 698 Thesis 12(0-36-0)

SCPA 798 Thesis 36(0-108-0)

3. Name Associate 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	Chumworathayee W, Munkongdee T, Buasuwan N, **Chaichompoo P**, Svasti S (corresponding author). Diagnosis of α-thalassaemia by colorimetric gap loop mediated isothermal amplification. Sci Rep. 2023;13(1):9612 (pp. 1 - 8).	12/1	2023
Published research work	Siriworadetkun S, Thiengtavor C, Thubthed R, Paiboonsukwong K, Fucharoen S,	12/1	2023

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Pattanapanyasat K, Vadolas J, Svasti S, **Chaichompoo P**. A comprehensive study of immune function and immunophenotyping of white blood cells from β-thalassaemia/HbE patients on hydroxyurea supports the safety of the drug. Br J Haematol. 2023;200(3):367-376.		
Published research work	**Chaichompoo P**, Svasti S, Smith DR. The roles of mitophagy and autophagy in ineffective erythropoiesis in β-thalassemia. Int J Mol Sci. 2022;23(18):10811.	12/1	2022
Published research work	**Chaichompoo P**, Nithipongvanitch R, Kheansaard W, Tubsuwan A, Srinoun K, Vadolas J, Fucharoen S, Smith DR, Winichagoon P, Svasti S. Increased autophagy leads to decreased apoptosis during β-thalassaemic mouse and patient erythropoiesis. Sci Rep. 2022;12(1):18628 (pp. 1- 13).	12/1	2022
Published research work	Thubthed R, Siriworadetkun S, Paiboonsukwong K, Fucharoen S, Pattanapanyasat K, Vadolas J, Svasti S, **Chaichompoo P**. Impaired neutrophil extracellular trap formation in β-thalassaemia/HbE. Sci Rep. 2022;12:1967.	12/1	2022
Published research work	Nuamsee K, Chuprajob T, Pabuprapap W, Jintaridth P, Munkongdee T, Phannasil P, Vadolas J, **Chaichompoo P**, Suksamrarn A, Svasti S. Trienone analogs of	12/1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	curcuminoids induce fetal hemoglobin synthesis via demethylation at Gγ-globin gene promoter. Sci Rep. 2021;11:8552.		
Published research work	Siriworadetkun, S., Thubthed, R., Thiengtavor, C., Paiboonsukwong, K., Khuhapinant, A., Fucharoen, S., Pattanapanyasat, K., Vadolas, J., Svasti, S. and **Chaichompoo, P**. Elevated levels of circulating monocytic myeloid derived suppressor cells in splenectomised β-thalassaemia/HbE patients. Br. J. Haematol. 2020;191:e72-e76.	12/1	2020
Published research work	Thiengtavor C, Siriworadetkun S, Paiboonsukwong K, Fucharoen S, Pattanapanyasat K, Vadolas J, Svasti S, **Chaichompoo P.** Increased ferritin levels in non-transfusion-dependent β°-thalassaemia/HbE are associated with reduced CXCR2 expression and neutrophil migration. Br J Haematol. 2020;189(1):187-198.	12/1	2020

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 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 607	Pathobiology and Mechanisms of Cancer	2(2-0-4)

SCPA 609	Systems Immunology	1(1-0-2)
SCPA 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

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 609	Systems Immunology	1(1-0-2)
SCPA 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

4. 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. Pathobiology
2. Free Radicals and Oxidative Stress
3. Cancer Biology
4. 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	Aimvijarn P, Payuhakrit W, Charoenchon N, Okada S, **Suwannalert P.** Riceberry rice germination and uvb radiation enhance protocatechuic acid and vanillic acid to reduce cellular oxidative stress and suppress B16F10 melanogenesis relating to F-actin rearrangement. Plants. 2023; 12(3):484.	12/1	2023

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Muangthong T, Chusangnin P, Hassametto A, Tanomrat R, **Suwannalert P.** Thioredoxin reductase-1 as a potential biomarker in fibroblast-associated HCT116 cancer cell progression and dissemination in a zebrafish model. Cancers (Basel). 2022;15(1):56.	12/1	2023
Published research work	Naktubtim C, Payuhakrit W, Uttarawichien T, Hassametto A, **Suwannalert P**. YAP, a novel target regulates F-actin rearrangement-associated CAFs transformation and promotes colorectal cancer cell progression. Biomed Pharmacother. 2022;155:113757.	12/1	2022
Published research work	Palipoch S, Punsawad C, Koomhin P, Na-Ek P, Poonsawat W, Kimseng R, Chotipong P, Bunluepuech K, Yusakul G, **Suwannalert P.** *Aqueous Thunbergia* laurifolia leaf extract alleviates paraquat-induced lung injury in rats by inhibiting oxidative stress and inflammation. BMC Complement Med Ther. 2022;22(1):83.	12/1	2022
Published research work	Povichit N, Muangthong T, Aimvijarn P, **Suwannalert P**. Green curmin reduces pro-inflammatory cytokines and fibroblast-associated colon cancer migration. Pharm Sci. 2021;27(4): 528-535.	12/1	2021
Published research work	Uttarawichien T, Khumsri W, **Suwannalert P**, Sibmooh N, Payuhakrit W. Onion peel	12/1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	extract inhibits cancer cell growth and progression through the roles of L1CAM, NF-κB, and angiogenesis in HT-29 colorectal cancer cells. Prev Nutr Food Sci. 2021;26(3):330-337.		
Published research work	Uttarawichien T, Kamnerdnond C, Inwisai T, **Suwannalert P**, Sibmooh N, Payuhakrit W. Quercetin inhibits colorectal cancer cells induced-angiogenesis in both colorectal cancer cell and endothelial cell through downregulation of VEGF-A/VEGFR2. Sci. Pharm. 2021;89(2):23.	12/1	2021
Published research work	Wangkanai J, Kittawat P, Sakulrat S, Wongsagonsup R, Manop S, **Suwannalert P**, Somsak D. Study on effect of inductively coupled Ar/O2 plasma in E- and H-mode on riceberry rice by SEM/EDS. Solid State Phenomena. 2020;302:149-157.	12/1	2020
Published research work	Rodboon T, Sirilun S, Okada S, Kariya R, Chontananarth T, **Suwannalert P.** Modified riceberry rice extract suppresses melanogenesis-associated cell differentiation through tyrosinase-mediated MITF downregulation on B16 cells and in vivo zebrafish embryos. Res. Pharm. Sci. 2020;15(5):491-502.	12/1	2020
Published research work	Rodboon T, Palipoch S, Okada S, Charoenchon N, Nakornpakdee Y, **Suwannalert P**.	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Oxyresveratol inhibits cellular tyrosinase-related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci. 2020;10(4):8-13.		
Published research work	Rodboon T, Okada S, **Suwannalert P.** Germinated riceberry rice enhanced protocatechuic acid and vanillic acid to suppress melanogenesis throuth cellular oxidant-related tyrosinase activity in B16 cells. Antioxidants. 2020;9(3):247.	12/1	2020
Published research work	Panichakul T, Rodboon T, **Suwannalert P,** Tripetch C, Rungruang R, Boohuad N, Youdee P. Additive effect of a combination of Artocarpus akoocha and Glycyrrhiza glabra extracts on tyrosinase inhibition in melanoma B16 cells. Pharmaceut. 2020;13:310.	12/1	2020

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)
SCID 500	Cell and Molecular Biology	3(3-0-6)

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)
SCID 500	Cell and Molecular Biology	3(3-0-6)

5. Name Assistant Professor 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 *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Aimvijarn P, **Payuhakrit W**, Charoenchon N, Okada S, Suwannalert P. Riceberry Rice Germination and UVB Radiation Enhance Protocatechuic Acid and Vanillic Acid to Reduce Cellular Oxidative Stress and Suppress B16F10 Melanogenesis Relating to F-Actin Rearrangement. Plants. 2023;12(3):484.	12/1	2023
Published research work	Asasutjarit R, Leenabanchong C, Theeramunkong S, Fristiohady A, Yimsoo T, **Payuhakrit W**, Sukatta U, Fuongfuchat A. Formulation	12/1	2023

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	optimization of sterilized xanthones-loaded nanoemulgels and evaluation of their wound healing activities. Int J Pharm. 2023;636:122812.		
Published research work	Naktubtim C, **Payuhakrit W**, Uttarawichien T, Hassametto A, Suwannalert P. YAP, a novel target regulates F-actin rearrangement-associated CAFs transformation and promotes colorectal cancer cell progression. Biomed Pharmacother. 2022;155:113757.	12/1	2022
Published research work	Uttarawichien T, Khumsri W, Suwannalert P, Sibmooh N, **Payuhakrit W.** Onion peel extract inhibits cancer cell growth and progression through the roles of L1CAM, NF-κB, and angiogenesis in HT-29 colorectal cancer cells. Prev Nutr Food Sci. 2021;26(3):330-337.	12/1	2021
Published research work	Uttarawichien T, Kamnerdnond C, Inwisai T, Suwannalert P, Sibmooh N, **Payuhakrit W.** Quercetin inhibits colorectal cancer cells induced-angiogenesis in both colorectal cancer cell and endothelial cell through downregulation of VEGF-A/VEGFR2. Sci. Pharm. 2021;89(2):23.	12/1	2021

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

6. Name Lecturer Dr. Nisamanee 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	Aimvijarn P, Payuhakrit W, **Charoenchon N**, Okada S, Suwannalert P. Riceberry Rice Germination and UVB Radiation Enhance Protocatechuic Acid and Vanillic Acid to Reduce Cellular Oxidative Stress and Suppress B16F10 Melanogenesis Relating to F-Actin Rearrangement. Plants. 2023;12(3):484.	12/1	2023
Published research work	**Charoenchon N,** Rhodes LE, Nicolaou A, Williamson G, Watson REB, Farrar MD. Ultraviolet radiation-induced degradation of dermal	12/1	2022

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	extracellular matrix and protection by green tea catechins: a randomised controlled trial. Clin Exp Dermatol. 2022;47(7):1314-1323.		
Published research work	Le Coz M, Aktary Z, Watanabe N, Yajima I, Pouteaux M, **Charoenchon N,** Motohashi T, Kunisada T, Corvelo A, Larue L. Targeted knockout of β-catenin in adult melanocyte stem cells using a mouse line, Dct::CreERT2, results in disrupted stem cell renewal and pigmentation Defects. J Invest Dermatol. 2021;141(5):1363-1366.e9.	12/1	2021
Published research work	**Charoenchon N**, Rhodes LE, Nicolaou A, Williamson G, Watson REB, Farrar MD. Ultraviolet radiation-induced degradation of dermal extracellular matrix and protection by green tea catechins: a randomised controlled trial. Clin Exp Dermatol. 2022;47(7):1314-1323.	12/1	2021
Published research work	Hamm M, Sohier P, Petit V, Raymond JH, Delmas V, Le Coz M, Gesbert F, Kenny C, Aktary Z, Pouteaux M, Rambow F, Sarasin A, **Charoenchon N**, Bellacosa A, Sanchez-del-Campo L, Mosteo L, Lauss M, Meijer D, Steingrimsson E, Jönsson GB, Cornell RA, Davidson I, Goding CR, Larue L. BRN2 is a non-canonical melanoma tumor-suppressor. Nat Commun. 2021;12(1):3707.	12/1	2021
Published research work	Rodboon T, Palipoch S, Okada S, **Charoenchon N** Nakornpakdee Y, Suwannalert P. Oxyresveratol inhibits cellular tyrosinase-	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci. 2020;10(4):8-13.		

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)

SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

7. 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	Samayoa-Reyes G, Flaherty SM, Wickham KS, Viera-Morilla S, Strauch PM, Roth A, Padrón L, Jackson CM, Meireles P, Calvo D, Roobsoong W, **Kangwanrangsan N,** Sattabongkot J, Reichard G, Lafuente-Monasterio MJ, Rochford R. Development of an ectopic huLiver model for Plasmodium liver stage infection. PLoS One. 2023;18(3):e0279144.	12/1	2023
Published research work	Sukkhee N, Mitparian T, Kanjanarakha T, SenaratS, **Kangwanrangsan N**, Kaneko G, Kettratad J.	12/1	2022

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Spermatozoon of the wild scalloped perchlet, *Ambassis nalua* (Hamilton, 1822): Ultrastructure and morphometric analysis. Vet Integr Sci. 2022;20(1):199-208.		
Published research work	Flannery EL, **Kangwanrangsan N**, Chuenchob V, Roobsoong W, Fishbaugher M, Zhou K, Billman ZP, Martinson T, Olsen TM, Schäfer C, Campo B, Murphy SC, Mikolajczak SA, Kappe SHI, Sattabongkot J. Plasmodium vivax latent liver infection is characterized by persistent hypnozoites, hypnozoite-derived schizonts, and time-dependent efficacy of primaquine. Mol Ther Methods Clin Dev. 2022;26:427-440.	12/1	2022
Published research work	Sankhuan D, Niramolyanun G, **Kangwanrangsan N,** Nakano M, Supaibulwatana K. Variation in terpenoids in leaves of Artemisia annua grown under different LED spectra resulting in diverse antimalarial activities against Plasmodium falciparum. BMC plant biology. 2022;22(1):128.	12/1	2022
Published research work	Palasai A, Na Lampang P, F. Gerald Plumley, Kettratad J, Senarat S, **Kangwanrangsan N,** Jiraungkoorskul W. Feeding apparatus, digestive system structure, and gut contents of Priapium fish, Neostethus lankesteri Regan 1916. Songklanakarin J. Sci. Technol. 2022;44(3):602-608.	12/1	2022

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chansela P, Potip B, Weerachayaphorn J, **Kangwanrangsan N,** Chukijrungroat N, Saengsirisuwan V. Morphological alteration of the pancreatic islet in ovariectomized rats fed a high-fat high-fructose diet. Histochem Cell Biol. 2022;157(4):427-442.	12/1	2022
Published research work	Mitparian T, Senarat S, Kettratad J, Jiraungkoorskul W, Kaneko G, **Kangwanrangsan N**, Ampawong S. Histological and ultrastructural characterization of the gonads of the grunting toadfish allenbatrachus grunniens (Linnaeus, 1758) from the Pranburi River Estuary, Thailand. Trends Sci. 2021;18(22):489.	12/1	2021
Published research work	Seephetdee C, Buasri N, Bhukhai K, Srisanga K, Manopwisedjaroen S, Lertjintanakit S, Phueakphud N, Pakiranay C, **Kangwanrangsan N**, Srichatrapimuk S, Kirdlarp S, Sungkanuparph S, Chutipongtanate S, Thitithanyanont A, Hongeng S, Wongtrakoongate P. Mice immunized with the vaccine candidate hexapro spike produce neutralizing antibodies against SARS-CoV-2. Vaccines. 2021;9:498.	12/1	2021
Published research work	Srisamai P, Srisamai P, Pankaew P, Sudtikoonaseth P, **Kangwanrangsan N**, Iamtham S,	12/1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Iamtham S, Jiraungkoorskul W. Cytotoxicity screening of anionic dye removal by bio-natural adsorbent: Egg shell and peanut shell. J Adv Vet Res. 2021;11(2):82-87		
Published research work	Sukkhee N, Mitparian T, Kanjanarakha T, Senarat S, Jiraungkoorskul W, **Kangwanrangsan N**, Kaneko G & Kettratad J Spermatogenic Ultrastructure of the Grunting Toadfish Allenbatrachus grunniens (Batrachoididae). J Ichthyol. 2021;61:467–475.	12/1	2021
Published research work	Yongkiettrakul S, Kolié F.R., Kongkasuriyachai D, Sattabongkot J, Nguitragool W, Nawattanapaibool N, Suansomjit C, Warit S, **Kangwanrangsan N,** Buates S. Validation of PfSNP-LAMP-lateral flow dipstick for detection of single nucleotide polymorphism associated with pyrimethamine resistance in *Plasmodium falciparum*. Diagnostics. 2020;10:948.	12/1	2020
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. A humanized mouse model for *Plasmodium vivax* to test interventions that block liver stage to	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	blood stage transition and blood stage infection. iScience. 2020;23(8):101381.		
Published research work	Palasai A, Senarat S, NaLampang P, **Kangwanrangsan N,** Jiraungkoorskul W, Siqueira-Silva DH, Kettratad J. Reproductive development of the priapium fish *Neostethus lankesteri* Regan, 1916 (Atheriniformes: Phallostethidae) from Pranburi river estuary, Thailand using the histological approach. Asia Pacific J Mol Biol Biotechnol. 2020;28(2):92-104.	12/1	2020

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)

SCPA 798	Thesis	36(0-108-0)

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 609	Systems Immunology	1(1-0-2)
SCPA 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

8. Name Lecturer 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	Krangvichian P, **Nakornpakdee Y**, Sangjun N, Komanee P, Techawiwattanaboon T, Patarakul K. Sublethal infection of C3H/HeNJ against *Leptospira interrogans* serovar Pomona. Acta Trop. 2023;238:106701.	12/1	2023
Published research work	Techawiwattanaboon T, Courant T, Brunner L, Sathean-Anan-Kun S, Krangvichian P, Iadsee N, **Nakornpakdee Y**, Sangjun N, Komanee P, Collin N, Ruxrungtham K. Designing adjuvant formulations to promote immunogenicity and protective efficacy of *Leptospira* immunoglobulin-like protein A subunit vaccine. Front Cell Infect Microbiol. 2022;12:918629.	12/1	2022

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. Oxyresveratrol inhibits cellular tyrosinase-related oxidative stress-induced melanogenesis in B16 melanoma cells. J Appl Pharm Sci. 2020;10(4):008-013.	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)
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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)

SCPA 622	Molecular and Cellular Pathology	2(2-0-4)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)
SCPA 698	Thesis	12(0-36-0)
SCPA 798	Thesis	36(0-108-0)

Curriculum Vitae of the Full Time Instructors

1. Name Lecturer Dr.Titipatima Sakulterdkiat

Education

Degree	Degree Name	Institute	Year of Graduation
M.D.	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	**Sakulterdkiat T**, Romphothong K, Chatchomchuan W, Nakasatien S, Krittiyawong S, Thewjitcharoen Y, Himathongkam T. Unilateral gynecomastia as an initial presentation of hyperthyroid Graves' disease. Endocrinol Diabetes Metab Case Rep. 2021;20:0140.	12, 1	2021

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 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	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 606	Selected Topic in Pathobiology	2(1-2-3)
SCPA 611	Seminar in Pathobiology I	1(1-0-2)
SCPA 612	Seminar in Pathobiology II	1(1-0-2)
SCPA 613	Research Rotation in Pathobiology	1(0-2-1)
SCPA 623	Current Techniques for Pathobiological Research	2(1-2-3)

Appendix C

Curriculum Mapping

Appendix C

Curriculum Mapping

● Major responsibility ○ Minor responsibility

Plan A1.1 : Academic (Research only)

Subjects	Knowledge			Skills						Ethics				Character		
	1	2	3	1	2	3	4	5	6	1	2	3	4	1	2	3
1. Thesis																
SCPA 798 Thesis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Plan A1.2 : Academic (Course work and research)

Subjects	Knowledge			Skills						Ethics				Character		
	1	2	3	1	2	3	4	5	6	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 611 Seminar in Pathobiology I	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 612 Seminar in Pathobiology II	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 622 Molecular and Cellular Pathology	●	●	●	●	●	○	○	○	○	○	○	○	○			
SCPA 623 Current Techniques for Pathobiological Research	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCID 518 Generic Skills in Science Research							●	●	●	●	●	●	●	●	●	●
2. Elective courses																
SCPA 604 Clinical Pathology	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 606 Selected Topic in Pathobiology	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SCPA 613 Research Rotation in Pathobiology						●	●	●	●							

Subjects	Knowledge			Skills						Ethics				Character		
	1	2	3	1	2	3	4	5	6	1	2	3	4	1	2	3
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 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. Thesis																
SCPA 698 Thesis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

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. Knowledge	
1.1 Describe principle and theory of pathobiology.	Mastery
1.2 Be able to operate scientific instruments under standard protocol.	Mastery
1.3 Apply knowledge in pathobiology for planning and conducting scientific research.	Mastery
2. Skills	
2.1 Create scientific research questions and integrate knowledge in pathobiology and related fields to develop experimental design and interpretation.	Originality
2.2 Solve scientific problems with logical thinking.	Determination
2.3 Discuss the basic knowledge and unknown knowledge to develop the hypothesis, develop the methods to prove the hypothesis, and compare the results to those of previously published publications.	Originality
2.4 Be able to determine appropriate statistical analysis for scientific research.	Mastery
2.5 Utilize suitable information technology for a variety of applications.	Mastery
2.6 Be able to communicate ideas and knowledge through written and oral presentations.	Mastery
3. Ethics	
3.1 Be disciplinarian and punctuality.	Integrity
3.2 Be honesty in academic and scientific works.	Integrity
3.3 Be respectful of the rights of class members and instructors.	Altruism

Learning Outcomes (as stated in Section 5, item no. 2)	Core value of Mahidol University
3.4 Follow the rules and regulations of the organization.	Harmony
4. Character	
4.1 Be competent as both a leader and a follower with reasonableness and implement the direction and problem solve.	Leadership
4.2 Be able to work with others without anticipation of rewards and unity.	Altruism
4.3 Perform academic study and activities as assigned and responsibility to social and environment.	Determination

Core value of Mahidol University is M; Mastery, A; Altruism, H; Harmony, I; Integrity, D; Determination, O; Originality, and L; Leadership.

Appendix D

Program Learning Outcomes

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
1. Possess the moral standards and ethics within academic and scientific works	1. Understand the theories related to the fields of pathobiology including pathogenesis, pathophysiology, anatomical pathology and histopathology in human diseases
2. Understand the theories related to the fields of pathobiology, self-directed and life-long learning	2. Possess proficiency in numerical analysis, formal and informal listening, speaking, reading, and writing, and the use of information technology for searching, collecting, processing, compiling, creating, analyzing, communicating, and presentation
3. Plan and analyze research experiments in the field of pathobiology and other related fields	3. Think critically, analyze and provide solutions to problems, and solve the problems
4. Work as a team in academic and research activities	4. Possess the moral standards and ethics within academic and scientific works
5. Select appropriate information technology for data searching, data analysis, and presentation in both academic setting and scientific research	5. Work effectively and responsibly as a team member and leader as well as on personal work, and maintain positive interpersonal relationships, altruism, harmony and a commitment to self-development

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

Objective of the Program	Program Learning Outcome*						
	PLO1	PLO2.1	PLO2.2	PLO2.3	PLO3	PLO4	PLO5
1. Understand the theories related to the fields of pathobiology including pathogenesis, pathophysiology, anatomical pathology and histopathology in human diseases	✓	✓	✓	✓			
2. Possess proficiency in numerical analysis, formal and informal listening, speaking, reading, and writing, and the use of information technology for searching, collecting, processing, compiling, creating, analyzing, communicating, and presentation		✓	✓	✓	✓		
3. Think critically, analyze and provide solutions to problems, and solve the problems				✓	✓		
4. Possess the moral standards and ethics within academic and scientific works						✓	
5. Work effectively and responsibly as a team member and leader as well as on personal work, and maintain positive interpersonal relationships, altruism, harmony and a commitment to self-development							✓

*PLOs;

PLO1: Explain the basis of anatomical pathology, histological technique and disease pathophysiology

PLO2: Show cognitive and intellectual ability skills including

PLO2.1: Interpretation and identify pathology at molecular, cellular and organ levels

PLO2.2: Apply basic knowledge on pathobiology to integrate basic science and clinical finding

PLO2.3: Create new research questions and use scientific methodology to discovery new knowledge or innovation that specific to the field such as thesis research proposal

PLO3: Demonstrate proficiency in critical thinking, scientific communication, numerical analysis, and the application of information technology

PLO4: Demonstrate correct use of scientific citations, accuracy in referencing, and avoid plagiarism

PLO5: Demonstrate leadership, altruism, harmony, awareness of social and environmental responsibility, good teamwork and responsibility on both individual and group assignments

Table 3: Relationships between standard domains of learning outcome and Program Learning Outcomes

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes						
		PLO 1	PLO 2.1	PLO 2.2	PLO 2.3	PLO 3	PLO 4	PLO 5
Knowledge	1.1 Describe principle and theory of pathobiology.	✓						
	1.2 Be able to operate scientific instruments under standard protocol.	✓						
	1.3 Apply knowledge in pathobiology for planning and conducting scientific research.	✓						
Skills	2.1 Create scientific research questions and integrate knowledge in pathobiology and related fields to develop experimental design and interpretation.		✓					
	2.2 Solve scientific problems with logical thinking.		✓	✓				
	2.3 Discuss the basic knowledge and unknown knowledge to develop the hypothesis, develop the methods to prove the hypothesis, and compare the results to those of previously published publications.			✓	✓			
	2.4 Be able to determine appropriate statistical analysis for scientific research.					✓		
	2.5 Utilize suitable information technology for a variety of					✓		

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes						
		PLO 1	PLO 2.1	PLO 2.2	PLO 2.3	PLO 3	PLO 4	PLO 5
	applications.							
	2.6 Be able to communicate ideas and knowledge through written and oral presentations.				✓	✓		
Ethics	3.1 Be disciplinarian and punctuality.						✓	
	3.2 Be honesty in academic and scientific works.						✓	
	3.3 Be respectful of the rights of class members and instructors.						✓	
	3.4 Follow the rules and regulations of the organization.						✓	
Character	4.1 Be competent as both a leader and a follower with reasonableness and implement the direction and problem solve.							✓
	4.2 Be able to work with others without anticipation of rewards and unity.							✓
	4.3 Perform academic study and activities as assigned and responsibility to social and environment.							✓

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

PLOs	Learning Method	Assessment
PLO1: Explain the basis of anatomical pathology, histological technique and disease pathophysiology	Lecture Laboratory practise Discussion Assignment	Short answer test Written test Practical test Presentation Rubric
PLO2.1: Interpretation and identify pathology at molecular, cellular and organ levels	Lecture Laboratory practise Discussion Assignment Team base learning	Short answer test Written test Practical test Presentation Rubric
PLO2.2: Apply basic knowledge on pathobiology to integrate basic science and clinical finding	Lecture Discussion Assignment Case study Team base learning	Written test Practical test Work assignment Presentation Rubric
PLO2.3: Create new research questions and use scientific methodology to discovery new knowledge or innovation that specific to the field such as thesis research proposal	Lecture Discussion Assignment Case study Research	Written test Practical test Work assignment Presentation Proposal Thesis examination Defense Thesis examination Rubric
PLO3: Demonstrate proficiency in critical thinking, scientific communication, numerical analysis, and the application of information technology	Lecture Discussion Assignment Case study Research	Written test Practical test Work assignment Presentation Proposal Thesis examination Defense Thesis examination Rubric

PLOs	Learning Method	Assessment
PLO4: Demonstrate correct use of scientific citations, accuracy in referencing, and avoid plagiarism	Lecture Discussion Assignment Case study Research	Written test Practical test Work assignment Presentation Proposal Thesis examination Defense Thesis examination Rubric
PLO5: Demonstrate leadership, altruism, harmony, awareness of social and environmental responsibility, good teamwork and responsibility on both individual and group assignments	Lecture Laboratory with others Discussion Assignment Team base learning Research Academic activity	Short answer test Written test Practical test Presentation Self evaluation and team evaluation Publication Rubric

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

Plan 1.1 : Academic (Research only)

Category	Code	Name	Credits	PLOs						
				1	2.1	2.2	2.3	3	4	5
Thesis	SCPA798	Thesis	2 (0-36-0)	M	M	M	M	M	M	M

Plan 1.2 : Academic (Course work and research)

Category	Code	Name	Credits	PLOs						
				1	2.1	2.2	2.3	3	4	5
Year 1 Semester 1										
Elective Course	SCID500	Cell and Molecular Biology	3(3-0-6)	I	I			I	I	I
Required Courses	SCPA622	Molecular and Cellular Pathology	2(2-0-4)	R	R	I	I	I		
Required Courses	SCPA602	Anatomical Basis for Pathological Study	2(1-2-3)	R	R	R				
Required Courses	SCPA603	Histopathologic al Techniques for Routine and Research	2(1-2-3)	P	P	P	R	R	R	R
Required Courses	SCPA501	General Pathology	2(1-2-3)	P	P	P	P			
Required Courses	SCID518	Generic Skills in Science Research	1(1-0-2)					R	R	R
Required Courses	SCPA611	Seminar in Pathobiology I	1(1-0-2)	P	P	P	P	P	P	P
Year 1 Semester 2										
Elective Course	SCID506	Concepts of Molecular Bioscience	2(2-0-4)	R	R				R	
Elective Course	SCID507	Microscopic Technique	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID508	Biomolecular and Spectroscopy	1(0-2-1)	P	P	P		P	P	P

Category	Code	Name	Credits	PLOs						
				1	2.1	2.2	2.3	3	4	5
		Techniques								
Elective Course	SCID509	Separation Techniques	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID510	Immunological Methods	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID511	Gene Technology	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID513	Animal Cell Culture Techniques	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID514	Animal Experimentation in Biomedical Research	1(0-2-1)	P	P	P		P	P	P
Elective Course	SCID516	Biostatistics	3(3-0-6)					P	P	P
Elective Course	GRID521	Research Ethics	1(1-0-2)					M	M	M
Required Courses	SCPA502	Systemic Pathology	2(1-2-3)	M	M	M	P	P	R	R
Required Courses	SCPA623	Current Techniques for Pathobiological Research	2(1-2-3)	M	M	M	P	P	P	M
Required Courses	SCPA612	Seminar in Pathobiology II	1(1-0-2)	M	M	M	P	P	M	M
Elective Course	SCPA604	Clinical Pathology	2(1-2-3)	M	M	M	P	P	M	M
Elective Course	SCPA613	Research Rotation in Pathobiology	1(0-2-1)				M	M		
Elective Course	SCID502	Cell Science	2(2-0-4)				M	M	M	M

Category	Code	Name	Credits	PLOs						
				1	2.1	2.2	2.3	3	4	5
Elective Course	SCID503	Systemic Bioscience	3(3-0-6)				M	M	M	M
Elective Course	SCPA606	Selected Topic in Pathobiology	2(1-2-3)	M	M	M	M	M	M	M
Year 2 Semester 1-2										
Thesis	SCPA698	Thesis	12(0-36-0)	M	M	M	M	M	M	M

I = ELO is introduced & assessed
P = ELO is practiced & assessed
R = ELO is reinforced & assessed
M = Level of Mastery is assessed

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

Plan 1.1 : Academic (Research only)

Year of study	Knowledge, skills, and any other expected learning outcomes	PLOs
1st	Develop a research question that has a significant impact on the field of pathobiology.	1, 2
	Acquire some preliminary results that can be used to demonstrate the concept of the hypothesis.	1, 2
2nd	Present or published scientific articles in pathobiology and related subjects.	1, 2, 3, 4, 5
	Demonstrate good teamwork and express roles in the workgroup	5

Plan 1.2 : Academic (Course work and research)

Year of study	Knowledge, skills, and any other expected learning outcomes	PLOs
1st	Apply basic knowledge in pathobiology and related subjects at molecular, cellular and organ levels and evaluate with clinical correlations.	1, 2
	Proper usage of scientific citations, English and information technology in communication.	3
2nd	Analyze new research question in pathobiological proposal.	1, 2, 3, 4
	Present or published scientific articles in pathobiology and related subjects.	1, 2, 3, 4, 5
	Demonstrate good teamwork and express roles in the workgroup	5

Appendix E

The Revised Curriculum

Appendix E

The Revision of Master of Science Program in Pathobiology

(International Program)

Volume 2021

Faculty of Science and Faculty of Graduate Studies,

Mahidol University

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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 596 meeting on September 20, 2023**

3. **The revised curriculum will be effective with student class 2024 from the 1st semester of the Academic Year 2024 onwards.**

4. **Rationale of revision**
   4.1 The curriculum is revised to align with the Thai Qualification Standard for Higher Education B.E 2565 and the mission of the university as stated in part 2: Academic and entrepreneurial education, Flagship 2.1: Flexible education and credit unit bank system, as well as part 1: Global research and innovation.
   4.2 The curriculum is amended on a regular basis to ensure that it remains current and relevant to new educational trends in higher education and to the needs of stakeholders. The analysis of survey data on interest in higher education from 79 students enrolled in B.Sc. Biomedical Sciences between 18 February and 1 March 2022 (unpublished) revealed that 77 percent of students are interested in studying in higher education at Mahidol University's Faculty of Science. 90% of those students express a significant interest in enrolling in the Plan 1.1 Academic (Research only) program.

5. The details of the revision

5.1 The Plan 1.1 : Academic (Research only) program is added.

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

Courses of the Current Program	Courses of the Revising Program	Remark
1. Required Courses (15 credits)	1. Required Courses (15 credits)	
SCPA 501 General Pathology 2(1-2-3) วทพย ๕๐๑ พยาธิวิทยาทั่วไป	SCPA 501 General Pathology 2(1-2-3) วทพย ๕๐๑ พยาธิวิทยาทั่วไป	No change
SCPA 502 Systemic Pathology 2(1-2-3) วทพย ๕๐๒ พยาธิวิทยาระบบ	SCPA 502 Systemic Pathology 2(1-2-3) วทพย ๕๐๒ พยาธิวิทยาระบบ	No change
SCPA 622 Molecular and Cellular Pathology 2(2-0-4) วทพย ๖๒๒ พยาธิวิทยาระดับโมเลกุลและระดับเซลล์	SCPA 622 Molecular and Cellular Pathology 2(2-0-4) วทพย ๖๒๒ พยาธิวิทยาระดับโมเลกุลและระดับเซลล์	No change
SCPA 623 Current Techniques for Pathobiological Research 2(1-2-3) วทพย ๖๒๓ เทคนิคปัจจุบันสำหรับงานวิจัยทางพยาธิชีววิทยา	SCPA 623 Current Techniques for Pathobiological Research 2(1-2-3) วทพย ๖๒๓ เทคนิคปัจจุบันสำหรับงานวิจัยทางพยาธิชีววิทยา	No change
SCPA 611 Seminar in Pathobiology I 1(1-0-2) วทพย ๖๑๑ สัมมนาทางพยาธิชีววิทยา ๑	SCPA 611 Seminar in Pathobiology I 1(1-0-2) วทพย ๖๑๑ สัมมนาทางพยาธิชีววิทยา ๑	No change
SCPA 612 Seminar in Pathobiology II 1(1-0-2) วทพย ๖๑๒ สัมมนาทางพยาธิชีววิทยา ๒	SCPA 612 Seminar in Pathobiology II 1(1-0-2) วทพย ๖๑๒ สัมมนาทางพยาธิชีววิทยา ๒	No change
SCID 518 Generic Skills in Science Research 1(1-0-2) วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	SCID 518 Generic Skills in Science Research 1(1-0-2) วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	No change
SCPA 602 Anatomical Basis for Pathological Study 2(1-2-3) วทพย ๖๐๒ พื้นฐานทางกายวิภาคสำหรับการศึกษาพยาธิวิทยา	SCPA 602 Anatomical Basis for Pathological Study 2(1-2-3) วทพย ๖๐๒ พื้นฐานทางกายวิภาคสำหรับการศึกษาพยาธิวิทยา	No change
SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3) วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย	SCPA 603 Histopathological Techniques for Routine and Research 2(1-2-3) วทพย ๖๐๓ เทคนิคทางจุลพยาธิวิทยาสำหรับงานประจำและงานวิจัย	No change

Courses of the Current Program	Courses of the Revising Program	Remark
2. Elective courses (9 credits)	**2. Elective courses (9 credits)**	**No change**
SCPA 604 Clinical Pathology 2(1-2-3) วทพย ๖๐๔ พยาธิวิทยาคลินิค	SCPA 604 Clinical Pathology 2(1-2-3) วทพย ๖๐๔ พยาธิวิทยาคลินิค	No change
SCPA 606 Selected Topic in Pathobiology 2(1-2-3) วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา	SCPA 606 Selected Topic in Pathobiology 2(1-2-3) วทพย ๖๐๖ หัวข้อเรื่องที่เลือกสรรทางพยาธิชีววิทยา	No change
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	No change
SCPA 613 Research Rotation in Pathobiology 1(0-2-1) วทพย ๖๑๓ การเวียนศึกษางานวิจัยทางพยาธิชีววิทยา	SCPA 613 Research Rotation in Pathobiology 1(0-2-1) วทพย ๖๑๓ การเวียนศึกษางานวิจัยทางพยาธิชีววิทยา	No change
SCID 502 Cell Science 2(2-0-4) วทคร ๕๐๒ วิทยาการเรื่องเซลล์	SCID 502 Cell Science 2(2-0-4) วทคร ๕๐๒ วิทยาการเรื่องเซลล์	No change
SCID 503 Systemic Bioscience 3(3-0-6) วทคร ๕๐๓ วิทยาศาสตร์ชีวภาพเชิงระบบ	SCID 503 Systemic Bioscience 3(3-0-6) วทคร ๕๐๓ วิทยาศาสตร์ชีวภาพเชิงระบบ	No change
SCID 506 Concepts of Molecular Bioscience 2(2-0-4) วทคร ๕๐๖ หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล	SCID 506 Concepts of Molecular Bioscience 2(2-0-4) วทคร ๕๐๖ หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล	No change
SCID 507 Microscopic Technique 1(0-2-1) วทคร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์	SCID 507 Microscopic Technique 1(0-2-1) วทคร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์	No change
SCID 508 Biomolecular and Spectroscopy Techniques 1(0-2-1) วทคร ๕๐๘ เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	SCID 508 Biomolecular and Spectroscopy Techniques 1(0-2-1) วทคร ๕๐๘ เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	No change
SCID 509 Separation Techniques 1(0-2-1) วทคร ๕๐๙ เทคนิคการแยกสาร	SCID 509 Separation Techniques 1(0-2-1) วทคร ๕๐๙ เทคนิคการแยกสาร	No change
SCID 510 Immunological Methods 1(0-2-1) วทคร ๕๑๐ ระเบียบวิธีวิทยาภูมิคุ้มกัน	SCID 510 Immunological Methods 1(0-2-1) วทคร ๕๑๐ ระเบียบวิธีวิทยาภูมิคุ้มกัน	No change
SCID 511 Gene Technology 1(0-2-1) วทคร ๕๑๑ เทคโนโลยีด้านยีน	SCID 511 Gene Technology 1(0-2-1) วทคร ๕๑๑ เทคโนโลยีด้านยีน	No change
SCID 512 Receptor Binding and Enzyme Kinetic Assay 1(0-2-1)	-	cancel

Courses of the Current Program	Courses of the Revising Program	Remark
วทคร ๕๑๒ การสอบปริมาณการจับตัวรับและเอนไซม์เชิงจลน์		
SCID 513 Animal Cell Culture Techniques 1(0-2-1) วทคร ๕๑๓ เทคนิคการเพาะเลี้ยงเซลล์สัตว์	SCID 513 Animal Cell Culture Techniques 1(0-2-1) วทคร ๕๑๓ เทคนิคการเพาะเลี้ยงเซลล์สัตว์	No change
SCID 514 Animal Experimentation in Biomedical Research 1(0-2-1) วทคร ๕๑๔ การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์	SCID 514 Animal Experimentation in Biomedical Research 1(0-2-1) วทคร ๕๑๔ การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์	No change
SCID 516 Biostatistics 3(3-0-6) วทคร ๕๑๖ ชีวสถิติ	SCID 516 Biostatistics 3(3-0-6) วทคร ๕๑๖ ชีวสถิติ	No change
GRID 521 Research Ethics 1(1-0-2) บทคร ๕๒๑ จริยธรรมการวิจัย	GRID 521 Research Ethics 1(1-0-2) บทคร ๕๒๑ จริยธรรมการวิจัย	No change
3. Thesis (12 credits)	**3. Thesis (12 credits)**	
SCPA 698 Thesis 12(0-36-0) วทพย ๖๙๘ วิทยานิพนธ์	SCPA 698 Thesis 12(0-36-0) วทพย ๖๙๘ วิทยานิพนธ์	No change
No the Academic (Research only) program	**4. Thesis (36 credits)**	
-	SCPA 798 Thesis 36(0-108-0) วทพย ๗๙๘ วิทยานิพนธ์	New course

5.2 Revised the list of the Faculty in Charge of the Program, Full time instructor of the curriculum

Current Program	Revising Program
The Faculty in Charge of the Program	**The Faculty in Charge of the Program**
Associate Professor Dr. Amornrat Naranuntarat Jensen	Associate Professor Dr. Amornrat Naranuntarat Jensen
Associate Professor Dr. Nathawut Sibmooh	-
Associate Professor Dr. Pornthip Chaichompoo	Associate Professor Dr. Pornthip Chaichompoo
Associate Professor Dr. Prasit Suwannalert	Associate Professor Dr. Prasit Suwannalert
Assistant Professor Dr. Witchuda Payuhakrit	Assistant Professor Dr. Witchuda Payuhakrit
-	Lecturer Dr.Niwat Kangwanrangsan
Full time instructors of the curriculum	**Full time instructors of the curriculum**
Associate Professor Dr.	Associate Professor Dr.

Amornrat Naranuntarat Jensen	Amornrat Naranuntarat Jensen
Associate Professor Dr. Nathawut Sibmooh	Associate Professor Dr. Nathawut Sibmooh
Associate Professor Dr. Pornthip Chaichompoo	Associate Professor Dr. Pornthip Chaichompoo
Associate Professor Dr. Prasit Suwannalert	Associate Professor Dr. Prasit Suwannalert
Assistant Professor Dr. Witchuda Payuhakrit	Assistant Professor Dr. Witchuda Payuhakrit
-	Lecturer Dr. Nisamanee Charoenchon
Lecturer Dr.Niwat Kangwanrangsan	Lecturer Dr.Niwat Kangwanrangsan
Lecturer Dr. Yaowarin Nakornpakdee	Lecturer Dr. Yaowarin Nakornpakdee

6. The Comparison Table of the Curriculum Structure between the Current Program and Revised Program Based on the Criteria and Standards of Graduate Studies Program B.E. 2565 (set by the Commission on Higher Education Standards, Ministry of Higher Education, Science, Research and Innovation)

6.1 Plan 1.1 Academic (Research only)

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2565	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required Course	-	-	-
2. Elective Course	-	-	-
3. Thesis	36	-	36
Total credits (not less than)	**36**	-	**36**

6.2 Plan 1.2 Academic (Course work and research)

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2565	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required Course	Not less than	15	15
2. Elective Course	12	not less than 9	not less than 9
3. Thesis	12	12	12
Total credits (not less than)	**36**	**36**	**36**