

Doctor of Philosophy Program in Anatomy and Structural Biology
(International Program)
Revised Program in 2022

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

Section 1 General Information

1. Curriculum Name

Thai : หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชากายวิภาคศาสตร์และชีววิทยาโครงสร้าง
(หลักสูตรนานาชาติ)
English : Doctor of Philosophy Program in Anatomy and Structural Biology
(International Program)

2. Name of Degree and Major

Full Title Thai : ปรัชญาดุษฎีบัณฑิต (กายวิภาคศาสตร์และชีววิทยาโครงสร้าง)
Abbreviation Thai : ปร.ด. (กายวิภาคศาสตร์และชีววิทยาโครงสร้าง)
Full Title English : Doctor of Philosophy (Anatomy and Structural Biology)
Abbreviation English : Ph.D. (Anatomy and Structural Biology)

3. Major Subjects : None

4. Required Credits:

4.1 Plan 1 : Research only

Plan 1.1 : For students with Master's degree: the number of credits to be studied throughout the program not less than 48 credits

4.2 Plan 2 : Courses work and Research

Plan 2.1 : For students with Master's degree

- For students with a Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields: the number of credits to be studied throughout the program not less than 48 credits

Plan 2.2 : For students with Bachelor's degree

- For students with Bachelor's degree, M.D., D.V.M., or D.D.S.: the number of credits to be studied throughout the program not less than 72 credits

5. Curriculum Characteristics

5.1 Curriculum type/model : Doctor's Degree

5.2 Language : English

5.3 Recruitment : Thai and international students

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

5.5 Graduate Degrees Offered to the Graduates : One degree

6. Curriculum Status and Curriculum Approval

6.1 Program: Revised Program in 2022

6.2 Starting in semester 1, academic year 2022 onwards

6.3 Curriculum screening committee approved the program in its meeting 13/2021 on 21 June, 2021 and meeting 33/2564 on 22 November, 2021

6.4 The Mahidol University Council approved the program in its meeting 577 on 23 February, 2022

7. Readiness to Implement/Promote the Curriculum

The curriculum from the program is readily implemented and promoted its quality and standard according to criteria set by Thai Qualification Framework for Higher Education in academic year 2025 (3 years after implementation).

8. Career Opportunities of the Graduates

8.1 Specialist or consultant in Anatomy and Structural Biology in University or Institutes

8.2 Researcher in Anatomy and Structural Biology and related biomedical fields

8.3 Knowledge transfer specialist in government or private companies

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.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Krai Meemon	Ph.D. (Anatomy), Mahidol University : 2004 B.Sc. (Physical Therapy) First Class Honor, Mahidol University : 1999	Department of Anatomy, Faculty of Science, Mahidol University
2.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Charoensri Thonabulsombat	Ph.D. (Animal Science and Reproductive Biology), Utah State University, USA : 1999 M.Sc. (Anatomy), Mahidol University : 1989 B.Sc. (Nursing), Mahidol University : 1984	Department of Anatomy, Faculty of Science, Mahidol University
3.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Kulathida Chaithirayanon	Ph.D. (Anatomy), Mahidol University : 2005 M.Sc. (Anatomy), Mahidol University : 2000 B.Sc. (Physical Therapy), Second Class Honor, Mahidol University : 1996	Department of Anatomy, Faculty of Science, Mahidol University
4.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Somluk Asuvapongpatana	Ph.D. (Anatomy), Mahidol University : 2000 M.Sc. (Anatomy), Mahidol University : 1993 B.N.S. (Nursing) First Class Honor, Mahidol University : 1991	Department of Anatomy, Faculty of Science, Mahidol University
5.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Wattana Weerachatanukul	Ph.D. (Anatomy), Mahidol University : 2002	Department of Anatomy,

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
		M.Sc. (Anatomy), Mahidol University : 1995 B.Sc. (Physical Therapy) Second Class Honor, Mahidol University : 1992	Faculty of Science, Mahidol University
6.	XXXXXXXXXXXXX Assistant Professor Dr. Morakot Sroyraya	Ph.D. (Anatomy and Structural Biology), Mahidol University : 2012 B.Sc. (Medical Technology), First Class Honor, Thammasat University : 2006	Department of Anatomy, Faculty of Science, Mahidol University

10. Venue for Instruction

Department of Anatomy, Faculty of Science, Mahidol University, Phayathai campus, Bangkok

11. External Factors to Be Considered in Curriculum Planning

11.1 Economic Situation/Development

The Thailand National Strategy (2561-2580) has been generated and pursued to ensure that the country achieves its vision of becoming “a developed country with security, prosperity and sustainability in accordance with the Sufficiency Economy Philosophy” with the ultimate goal being all Thai people’s happiness and well-being. The key goals of national development of the National Strategy are: A Secure Nation, Contented People, Continued Economic Growth, An Equal Society, and Sustainable Natural Resources.

Moreover, the vision of Ministry of Higher Education, Science, Research and Innovation (MHESRI) is to enhance capacities to promote sustainable and constraint economic development by the year 2580. It focuses on promoting the development of science, technology, research and innovation at the advanced level along with the development of highskilled workforce according to the need of the country.

Capacity constraints on enhancing Thailand's competitiveness in the past have been engaged with several factors such as the poor quality of people, a low investment in research and development for science, technology and innovation. Thailand is in a situation

where it is losing its advantage, yet it cannot compete with other countries with the most advanced innovation and creativity. This is the biggest obstacle to push the country forward to become a developed country.

The knowledge of research innovation can be applied to the economy and society. Being ready for both quantitative and qualitative research and development in order to support the development of the country to be stable, wealthy, and sustainable is concerned, curriculum in doctoral program in Anatomy and Structural Biology is developed to create graduates with advanced knowledge and technologies to apply and create a body of knowledge that will lead to integrative learning. The program offers a wide range of basic cognitive learning and researches in Medical and Biological Sciences for solving public health threat, in particular issues on age-associated and emergic diseases. Academic cooperation with the public and industrial sectors both national and international levels is required for effective problem solving. The fundamentals of Medical and Biological Sciences are the key drivers of economic development of the country to compete in international level.

11.2 Social and Cultural Situation/Development

Current and future socio-cultural situations are still being considered as beyond frontier and IT society. Various knowledge is emerging and expanding rapidly. One of the key goals of the National strategic plan is to improve well-being and quality of life of Thai people and society. This relates in lifestyle modifications, self-learning development, and lifelong-learning opportunities. The quality of education must also be developed to keep pace with the constant change in society, economy, knowledge base, investment in research, knowledge creation and research innovation. The production of competent personnel, applying knowledge and integrating medical science as well as biological science and technology, is the purpose of this curriculum development with the aim of improving the quality of education and research in Anatomy and Structural Biology. The principles are necessary and consistent with the changes in world society and culture in order to achieve the goals and improve the quality of life.

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

From the economic, social and cultural impacts, the curriculum is revised in response to the changes of the global society as follows:

12.1.1 To organize the teaching process with the aim to enhance student outcome to gain current knowledge of Anatomy and Structural Biology as well as to develop the student potential for establishing the high quality of research to compete internationally.

12.1.2 To emphasize on learning, acquiring and analyzing knowledge systematically. Students are encouraged to develop both leadership and interpersonal skills that can be applied to the benefits of social and cultural situation.

12.1.3 To focus on developing the student with research-based knowledge and strengthening the research quality to meet international standard. Knowledge and its application support the needs of government and private sectors in both the people's health and industrial aspects for the sustainable economic development and competitiveness of the country.

12.2 Relevance to the Missions of the University/Institution

The mission of Mahidol University is to create excellence in health, science, arts and innovation based on virtue for Thai society and the benefit of humankind. Doctor of Philosophy Program in Anatomy and Structural Biology focuses on producing a competent graduate specialized in both academic and research knowledge. Being able to learn by oneself and pursue knowledge throughout life is expected. Graduates have a vision of applying knowledge and research to solve problems with efficiency, suitability and morality in line with the university's mission of academic excellence and create graduates who are wisdom of the land.

13. Collaboration with Other Curricula of the University (if any)

13.1 Course(s) offered by other faculties/departments/ programs:

1 compulsory course as follows:

SCID 518 Generic Skills in Science Research	1 (1-0-2)
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12 elective courses as follows:

SCID 502 Cell Science	2 (2-0-4)
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SCID 503 Systemic Bioscience	3 (3-0-6)
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SCID 506 Concepts of Molecular Bioscience	2 (2-0-4)
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SCID 507 Microscopic Technique	1 (0-2-1)
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SCID 508 Biomolecular and Spectroscopic Techniques	1 (0-2-1)
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SCID 510 Immunological Methods	1 (0-2-1)
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SCID 511 Gene Technology	1 (0-2-1)
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SCID 514 Animal Experimental in Biomedical Research	1 (0-2-1)
SCID 516 Biostatistics	3 (3-0-6)
SCBC 610 Modern metabolism	2 (2-0-4)
SCBC 611 Current Protocols in Biomolecular Research	1 (1-0-2)
SCBT 502 Recombinant DNA Technology	3 (2-3-5)

13.2 Course(s) offered to other programs:

6 courses as follows:

SCAN 601 Advanced Clinical Gross Anatomy	1 (1-0-2)
SCAN 602 Integrative Histology	1 (1-0-2)
SCAN 603 Current Topics in Integrative Neuroscience	1 (1-0-2)
SCAN 621 Essential Topics in Integrative Developmental Biology	1 (1-0-2)
SCAN 623 Selected Topics in Medical and Developmental Genetics	1 (1-0-2)
SCAN 625 Image Processing in Research	1 (0-2-1)

13.3 Coordination:

13.3.1 The program has the management procedures are as follows:

(1) The program appoints a course coordinator to take responsibility with the instructor in determining the course's aim requirements, schedule, examination, and coordinating with the Department, Faculty of Graduate Studies and other agencies.

(2) The program arranges regular meeting and consult with instructors or invited lecturers in writing subject contents in accordance with the course objectives, lesson plans and course descriptions, as well as, assigns tasks to the education support staffs in the particular course, organize grades-cutting meetings, assess the learning assessment, and improve the course operation.

13.3.2 The administrative procedures for inter-departmental learning courses are as follows:

(1) The program director informs students to register in the courses according to their study plans.

(2) The program director coordinates with the instructors to monitor the student's academic performance.

Section 2 Information of the Curriculum

1. Philosophy, Justification, and Objectives of the Curriculum

1.1 Philosophy and Justification of the Curriculum

The Doctor of Philosophy program aims at producing graduates who have expertise in creating new body of knowledge of Anatomy and Structural Biology via research activities, with a moral and ethical responsibility in the work.

1.2 Objectives of the Program

At the end of the program, a graduate will have characteristics in compliance with the the Office of the Higher Education Commission's standard criteria for graduate program as follows:

1.2.1 Having their moral behaviors and discipline, and be able to maintain moral integrity and ethics in academic and professional contexts;

1.2.2 Be knowledge able of the course content, substantial body of knowledge, and research processes; be able to demonstrate their understanding in the concept of research topics and their skills in the use of research instruments in the field of Anatomy and Structural Biology;

1.2.3 Analyze, criticize, synthesize, and evaluate scientific problems in a systematic and theoretical context; be able to design and carry out research projects to develop new knowledge and/or research innovation in the field of Anatomy and Structural Biology;

1.2.4 Having and develop responsible behavior and a good relationship with colleagues and communities; be able to playing roles of leader, follower, and co-operator effectively;

1.2.5 Having essential skills on numerical and statistical analysis and be able to use appropriate information and communication technology for effective data management and presentations

1.3 Program Learning Outcomes (PLOs)

1.3.1 Exhibit honest, disciplined, and punctual behaviors including complying with regulations; and maintain ethical standards in academic and research contexts.

1.3.2 Explain substantial body of knowledge, research processes, and the concept of research topics; and discuss on the latest developments including research techniques in Anatomy and Structural Biology.

1.3.3 Demonstrate their expertise in the use and application of research equipments in the field of Anatomy and Structural Biology.

1.3.4 Analyze, criticize, synthesize, and evaluate scientific problems in a systematic and theoretical context; and able to design and carry out research projects on their own, with wide and deep views in order to develop new knowledge and innovation in the field of Anatomy and Structural Biology.

1.3.5 Possess a good relationship, be responsible, receive and process feedback; and possess desirable roles of leader, follower, and co-operator effectively.

1.3.6 Analyze and process mathematical or statistical data involving in their research effectively, with the use of appropriate information and communication technology.

1.3.7 Utilize both oral and written communication skills to present their works effectively via oral presentations and publications to international scientific community.

2. Plan for Development and Improvement

Plan for Development/Revision	Strategies	Evidences/Indexes
1. Development of the curriculum to meet the international standard (AUN-QA)	<p>1. Annual evaluation process: following, comparing, and enhancing the curriculum to meet the international standard.</p> <p>1.2 Annual evaluation of all courses based on the criterion of AUN-QA</p> <p>1.3 The 5-year review cycle: re-evaluating goals or objectives of the program and revise the program accordingly.</p>	<p>1.1 AUN-QA self assessment report</p> <p>1.2 Report of course evaluation</p> <p>1.3 Report of curricular evaluation</p> <p>1.4 Benchmarking report of the research output with similar programs of the world-ranked universities in Asian</p>
2. Development of the curriculum according to stakeholders, social and job trends, needs of the country and the Office of the Higher Education Commission	<p>2.1 Survey for the needs of stakeholders</p> <p>2.2 The Thailand National Strategy (2561-2580)</p> <p>2.3 Weak point analysis</p>	<p>2.1 Satisfactory evaluation report by stakeholders/employers</p> <p>2.2 Satisfactory evaluation report by final year students</p>

Plan for Development/Revision	Strategies	Evidences/Indexes
<p>3. Career development of instructors on academic teaching, academic service, and research</p>	<p>3.1 Scheduling orientation of career progression in research and education to new instructors</p> <p>3.2 Faculty mentoring program</p> <p>3.3 Encouraging all instructors to participate training courses /workshop/academic meetings to improve teaching capacity, up to date academic services and researches</p>	<p>3.1 Report of new instructors' orientation and satisfactory evaluation</p> <p>3.2 Instructors' self evaluation and students' feedback</p> <p>3.3 All instructors improve efficiency in academic teaching, service, or research</p> <p>3.4 Instructors achieve promotion to a higher post</p>

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 : There is a 2 week Summer Semester in year 1, or as considered by the Curriculum Committee

1.3 Credit Equivalence to Semester System : None

2. Curriculum Implementation

2.1 Teaching Schedule: Weekdays from Monday to Friday (08:00 A.M. - 4:00 P.M.).

Semester 1 August - December

Semester 2 January - May

Summer Semester May - July

2.2 Qualifications of Prospective Students

Plan 1 : Research Only

Plan 1.1 : For students with Master's degree:

(1) Hold a Master of Science degree in Anatomy, Anatomy and Structural Biology, Pathology, Physiology, Pharmacology, Microbiology, Biology, Medical Technology, or other related biological sciences from institutions which accredited by the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation

(2) Have cumulative GPA not less than 3.50

(3) Have at least 1 research article published in national or international journals, with their name as the first author

(4) Have an English Proficiency Examination score as the requirement of the Faculty of Graduate Studies, Mahidol University

(5) Applicants who do not meet the qualification criteria in items (2) - (4) may be considered for admission by the program executive committee and the Dean of the Faculty of Graduate Studies

Plan 2 : Courses work and Research

Plan 2.1 : For students with Master's degree:

(1) Hold a Master of Science degree in Anatomy, Anatomy and Structural Biology, Pathology, Physiology, Pharmacology, Microbiology, Biology, Medical Technology, or other related biological sciences from institutions which accredited by the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation

(2) Have cumulative GPA not less than 3.50, or have at least 1 research article published in national or international journals, with their name as the first author

(3) Have an English Proficiency Examination score as the requirement of the Faculty of Graduate Studies, Mahidol University

(4) Applicants who do not meet the qualification criteria in items (2) - (3) may be considered for admission by the program executive committee and the Dean of the Faculty of Graduate Studies

Plan 2.2 : For students with Bachelor's degree:

(1) Hold a Bachelor of Science degree, or hold a M.D., D.V.M., or D.D.S. from institutions which accredited by the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation

(2) Have cumulative GPA not less than 3.50

(3) Have an English Proficiency Examination score as the requirement of the Faculty of Graduate Studies, Mahidol University

(4) Applicants who do not meet the qualification criteria in items (2) – (3) may be considered for admission by the program executive committee and the Dean of the Faculty of Graduate Studies

2.3 Problems Encountered by New Students

2.3.1 English skills

2.3.2 Foundation of Anatomical Science

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

Problems of New Students	Strategies for Problem Solving	Evaluation
English skills	Students are advised to take English courses offered by the Faculty of Graduate Studies	English courses will be evaluated following the regulation of the Faculty of Graduate Studies
Substantial knowledge in Anatomical Science	<p>- For students with a Bachelor's degree and students with a Master's degree in other fields, they are encouraged to take an introductory course in SCAN 501 Anatomical Basis of Human Body.</p> <p>- For students with a Master's degree in other fields, the substantial level of anatomical knowledge will be determined by the Program committees on the passing score of examination in three subjects (Human gross anatomy, Histology, and Neuroanatomy). Students who do not pass the examination will take the following pre-courses of those subjects:</p> <p style="padding-left: 40px;">SCAN 511 Structure and Function of Human Body</p> <p style="padding-left: 40px;">SCAN 513 Structure and Function of Cell, Tissue, and Organ</p> <p style="padding-left: 40px;">SCAN 514 Essential in Structural and Functional Neuroanatomy</p>	Pre-courses will be evaluated as AU (Audit). Student has to attend and participate for more than 80% of the courses to pass the courses.

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

Plan 1 : Research Only

Plan 1.1 : For Students with Master's degree:

Academic Year	2022	2023	2024	2025	2026
1 st	4	4	4	4	4
2 nd	-	4	4	4	4
3 rd	-	-	4	4	4
4 th	-	-	-	4	4
Cumulative numbers	4	8	12	16	16
Expected number of students graduated	-	-	-	4	4

Plan 2 : Courses Work and Research

Plan 2.1 : For Students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields:

Academic Year	2022	2023	2024	2025	2026
1 st	6	6	6	6	6
2 nd	-	6	6	6	6
3 rd	-	-	6	6	6
4 th	-	-	-	6	6
Cumulative numbers	6	12	18	24	24
Expected number of students graduated	-	-	-	6	6

Plan 2.2 : For Graduate students with Bachelor's degree, M.D., D.V.M., or D.D.S.:

Academic Year	2022	2023	2024	2025	2026
1 st	10	10	10	10	10
2 nd	-	10	10	10	10
3 rd	-	-	10	10	10
4 th	-	-	-	10	10
5 th	-	-	-	-	10
Cumulative numbers	10	20	30	40	50
Expected number of students graduated	-	-	-	-	10

2.6 Budget based on the plan

Plan 1.1 For students with Master's degree in other fields: Budget: The budget is from Department of Anatomy, Faculty of Science, Mahidol University.

Estimated income per student	Credit	fee/unit	Total (Baht)
Registration fee			
Tuition	-	xxxx	-
Dissertation	xx		xxxxx
Qualification Examination			xxxx
Dissertation research fee			xxxxxx
	Total income per student		xxxxxxx
Estimated expenses			
Variable expenses per student			
College/university allocation			-
Position allowance of QE committee			xxxx
Position allowance of thesis advisor and committee			xxxxx
	Total variable expenses per student		xxxxx
Fixed expenses			
Staff salary			xxxxxx
Utility fee			xxxxxx
Material fee			xxxxxx
	Total Fixed expenses		xxxxxxx
Number of students at break-even point		=	4 persons
Cost of students at break-even point			334,700.00 Baht
Expenses per student per academic year			83,675.00 Baht

Plan 2.1 : For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields:

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

Estimated income per student	Credit	fee/unit	Total (Baht)
Registration fee			
Tuition	xx	xxxx	xxxxx
Dissertation	xx		xxxxx
Qualification Examination			xxxx
Dissertation research fee			xxxxx
	Total income per student		xxxxxxx
Estimated expenses			
Variable expenses per student			
College/university allocation			xxxx
Position allowance of QE committee			xxxx
Position allowance of Dissertation advisor and committee			xxxxx
	Total variable expenses per student		xxxxxx
Fixed expenses			
Staff salary			xxxxxxx
Teaching payment			xxxxxxx
Utility fee			xxxxxxx
Material fee			xxxxxxx
	Total Fixed expenses		xxxxxxx
Number of students at break-even point		=	6 persons
Cost of students at break-even point			356,520.00 Baht
Expenses per student per academic year			89,130.00 Baht

Plan 2.2 : : For Graduate students with Bachelor's degree, M.D., D.V.M., or D.D.S.:

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

Estimated income per student	Credit	fee/unit	Total (Baht)
Registration fee			
Tuition	xx	xxxx	xxxxx
Dissertation	xx	xxxx	xxxxx
Qualification Examination			xxxx
Dissertation research fee			xxxxx
	Total income per student		xxxxxxx
Estimated expenses			
Variable expenses per student			
College/university allocation			xxxx
Position allowance of QE committee			xxxx
Position allowance of Dissertation advisor and committee			xxxxx
	Total variable expenses per student		xxxxx
Fixed expenses			
Staff salary			xxxxxx
Teaching payment			xxxxxx
Utility fee			xxxxxxx
Material fee			xxxxxx
	Total Fixed expenses		xxxxxxx
Number of students at break-even point		=	10 persons
Cost of students at break-even point			405,040.00 Baht
Expenses per student per academic year			101,260.00 Baht

2.5 Educational System: Classroom mode

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. www.grad.mahidol.ac.th.

3. Curriculum and Instructors

3.1 Curriculum

3.1.1 Number of credits

Plan 1 : Research Only

Plan 1.1 : For students with Master's degree: the number of credits to be studied throughout the program not less than 48 credits

Plan 2 : Courses work and Research

Plan 2.1 : For students with Master's degree

- For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields: the number of credits to be studied throughout the program not less than 48 credits

Plan 2.2 : For students with Bachelor's degree

- For students with Bachelor's degree, M.D., D.V.M., or D.D.S.: the number of credits to be studied throughout the program not less than 72 credits

3.1.2 Curriculum Structure

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

Plan 1 : Research only

Plan 1.1 : For graduate students with Master's degree:

Dissertation 48 credits

Total not less than 48 credits

Plan 2 : Courses work and research

Plan 2.1 : For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields:

Required courses 6 credits

Elective courses not less than 6 credits

Dissertation 36 credits

Total not less than 48 credits

Plan 2.2 For students with Bachelor's degree, M.D., D.V.M., or D.D.S.:

Required courses	20 credits
Elective courses not less than	4 credits
Dissertation	48 credits
Total not less than	72 credits

3.1.3 Courses in the curriculum

1) Required Courses

Plan 2.1 : For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields : 6 Credits

	Credits (lecture-lab-self study)
*SCAN 601 Advanced Clinical Gross Anatomy วทกว ๖๐๑ มหกายวิภาคศาสตร์ทางคลินิกขั้นสูง	1(1-0-2)
SCAN 602 Integrative Histology วทกว ๖๐๒ จุลกายวิภาคศาสตร์บูรณาการ	1(1-0-2)
SCAN 603 Current Topics in Integrative Neuroscience วทกว ๖๐๓ หัวข้อปัจจุบันทางประสาทวิทยาศาสตร์บูรณาการ	1(1-0-2)
SCAN 617 Seminar in Frontier Research of Anatomy and Structural Biology I วทกว ๖๑๗ สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๑	1(1-0-2)
SCAN 618 Seminar in Frontier Research of Anatomy and Structural Biology II วทกว ๖๑๘ สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๒	1(1-0-2)
SCAN 619 Seminar in Frontier Research of Anatomy and Structural Biology III วทกว ๖๑๙ สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๓	1(1-0-2)

* *New course*

Plan 2.2 : For students with Bachelor's degree, M.D., D.V.M., or D.D.S.- : 20

Credits

Credits (lecture-lab-self study)

#SCAN 511	Structure and Function of Human Body	3(3-0-6)
วทกว ๕๑๑	โครงสร้างและหน้าที่ของร่างกายมนุษย์	
#SCAN 512	Human Gross Anatomy Laboratory	2(0-4-2)
วทกว ๕๑๒	ปฏิบัติการมหกายวิภาคศาสตร์มนุษย์	
#SCAN 513	Structure and Function of Cell, Tissue, and Organ	3(2-2-5)
วทกว ๕๑๓	โครงสร้างและหน้าที่ของเซลล์ เนื้อเยื่อ และอวัยวะ	
#SCAN 514	Essential in Structural and Functional Neuroanatomy	3 (2-2-5)
วทกว ๕๑๔	สาระสำคัญทางประสาทกายวิภาคศาสตร์เชิงโครงสร้างและหน้าที่	
#SCAN 515	Human Embryology	1(1-0-2)
วทกว ๕๑๕	วิทยาเอ็มบริโอมนุษย์	
*SCAN 525	Research Design and Methodology	1(0-2-1)
วทกว ๕๒๕	การออกแบบและระเบียบวิธีการวิจัย	
SCID 518	Generic Skills in Science Research	1(1-0-2)
วทคร ๕๑๘	ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	
*SCAN 601	Advanced Clinical Gross Anatomy	1(1-0-2)
วทกว ๖๐๑	มหกายวิภาคศาสตร์ทางคลินิกขั้นสูง	
SCAN 602	Integrative Histology	1(1-0-2)
วทกว ๖๐๒	จุลกายวิภาคศาสตร์บูรณาการ	
SCAN 603	Current Topics in Integrative Neuroscience	1(1-0-2)
วทกว ๖๐๓	หัวข้อปัจจุบันทางประสาทวิทยาศาสตร์บูรณาการ	
SCAN 617	Seminar in Frontier Research of Anatomy and Structural Biology I	1(1-0-2)
วทกว ๖๑๗	สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๑	
SCAN 618	Seminar in Frontier Research of Anatomy and Structural Biology II	1(1-0-2)
วทกว ๖๑๘	สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๒	
SCAN 619	Seminar in Frontier Research of Anatomy and Structural Biology III	1(1-0-2)
วทกว ๖๑๙	สัมมนาทางการวิจัยระดับแนวหน้าด้านกายวิภาคศาสตร์ และชีววิทยาโครงสร้าง ๓	

For students with M.D., D.V.M., or D.D.S. who have previously studied these courses or similar can bypass these courses after evaluation by the course committee and the Program director

* New course

2) Elective Courses

Plan 2.1 : For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields: 6 Credits

			Credits (lecture-lab-self study)
SCAN	621	Essential Topics in Integrative Developmental Biology	1(1-0-2)
วทกว	๖๒๑	หัวข้อหลักทางชีววิทยาการเจริญเชิงบูรณาการ	
SCAN	623	Selected Topics in Medical and Developmental Genetics	1(1-0-2)
วทกว	๖๒๓	หัวข้อคัดสรรทางพันธุศาสตร์การแพทย์และการเจริญ	
*SCAN	625	Image Processing in Research	1(0-2-1)
วทกว	๖๒๕	การประมวลผลภาพเพื่องานวิจัย	
*SCAN	627	Teaching Practicum	2(0-4-2)
วทกว	๖๒๗	ปฏิบัติการการสอน	
SCID	502	Cell Science	2(2-0-4)
วทคร	๕๐๒	วิทยาศาสตร์เรื่องเซลล์	
SCID	503	Systemic Bioscience	3(3-0-6)
วทคร	๕๐๓	วิทยาศาสตร์ชีวภาพเชิงระบบ	
SCID	506	Concepts of Molecular Bioscience	2(2-0-4)
วทคร	๕๐๖	หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล	
SCID	507	Microscopic Technique	1(0-2-1)
วทคร	๕๐๗	เทคนิคการใช้กล้องจุลทรรศน์	
SCID	508	Biomolecular and Spectroscopic Techniques	1(0-2-1)
วทคร	๕๐๘	เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	
SCID	510	Immunological Methods	1(0-2-1)
วทคร	๕๑๐	ระเบียบวิธีวิทยาภูมิคุ้มกัน	
SCID	511	Gene Technology	1(0-2-1)
วทคร	๕๑๑	เทคโนโลยีด้านยีน	
SCID	514	Animal Experimentation in Biomedical Research	1(0-2-1)
วทคร	๕๑๔	การใช้สัตว์ทดลองในงานวิจัยทางชีวการแพทย์	
SCID	516	Biostatistics	3(3-0-6)
วทคร	๕๑๖	ชีวสถิติ	
SCBC	610	Modern Metabolism	2(2-0-4)
วทชค	๖๑๐	เมแทบอลิซึมสมัยใหม่	

* New course

SCBC	611	Current Protocols in Biomolecular Research	1(1-0-2)
วทชค	๖๑๑	วิธีปัจจุบันในการวิจัยทางชีวโมเลกุล	
SCBT	502	Recombinant DNA Technology	3(3-0-6)
วททช	๕๐๒	เทคโนโลยีทางพันธุวิศวกรรม	

Plan 2.2 : For students with Bachelor's degree, M.D., D.V.M., or D.D.S. : 4 Credits

SCAN	607	Advanced Microscopy and Structural Biology	2(1-2-3)
วทกว	๖๐๗	ชีววิทยาโครงสร้างและจุลทรรศน์ขั้นสูง	
SCAN	620	Selected Topics in Cellular Neuroscience	1(1-0-2)
วทกว	๖๒๐	หัวข้อคัดสรรทางประสาทวิทยาศาสตร์ระดับเซลล์	
SCAN	621	Essential Topics in Integrative Developmental Biology	1(1-0-2)
วทกว	๖๒๑	หัวข้อหลักทางชีววิทยาการเจริญเชิงบูรณาการ	
SCAN	623	Selected Topics in Medical and Developmental Genetics	1(1-0-2)
วทกว	๖๒๓	หัวข้อคัดสรรทางพันธุศาสตร์การแพทย์และการเจริญ	
*SCAN	625	Image Processing in Research	1(0-2-1)
วทกว	๖๒๕	การประมวลผลภาพเพื่องานวิจัย	
*SCAN	626	Modern Anatomical Imaging	1(0-2-1)
วทกว	๖๒๖	การสร้างภาพกายวิภาคศาสตร์สมัยใหม่	
*SCAN	627	Teaching Practicum	2(0-4-2)
วทกว	๖๒๗	ปฏิบัติการการสอน	
SCID	502	Cell Science	2(2-0-4)
วทคร	๕๐๒	วิทยาศาสตร์เรื่องเซลล์	
SCID	503	Systemic Bioscience	3(3-0-6)
วทคร	๕๐๓	วิทยาศาสตร์ชีวภาพเชิงระบบ	
SCID	506	Concepts of Molecular Bioscience	2(2-0-4)
วทคร	๕๐๖	หลักการทางวิทยาศาสตร์ชีวภาพระดับโมเลกุล	
SCID	507	Microscopic Technique	1(0-2-1)
วทคร	๕๐๗	เทคนิคการใช้กล้องจุลทรรศน์	
SCID	508	Biomolecular and Spectroscopic Techniques	1(0-2-1)
วทคร	๕๐๘	เทคนิคด้านชีวโมเลกุลและด้านสเปกโทรสโกปี	
SCID	509	Separation Techniques	1(0-2-1)
วทคร	๕๐๙	เทคนิคการแยกสาร	

* New course

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	
SCBC	610	Modern Metabolism	2(2-0-4)
วทชค	๖๑๐	เมแทบอลิซึมสมัยใหม่	
SCBC	611	Current Protocols in Biomolecular Research	1(1-0-2)
วทชค	๖๑๑	วิธีปัจจุบันในการวิจัยทางชีวโมเลกุล	
SCBT	502	Recombinant DNA Technology	3(3-0-6)
วททช	๕๐๒	เทคโนโลยีทางพันธุวิศวกรรม	

* *New course*

In addition to elective courses mentioned above, a student may register other courses in international program offered by other faculties 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.

2) Dissertation

Credits (lecture-lab-self study)

4.1 Plan 1 : Research Only

Plan 1.1 : For students with Master's degree

SCAN 898 Dissertation 48 (0-144-0)

วททว ๘๘๘ วิทยานิพนธ์

4.2 Plan 2 : Courses work and Research

Plan 2.1 : For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other biological fields

SCAN 699 Dissertation 36 (0-108-0)

วททว ๖๙๙ วิทยานิพนธ์

Plan 2.2 : For students with Bachelor's degree, M.D., D.V.M., or D.D.S.

SCAN 799 Dissertation 48 (0-144-0)

วททว ๗๙๙ วิทยานิพนธ์

3.1.4 Research Project of the Program

Guidelines for conducting a research project are as follows:

(1) Gross/clinical anatomy and modern anatomy research related to:

1. Anatomical variations and clinical relevance
2. Tissue engineering scaffolds for medical applications
3. Modern Imagings in Anatomy and Structural Biology
4. 3D models of human development

(2) Neuroscience and age-associated diseases research related to:

1. Neurotoxicology
2. Mechanism of neurodegeneration and neuroprotection and treatment of age-associated diseases by natural products

3. Cellular and *C. elegans* models of neurodegenerative diseases
4. Longevity and anti-aging research

(3) Cell and molecular biology and cancer research related to

1. Mechanism of cancer growth, metastasis, and angiogenesis
2. Cancer diagnosis: histopathology, cytology and tumor markers
3. Cell surface receptors, molecular interactions, and target molecules

4. Anti-cancer research: biomedical applications of natural products for drug adjuvant

5. Rodent models for study human diseases

6. Immunodiagnosis and vaccine development

(4) Stem cell and developmental biology research related to:

1. Stem cell and gene therapy

2. Tissue engineering and regenerative medicine: transplantation for the treatment of hearing loss, and damaged nervous system

3. Developmental and reproductive toxicology

(5) Agriculture and aquaculture science research related to:

1. Shrimp biotechnology and reproductive biology

2. Molecular mechanisms of the adaptation of aquatic animals

3. Host-pathogen Interaction

4. Endocrine manipulation in shrimp and sea cucumber

5. Biomaterial development for nanocontainer and drug delivery system

3.1.5 Definition of Course Codes

Four main alphabets are defined as follows:

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

SC (วท) is an abbreviation of Faculty of Science

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

AN (กว) means an abbreviation of Department of Anatomy

BT (ทช) means an abbreviation of Department of Biotechnology

BC (ชค) means an abbreviation of Department of Biochemistry

ID (คร) means an abbreviation of inter-departmental courses

Three digits of number are 5XX, 6XX, 7XX and 8XX indicate that the courses are in the graduate study level.

3.1.7 Study Plan

Plan 1 : Research Only

Plan 1.1 : For students with Master's degree

Year	Semester 1	Semester 2
1	Qualification examination SCAN 898 Dissertation 6(0-18-0) Total 6 credits	SCAN 898 Dissertation 6(0-18-0) Dissertation proposal examination Total 6 credits
2	SCAN 898 Dissertation 6(0-18-0) Total 6 credits	SCAN 898 Dissertation 6(0-18-0) Total 6 credits
3	SCAN 898 Dissertation 6(0-18-0) Total 6 credits	SCAN 898 Dissertation 6(0-18-0) Total 6 credits
4	SCAN 898 Dissertation 6(0-18-0) Total 6 credits	SCAN 898 Dissertation 6(0-18-0) Dissertation defense examination Total 6 credits

Plan 2.1 : For students with Master's degree in Anatomy, or Anatomy and Structural Biology

Year	Semester 1	Semester 2
1	SCAN 617 Seminar in Frontier Research of Anatomy and Structural Biology I 1(1-0-2) Electives 4 credits Total 5 credits	SCAN 601 Advanced Clinical Gross Anatomy 1(1-0-2) SCAN 602 Integrative Histology 1(1-0-2) SCAN 603 Current Topics in Integrative Neuroscience 1(1-0-2) SCAN 618 Seminar in Frontier Research of Anatomy and Structural Biology II 1(1-0-2) Electives 2 credits Total 6 credits
2	SCAN 619 Seminar in Frontier Research of Anatomy and Structural Biology III 1(1-0-2) Qualification examination SCAN 699 Dissertation 6(0-18-0) Total 7 credits	SCAN 699 Dissertation 6(0-18-0) Dissertation proposal examination Total 6 credits
3	SCAN 699 Dissertation 6(0-18-0) Total 6 credits	SCAN 699 Dissertation 6(0-18-0) Total 6 credits
4	SCAN 699 Dissertation 6(0-18-0) Total 6 credits	SCAN 699 Dissertation 6(0-18-0) Dissertation defense examination Total 6 credits

- For graduate students with Master's degree in other fields

SCAN 501 Anatomical Basis of Human Body	1(1-0-2) (Non-credit)	
SCAN 511 Structure and Function of Human Body	3(3-0-6) (Non-credit)	
SCAN 513 Structure and Function of Cell, Tissue, and Organ	3(2-2-5) (Non-credit)	
SCAN 514 Essential in Structural and Functional Neurobiology	3(2-2-5) (Non-credit)	
Year	Semester 1	Semester 2
1	SCAN 617 Seminar in Frontier Research of Anatomy and Structural Biology I 1(1-0-2) Electives 4 credits Total 5 credits	SCAN 601 Advanced Clinical Gross Anatomy 1(1-0-2) SCAN 602 Integrative Histology 1(1-0-2) SCAN 603 Current Topics in Integrative Neuroscience 1(1-0-2) SCAN 618 Seminar in Frontier Research of Anatomy and Structural Biology II 1(1-0-2) Electives 2 credits Total 6 credits
2	SCAN 619 Seminar in Frontier Research of Anatomy and Structural Biology III 1(1-0-2) Qualification examination SCAN 699 Dissertation 6(0-18-0) Total 7 credits	SCAN 699 Dissertation 6(0-18-0) Dissertation proposal examination Total 6 credits
3	SCAN 699 Dissertation 6(0-18-0) Total 6 credits	SCAN 699 Dissertation 6(0-18-0) Total 6 credits
4	SCAN 699 Dissertation 6(0-18-0) Total 6 credits	SCAN 699 Dissertation 6(0-18-0) Dissertation defense examination Total 6 credits

Plan 2 : Courses Work and Research

Plan 2.2 : For students with Bachelor's degree

SCAN 501 Anatomical Basis of Human Body 1(1-0-2) (Non-credit)		
Year	Semester 1	Semester 2
1	SCAN 511 Structure and Function of Human Body 3(3-0-6) SCAN 512 Human Gross Anatomy Laboratory 2(0-4-2) SCAN 513 Structure and Function of Cell, Tissue, and Organ 3(2-2-5) SCID 518 Generic Skills in Science Research 1(1-0-2) Total 9 credits	SCAN 514 Essential in Structural and Functional Neurobiology 3(2-2-5) SCAN 515 Human Embryology 1(1-0-2) SCAN 525 Research Design and Methodology 1(0-2-1) SCAN 601 Advanced Clinical Gross Anatomy 1(1-0-2) SCAN 602 Integrative Histology 1(1-0-2) SCAN 603 Current Topics in Integrative Neuroscience 1(1-0-2) SCAN 617 Seminar in Frontier Research of Anatomy and Structural Biology I 1(1-0-2) Total 9 credits
2	SCAN 618 Seminar in Frontier Research of Anatomy and Structural Biology II 1(1-0-2) Electives 2 credits Total 3 credits	SCAN 619 Seminar in Frontier Research of Anatomy and Structural Biology III 1(1-0-2) Electives 2 credits Total 3 credits
3	Qualification examination SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Dissertation proposal examination Total 8 credits
4	SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Total 8 credits
5	SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Dissertation defense examination Total 8 credits

- For students with M.D., D.V.M., or D.D.S.

Year	Semester 1	Semester 2
1	SCAN 511 Structure and Function of Human Body 3(3-0-6) SCAN 512 Human Gross Anatomy Laboratory 2(0-4-2) SCAN 513 Structure and Function of Cell, Tissue, and Organ 3(2-2-5) SCID 518 Generic Skills in Science Research 1(1-0-2) Total 9 credits	SCAN 514 Essential in Structural and Functional Neurobiology 3(2-2-5) SCAN 515 Human Embryology 1(1-0-2) SCAN 525 Research Design and Methodology 1(0-2-1) SCAN 601 Advanced Clinical Gross Anatomy 1(1-0-2) SCAN 602 Integrative Histology 1(1-0-2) SCAN 603 Current Topics in Integrative Neuroscience 1(1-0-2) SCAN 617 Seminar in Frontier Research of Anatomy and Structural Biology I 1(1-0-2) Total 9 credits
2	SCAN 618 Seminar in Frontier Research of Anatomy and Structural Biology II 1(1-0-2) Electives 2 credits Total 3 credits	SCAN 619 Seminar in Frontier Research of Anatomy and Structural Biology III 1(1-0-2) Electives 2 credits Total 3 credits
3	Qualification examination SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Dissertation proposal examination Total 8 credits
4	SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Total 8 credits
5	SCAN 799 Dissertation 8(0-24-0) Total 8 credits	SCAN 799 Dissertation 8(0-24-0) Dissertation defense examination Total 8 credits

3.1.6 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 B)

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	XXXXXXXXXXXXXXXX Associate Professor Dr. Charoensri Thonabulsombat	Ph.D. (Animal Science and Reproductive Biology) Utah State University, USA : 1999 M.Sc. (Anatomy) Mahidol University : 1989 B.Sc. (Nursing) Mahidol University : 1984	Department of Anatomy, Faculty of Science, Mahidol University
2.	XXXXXXXXXXXXXXXX Associate Professor Dr. Kanokpan Wongprasert	Ph.D. (Anatomy) Mahidol University : 2001 M.Sc. (Anatomy) Mahidol University : 1992 B.Sc. (Physical Therapy) First Class Honor, Mahidol University : 1988	Department of Anatomy, Faculty of Science, Mahidol University
3.	XXXXXXXXXXXXXXXX Associate Professor Dr. Krai Meemon	Ph.D. (Anatomy) Mahidol University : 2004 B.Sc. (Physical Therapy), First Class Honor, Mahidol University : 1999	Department of Anatomy, Faculty of Science, Mahidol University
4.	XXXXXXXXXXXXXXXX Associate Professor Dr. Kulathida Chaithirayanon	Ph.D. (Anatomy) Mahidol University : 2005 M.Sc. (Anatomy) Mahidol University : 2000 B.Sc. (Physical Therapy), Second Class Honor), Mahidol University: 1996	Department of Anatomy, Faculty of Science, Mahidol University

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
5.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Rapeepun Vanichviriyakit	Ph.D. (Anatomy) Mahidol University : 2007 B.Sc. (Physical Therapy), Second Class Honor, Srinakharinwirot University : 1998	Department of Anatomy, Faculty of Science, Mahidol University
6.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Somluk Asuvapongpatana	Ph.D. (Anatomy) Mahidol University : 2000 M.Sc. (Anatomy) Mahidol University : 1993 B.N.S. (Nursing) First Class Honor Mahidol University : 1991	Department of Anatomy, Faculty of Science, Mahidol University
7.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Wattana Weerachatanukul	Ph.D. (Anatomy) Mahidol University : 2002 M.Sc. (Anatomy) Mahidol University : 1995 B.Sc. (Physical Therapy), Second Class Honor, Mahidol University : 1992	Department of Anatomy, Faculty of Science, Mahidol University
8.	XXXXXXXXXXXXXXXXX Associate Professor Dr. Yotsawan Tinikul	Ph.D. (Anatomy) Mahidol University : 2008 M.Sc. (Anatomy) Chiang Mai University : 2004 B.Sc. (Zoology) Chiang Mai University : 2002	Department of Anatomy, Faculty of Science, Mahidol University
9.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Chinnawut Suriyonplengsaeng	Diploma of Thai Board of Anatomic Pathology,	Department of Anatomy, Faculty of Science,

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
		Thai Medical Council : 2015 M.D. Mahidol University : 2009	Mahidol University
10.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Morakot Sroyraya	Ph.D. (Anatomy and Structural Biology) Mahidol University : 2012 B.Sc. (Medical Technology), First Class Honor, Thammasat University : 2006	Department of Anatomy, Faculty of Science, Mahidol University
11.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Nopporn Jongkamonwiwat	Ph.D. (Neuroscience) Mahidol University : 2004 B.Sc. (Physical Therapy), Second Class Honor, Srinakharinwirot University : 1997	Department of Anatomy, Faculty of Science, Mahidol University
12.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Thanapong Kruangkum	Ph.D. (Anatomy and Structural Biology), Mahidol University : 2015 B.Sc. (Zoology), First Class Honor) Chiang Mai University : 2008	Department of Anatomy, Faculty of Science, Mahidol University
13.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Worawit Suphamungmee	Ph.D. (Anatomy), Mahidol University : 2005 M.Sc. (Anatomy) Mahidol University : 2001 B.Sc. (Radiologic Technology), Chiang Mai University : 1999	Department of Anatomy, Faculty of Science, Mahidol University
14.	XXXXXXXXXXXXXXXXX Lecturer Dr. Monsicha Somrit	Ph.D. (Anatomy and Structural Biology), Mahidol University :	Department of Anatomy, Faculty of Science,

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
		2015 B.Sc. (Physical Therapy), Second Class Honor, Chiang Mai University : 2003	Mahidol University
15.	XXXXXXXXXXXXXXXXX Lecturer Dr. Nutmethee Kruepunga	Ph.D. (Anatomy and Structural Biology), Mahidol University : 2017 B.Sc. (Biology) First Class Honor, Kasetsart University : 2012	Department of Anatomy, Faculty of Science, Mahidol University
16.	XXXXXXXXXXXXXXXXX Lecturer Dr. Phetcharat Phanthong	Ph.D. (Anatomy and Structural Biology) Mahidol University : 2015 B.Sc. (Biotechnology), Second Class Honor, Silpakorn University : 2007	Department of Anatomy, Faculty of Science, Mahidol University

3.2.2 Full time instructors

No.	Identification Card Number Academic position Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	XXXXXXXXXXXXXXXXX Assistant Professor Dr. Somyoth Sridurongrit	Ph.D. (Pathobiology) University of Southem California, USA : 2008 M.Sc. (Biochemistry and Molecular Biology) University of Southem California, USA : 2004 B.Sc. (Biochemistry), Chulalongkorn University: 1999	Department of Anatomy, Faculty of Science, Mahidol University

4. Details of Practicum

None

5. Dissertation requirement

5.1 Short Description

Research topics for dissertation must be related to Anatomy and Structural Biology, to create new knowledge and in-depth. Dissertation work must be published in journals.

5.2 Standard Learning Outcomes

Students are able to analyze, synthesize, and evaluate scientific problems in a systematic and theoretical context; and able to take initiative in designing and carrying out research or developing projects on their own, with wide and deep view in order to develop new knowledge and innovation in the field of Anatomy and Structural Biology; and dissertation work must be presented and published in the academic journals

5.3 Time Frame

Plan 1 : Resarch Only

Since semester 1 Academic Year 1

Plan 2 : Courses Work and Reaearch

Since semester 1 Academic Year 2

5.4 Number of credits

Plan 1 : Research Only

For students with Master's degree: 48 credits

Plan 2 : Courses Work and Research

- For students with Master's degree: 36 credits

- For students with Bachelor's degree: 48 credits

5.5 Preparation

5.5.1 Students discuss with advisor to determine the topic of research dissertation

5.5.2 Students take and pass the Qualifying Examination

5.5.3 Students submit the oral Dissertation proposal defence and committee form to appoint the dissertation title and dissertation advisory committee.

5.6 Evaluation Process

Plan 1 : Research Only

- 1) Students are required to attend all seminar courses of Ph.D. curriculum.
- 2) Students must pass the qualification examination with the approval of the Program Committee, and then present the dissertation proposal.
- 3) During the dissertation process, there is an evaluation of the progress twice a year.
- 4) After completing the dissertation, students submit a request for dissertation defence. The defence committee shall consist of not less than 5 persons, with one external expert acting as the chairman.
- 5) Research dissertation must be published at least 2 papers in international academic journals.

Plan 2 : Courses Work and Research

- 1) Students pass the exam in all courses required in the Program.
- 2) Students must pass the qualification examination with the approval of the Program Committee, and then present the dissertation proposal.
- 3) During the dissertation process, there is an evaluation of the progress twice a year.
- 4) After completing the dissertation, students submit a request for dissertation defence. The defence committee shall consist of not less than 5 persons, with one external expert acting as the chairman.
- 5) Research dissertation must be published at least one paper in international academic journals.

Section 4 Learning Outcome, Teaching Strategies and Evaluation

1. Development of Students' Specific Qualifications

Special Characteristics	Teaching Strategies or Student Activities
<p>Possess characteristics according to the core values of Mahidol University.</p> <p>M = Mastery A = Altruism H = Harmony I = Integrity D = Determination O = Originality L = Leadership</p> <p>1. Self-driven lifelong learning with inquiry mind and science (Mahidol core value “Mastery” and “Determination”)</p> <p>2. Personal accountability and community awareness (Mahidol core value “Altruism” and “Integrity”)</p> <p>3. Teamwork skill and responsibility (Mahidol core value “Harmony” and “Leadership”)</p>	<ol style="list-style-type: none"> 1. Mini-symposium: dissertation research progression (Semester 2, every year after proposal exam) 2. Special Seminar: Invited speakers and academic staffs, 2 times/semester 3. Student Forum “Research techniques: discuss and share”, 2 times/semester 4. Pre-defense Presentation (1-2 weeks before dissertation examination) 5. Outreach activities for educating students in the community or public and private agencies <ul style="list-style-type: none"> - Mahidol Open House, 1 time/ year, Semester 1 - Science Avenue, 1 time/ year, Semester 2 6. Merit making ceremony for Great Teacher, 1 time/ year, Semester 1 7. The royal fire ceremony for Great teachers, 1 time/ year, Semester 2 8. Freshmen welcoming ceremony and Departmental outing. 1 time/ year, Semester 1 9. Wai Kru ceremony, 1 time/ year, Semester 1 10. Sport day and New Year celebration, 1 time/year 11. Commencement ceremony, 1 time/year

2. Development of Learning Outcome in Each Objective

Expected Outcome	Teaching Strategies	Evaluation Strategies
<p>1. Morality and Ethics</p> <p>1) Being honest to academic term including collecting and presenting data</p> <p>2) Being respect to regulation of agencies</p> <p>3) Generosity and good etiquette</p> <p>4) Having ethical standard in academic and research</p>	<p>1) Case study</p> <p>2) Self-study</p> <p>3) Group discussion</p> <p>4) Critical discussion</p> <p>5) Interpolation of morality and ethics in class activities</p> <p>6) Individual assignment</p> <p>7) Seminar</p>	<p>1) Quality of assignment</p> <p>2) Behavioral observation</p> <p>3) Analysis report for the case study</p> <p>4) Self and group reflection</p> <p>5) Assessment of responsibility and honesty in assignment</p>
<p>2. Knowledge</p> <p>1) Intellectual understanding of knowledge in Anatomy and Structural Biology</p> <p>2) Conquering knowledge of theory, principle, and concept in Anatomy and Structural Biology</p> <p>3) Conquering knowledge of research techniques and tools in Anatomy and Structural Biology</p> <p>4) Applying new knowledge in Anatomy and Structural Biology to other related disciplines</p>	<p>1) Conference and seminar</p> <p>2) Self study</p> <p>3) Group and individual assignment and presentation</p> <p>4) Lecture</p> <p>5) Laboratory practice</p> <p>6) Discussion</p>	<p>1) Test</p> <p>2) Quality of assignment</p> <p>3) Instructor assessment</p> <p>4) Self assessment</p> <p>5) Practical assessment</p> <p>6) Formative evaluation</p> <p>7) Summative evaluation</p> <p>8) Qualifying examination</p> <p>9) Thesis proposal and defense</p> <p>10) Course evaluation</p>
<p>3. Intellectual Development</p> <p>1) Being able to search, collect, and review existing</p>	<p>1) Case study</p> <p>2) Conference and seminar</p>	<p>1) Test</p> <p>2) Quality of assignment</p>

Expected Outcome	Teaching Strategies	Evaluation Strategies
<p>data in Anatomy and Structural Biology to reach conclusive ideas</p> <p>2) Being able to analyze and investigate questions or problems in Anatomy and Structural Biology systematically</p> <p>3) Being able to conduct, interpret, discuss, criticize and conclude scientific data in Anatomy and Structural Biology</p> <p>4) Being able to perform knowledge transfer, create and present scientific data in Anatomy and Structural Biology</p>	<p>3) Group activities and discussion</p> <p>4) Dissertation writing</p> <p>5) Self study and individual report</p> <p>6) Oral presentation</p> <p>7) Data analysis and problem solving</p> <p>8) Comparative discussion</p> <p>9) Knowledge discussion</p> <p>10) Research performing</p>	<p>3) Instructor assessment</p> <p>4) Self assessment</p> <p>5) Practical assessment</p> <p>6) Formative evaluation</p> <p>7) Summative evaluation</p> <p>8) Qualifying examination</p> <p>9) Dissertation proposal and defense</p>
<p>4. Interpersonal Relationship and Responsibility</p> <p>1) Being responsible for assigned work systematically and efficiently</p> <p>2) Being cooperatively work with others as a team</p> <p>3) Being able to play roles in leadership and follower appropriately</p>	<p>1) Conference and seminar</p> <p>2) Data searching and oral presentation</p> <p>3) Practice</p> <p>4) Group activities and discussion</p>	<p>1) Responsibility assessment and management</p> <p>2) Discussion and in class practice</p> <p>3) Activity evaluation</p> <p>4) Behavioral observation</p> <p>5) Self and group reflection</p>

Expected Outcome	Teaching Strategies	Evaluation Strategies
<p>5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills</p> <p>1) Being able to search, collect, and analyse mathematical and statistical data</p> <p>2) Using the appropriate English skills for communication and presentations effectively</p> <p>3) Using appropriate information technology to present reports and scientific data</p>	<p>1) Case study</p> <p>2) Conference and seminar</p> <p>3) Data searching and oral presentation</p> <p>4) Lecture</p> <p>5) Practice</p> <p>6) Discussion</p> <p>7) Research writing</p> <p>8) Dissertation presentation</p>	<p>1) Quality assessment</p> <p>2) Discussion and in class practice</p> <p>3) Mathematic analysis</p> <p>4) Publication</p> <p>5) Oral presentation in interational conference</p> <p>6) Qualifying examination</p> <p>7) Dissertation proposal and defense</p>

3.3 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 (www.grad.mahidol.ac.th).

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 course learning outcome.

2.1.1. Evaluating process according to the course learning outcome.

2.2.2 Evaluating process based on the formative and summative examination of courses, and student evaluation

2.1.3 For research dissertation, the research progression will be reported by dissertation advisor and committee. The external examiner is required as one of dissertation defense committee.

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

2.2.1 Satisfaction assessment on teaching and learning methods, atmosphere, and facilities in order to improve the curriculum.

2.2.2 Graduate evaluation by stakeholder, alumni, external examiner, advisor, including self evaluation.

3. Graduation Requirement

Plan 1 : Research Only

- 1) The duration of the study is in accordance with the study plan.
- 2) Students must complete dissertation for 48 credits and may attend additional courses following the advice from their advisor without credit counting. Total credits are not less than 48 credits.
- 3) Students must pass the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.
- 4) Students must pass the qualifying examination.
- 5) Students must participate and pass in skill development activities of the Graduate Studies, Mahidol University

- 6) Students must present their dissertation and pass the defense examination from the examination committee appointed by the Faculty of Graduate Studies, Mahidol University. The examination must be done orally and open to any interested persons.
- 7) Students' Dissertation or part of the Dissertation must be published or at least accepted to be published in at least 2 international peer-reviewed academic articles following the announcements of the Higher Education Commission on criteria for publication on academic journals and the Faculty of Graduate Studies, Mahidol University.

Plan 2 : Courses Work and Research

- 1) The duration of the study is in accordance with the study plan.
- 2) Students must complete their courses as stated in the curriculum:
 - For students with Master's degree in Anatomy, Anatomy and Structural Biology, or other fields, student must complete their courses with not less than 12 credits and dissertation for 36 credits. Total credits are not less than 48 credits.
 - For students with Bachelor's degree, M.D., D.V.M., or D.D.S student must complete their courses with not less than 24 credits and dissertation for 48 credits. Total credits are not less than 72 credits.
- 3) Students must obtain cumulative grade point average of not less than 3.00.
- 4) Students must pass the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.
- 5) Students must pass the qualifying examination.
- 6) Students must participate and pass in skill development activities of the Faculty of Graduate Studies, Mahidol University.
- 7) Students must present their dissertation and pass the defense examination from the examination committee appointed by the Faculty of Graduate Studies, Mahidol University. The examination must be done orally and open to any interested persons.
- 8) Students' Dissertation or part of the Dissertation must be published or at least accepted to be published in at least 1 international peer-reviewed academic article following the announcements of the Higher Education Commission on criteria for publication on academic journals and the Faculty of Graduate Studies, Mahidol University.

Section 6 Faculty Development

1. The Orientation for New Faculty Members

- 1.1 New faculty members have to attend an orientation and welcome by Department and Faculty staffs
- 1.2 New faculty members have an opportunity to participate the research groups and receive guidances and suggestions by mentors
- 1.3 The head of Department is required to explain concerned disciplines, curriculum, process of teaching, and assignments to the new faculty members.
- 1.4 First orientation is required for the new faculty members to know and understand policies, philosophy of the University and Faculties.
- 1.5 To understand the process of teaching and research, the new faculty members are required to be a co-course coordinator and thesis co-advisor.

2. Skill and Knowledge Development for Faculty Members

2.1 Skills Development in Teaching and Evaluation

- 2.1.1 Allow the instructor to participate in the teaching development, evaluation, revision of the courses and curriculum implemented by the university and other organizations in both national and international levels.
- 2.1.2 Provide workshops to develop skills on teaching and learning methods by information technology (IT).

2.2 Other Academic and Professional Skill Development

- 2.2.1 Support instructors to attend meetings, conferences, training sessions, seminars and research
- 2.2.2 Enhance experiences in research development by research grant writing and participate the research networks from internal and external organizations
- 2.2.3 Support instructors to participate academic services such as invited speaker in conferences, reviewer for research projects, articles and academic promotion, and invited lecturers

Section 7 Quality Assurance

1. Regulatory Standard

The curriculum has employed the Standard of Graduate Programs of Study B.E. 2563 (based on Thai Qualification Framework for Higher Education (HEd3) B.E. 2558). Developing and improving the curriculum has a clear process that is:

- 1.1 Implement the quality assurance system of Mahidol University.
- 1.2 There is a Program Executive Committee supervising, giving advice and formulating policies for the course committee, as well as giving approval to teaching and learning management and course development.
- 1.3 There are course coordinators, together with instructors, who are responsible for course planning, tracking and collecting data for continuous improvement and development of the courses every year.
- 1.4 Every lesson plan has been prepared, including measurement and evaluation, and skills development activities for students have been organized.
- 1.5 There is an assessment of satisfaction towards the courses and teaching and learning methods for improvement, and there is a follow-up of the evaluation data of each course from the Course Performance report.
- 1.6 Program Director, course coordinators, and lecturers have a meeting to plan and improve the teaching and learning of the programs in the next year.
- 1.7 Follow up and compile the Course Performance report, TQF5 of every courses at the end of each semester, including the preparation of the Program Performance report, TQF7 every academic year.
- 1.8 The Program Improvement Committee performs the improvement and development of the curriculum according to the five-year improvement cycle.

2. Graduates

2.1 The ultimate goal of the program is to produce qualified graduates as specified in Thai Qualification Framework for Higher Education. The graduates are expected to have the following characteristics:

1. Having honesty, discipline, punctuality, for institutional rule and academic ethics
2. Having knowledge in depth, research conceptual framework and methodology in Anatomy and Structural Biology

3. Having a professional skill to be able to apply research instruments for research area in Anatomy and Structural Biology
4. Being able to solve the problem, design, and process a research project; Being able to integrate and synthesize the knowledge of Anatomy and Structural Biology precisely and systemically in order to develop new knowledge
5. Being able to create academic innovations and researches; Being able to solve the problem of Anatomy and Structural Biology academically
6. Having teamworking skills; Being able to listen and integrate ideas; Having characteristics of a good leader and follower appropriately
7. Being able to analyze and integrate mathematical and statistical data; Being able to utilizing information technology effectively
8. Being proficient in the use of English language for communication; Being able to present and convey the knowledge through printing media verbally and nonverbally

2.2 Work of Graduates

Graduates who hold doctorates in Anatomy and Structural Biology are able to work as the following careers;

1. Specialist in Anatomy and Structural Biology
2. Academic instructors in Anatomy and Structural Biology
3. Researchers in Medical Science, and Scientists in Government and Private institutions, International and Non-governmental organizations
4. Regional and International consultants

2.3 Graduate outcomes

Plan 1 : Research Only

The program specifies that the entire or partial dissertation outputs must be published internationally whose manuscripts at least two, must be peer-reviewed according to announcement of the Faculty of Graduate Studies. Being the first author in a research article is required.

Plan 2 : Courses Work and Research

The program specifies that the entire or partial dissertation outputs must be published internationally whose manuscripts at least one, must be peer-reviewed according to

announcement of the Faculty of Graduate Studies. Being the first author in a research article is required.

The program encourages graduates to submit their research outputs to academic competitions nationally and internationally.

3. Students

3.1 Student recruitment and admission

The program has a system for recruiting graduate students who are qualified as defined in the curriculum, to further their study in the program in coordination with the educational administration such as academic qualifications, a cumulative grade point average (GPA) or national or international research publications. Applicants must also pass the English proficiency requirements including listening, speaking, and writing skills as required by the Faculty of Graduate Studies.

The program provides readiness preparation prior to enrollment for graduate students in English proficiency and basic knowledge in Biological Sciences. Students are able to register introductory courses such as English language skills from Faculty of Graduate Studies and Foundation of Anatomical Sciences provided by the program.

3.2 Supervision of academic advising, dissertation counseling for graduate students to maintain the high graduation rate as follows;

1. Student orientation will be organized. During the orientation, study plan, program content, academic life, faculty member introduction and departmental activities will be informed.

2. The students will also be guided by dissertation advisor in study and research plans.

3. In case of first-year students who do not have dissertation thesis advisor yet, they will temporarily be supervised by the program director.

4. Advisory schedule of all courses will be appointed for graduate students.

5. Academic staffs and seniors will also be assigned for the students to give their advices on qualifying examination and self-study processes.

3.3 Students have ready access to appeal procedure

Students can get access to appeal procedures, both informal and formal, at any steps of study and dissertation research activity to the Dean of the Faculty of Graduate Studies. Thereafter, the decision on any appealing issues will be assessed by the Dean of the Faculty of Graduate Studies.

4. Instructors

4.1 New staff recruitment

Department and Faculty recruit a new lecturer based on his/her qualifications and experiences from application forms which all applicants must hold a Ph.D. or equivalent. The selection committee evaluates all applicants by their knowledge, research abilities, English skills and information technology through academic report and presentation. The selection result is based on the academic qualifications in association with the standard of graduate program from the Ministry of Higher Education, Science, Research and Innovation, applicants' experiences and decisions from the selection committee. A new faculty will be in 1-year probation and evaluated every 6 months.

4.2 Staff participation for planning, evaluating and improving curriculum

Program committee and course instructors participate in teaching improvement by brainstorming. The meetings will be set regularly with an aim to assess and develop curriculum in order to meet the requirements from stakeholders.

4.3 Appointment for academic experts

A course coordinator is able to invite a special lecturer according to his/her qualification and expertise for teaching both theory and laboratory sessions in the program. Furthermore, the course coordinator nominates an academic expert to the program director for consideration and to Faculty for approval as a special lecturer.

4.4 Staff development

- 4.4.1 Staffs are encouraged to participate in the teaching development, research and academic services in both national and international levels.
- 4.4.2 New staffs attend an orientation for teaching management.

5. Program, Study and Student Assessment

5.1 Designing and regulating the courses in accordance to the frontier knowledge

The program develops the curriculum reaching the international standard by the following processes;

- (1) Investigate, benchmark and develop the curriculum annually to meet the international standard.
- (2) Evaluate the overall performance of courses in the program annually.
- (3) Evaluate the whole curriculum every 3 – 5 years.

5.2 Managing the course in systematic process for course instructors and teaching processes

The program manages each course by the following processes;

- (1) Appoint a course coordinator who is responsible for course regulation, objectives, schedule, examination and evaluation with course instructors and coordinate with the department and Graduate Education Division of the Faculty of Science.
- (2) Brainstorm with all course instructors and invited instructors for generating course outline following course objectives, lesson plan and course description and also assign related supporting staffs for meetings, course evaluations and improvements.

For an interdisciplinary course, the following processes are applied;

- (1) The program director notifies students to register a course as his/her study plan.
- (2) The program director coordinates with course instructors for students' grades.

5.3 Assessing and regulating the student performance by realistic and diverse criteria

- (1) Provide the evaluating processes of student performances in an individual course based on course objectives and his/her dissertation following the program's study plan which are evaluated by students, course instructors and program committee at the end of semester.
- (2) Provide the evaluating processes of student performances in curriculum level which are evaluated by students, stakeholders, alumni and external reviewers based on students' employments, awards and recognitions.

5.4 Teaching activities

The program organizes integrative teaching activities by teaching media and technology with the following teaching methods;

- (1) Lecture
- (2) Laboratory
- (3) Self-study
- (4) Group seminars and academic conferences

5.5 Curriculum performance based on Thailand Qualification Framework

- (1) Prepare the detailed curriculum following TQF2
- (2) Prepare the detailed course description following TQF3 before starting all courses
- (3) Prepare the course's progressed report following TQF5 after the end of semester
- (4) Prepare the curriculum's progressed report following TQF7 after the end of academic year

- (5) Assess students' performances based on knowledge standard following TQF3
- (6) Develop and improve teaching activities and strategies, and evaluate learning assessments from the past curriculum's progressed report following TQF7

6. Learning Support

The program has invested the learning resources for students. An annual budget for adequate books, learning media, audio-visual and computer equipments is supported by Faculty of Graduate studies and Faculty of Science.

6.1 Current learning resource

- 1) Faculty of Science provides library, computer rooms, electronic database, computer network and internet for searching information from both national and international institutes.
- 2) Faculty and Department provide adequate laboratory rooms for teaching and research in Anatomy and Structural Biology for staffs and students.
- 3) Program provides classrooms with adequate audio-visual equipments and learning materials such as multimedia projectors, computers, high-speed internet.
- 4) Program maintains Learning environment facilitates sufficient academic activities.

6.2 Additional learning resource

Faculty has an evaluating committee for book and journal selection, and learning resource acquisition, including books, academic journals and learning materials as requested by students and associated by the program and course instructors. Moreover, the program is able to propose the required learning materials and research equipments for budget support from both Faculty of Science and Faculty of Graduate Studies.

6.3 Evaluation of learning resource sufficiency

Faculty surveys a sufficiency for books, academic journals and other learning materials based on the satisfactory forms and requests by students and staffs. Furthermore, the program improves the satisfaction of current learning resources according to students and staffs' evaluation.

7. Key Performance Indicators

The doctor of Philosophy program in Anatomy and Structural Biology, Department of Anatomy, Faculty of Science, divides key performances based on the curriculum that meets the standards of Thai Qualifications Framework following conditions: (1) the compulsory

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

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

Key Performance Indicators	Academic Year				
	2022	2023	2024	2025	2026
10. The number of supporting staff who demonstrate academic and/ or professional improvement by at least 50 percent each year.	✓	✓	✓	✓	✓
11. The level of satisfaction from the previous year's students and new graduates toward curriculum quality, with an average score of at least 3.5 out of 5	✓	✓	✓	✓	✓
12. The level of satisfaction from employers of new graduates with an average score of at least 3.5 out of 5	-	-	-	-	✓

Section 8 Evaluation and Improvement of the Curriculum Implementation

1. Evaluation on the Teaching Efficiency

1.1 Evaluation of Teaching Strategies

1.1.1 Analysis from students' evaluation towards courses and instructors and evaluate strengths and weaknesses for development in teaching strategies

1.1.2 Evaluation of students' learning (Following TQF5)

1.1.3 Meeting for course evaluation and suggestions for teaching development

1.2 Evaluation of Instructors' Skills in Using Teaching Strategies

1.2.1 Analysis students' evaluation towards courses and instructors in all aspects

1.2.2 Investigation by course co-ordinators, program directors, or instructors

1.2.3 Meeting for course evaluation and suggestions for teaching skill enhancement

2. Overall Evaluation of the Curriculum

2.1 Curriculum evaluation from final year students

2.2 Curriculum evaluation from graduated students or new graduates and external expertise

2.3 Curriculum evaluation from stakeholders

3. Evaluation of Curriculum Implementation in Accordance with the Curriculum

Evaluation is made annually by the program director and curriculum committee according to the key performance indicators of TQF2, section 7, item 7. The criteria of curriculum revision are follow;

“Excellent” means the program has all Key Performance Indicators.

“Good” means the program shows 80% of Key Performance Indicators,

“Fair” means the program does not cover the first 5 Key Performance Indicators

4. Review of the Evaluation and Plans for Improvement

4.1 Collect all information, advices, and evaluations by course co-ordinator and report annually to program director

4.2 Review and analyze the above information by annual report to the head of department

4.3 Meet the curriculum committee for reviewing and analyzing progressed curriculum

4.4 After completion of 4-year program (for Plan 2.1) or 5-year program (for Plan 2.2), the curriculum committee revises the academic curriculum in the past 5 years according to comments and suggestions, propose the revision plan to the university within the fourth year, and submit the revised curriculum before the fifth year of current curriculum

4.5 Present the improvement plan for the program