

Program Specification
Master of Science Program in Anatomy and Structural Biology
(International Program)
Curriculum Last Revised in 2017

(Approved by Mahidol University Council on 21 June 2017, and
started in the 1st semester of academic year 2017 onwards)

1. Program Title Master of Science Program in Anatomy and Structural Biology
(International Program)

2. Degree Name Master of Science (Anatomy and Structural Biology)
Abbreviation M.Sc. (Anatomy and Structural Biology)

3. Responsible Units

3.1 Teaching Unit: Department of Anatomy, Faculty of Science, Mahidol University
3.2 Awarding Unit: Faculty of Graduate Studies, Mahidol University

4. Philosophy of the Program

The Master of Science program aims at producing graduates who have knowledge and research capability in the field of anatomy and structural biology, with a moral and ethical responsibility in the work.

5. Expected Learning Outcomes of the Program

Upon completion of the doctoral program, graduates must be able to:

1. Graduates exhibit honest, responsible, disciplined, and punctual behaviors including complying with regulations; and maintain ethical standards in academic and research contexts.
2. Graduates are able to acquire up-to-date knowledge and thorough understanding of the principles and theoretical aspects of anatomy and structural biology.
3. Graduates demonstrate their proficiency in the use of research equipment in the field of anatomy and structural biology.
4. Graduates are able to analyze, synthesize, design, and carry out research on the anatomy and structural biology in a well-organized format.

5. Graduates possess a good relationship, skills in teamwork, and responsibility for the duties assigned.
6. Graduates demonstrate essential skills on numerical and statistical analysis involving in their research, with the use of appropriate information and communication technology.
7. Graduates are able to communicate in oral and written modes and present their work through international publications.

6. Admission Requirements

- 1) Applicants must hold a Bachelor of Science degree in relevant life science fields, Bachelor of Nursing Science or other courses in medical science from institutions accredited by the Office of the Higher Education Commission.
- 2) Applicants must get a cumulative grade point average of not less than 2.50.
- 3) Applicants must have English language examination results passed the criteria of the Faculty of Graduate Studies, Mahidol University.
- 4) Those with qualifications other than the above criteria may be considered to apply for admission at the discretion of the Program Director and the Dean of the Faculty of Graduate Studies.

7. Selection Methods

Applicants are selected based on their academic performance and research experience, and interview according to the regulations of the Faculty of Graduate Studies, Mahidol University. Foreign applicants may be interviewed by phone and must provide proof of financial support during the study period to be considered for enrollment. The final decision will be made under the consideration of the Program Committee with the approval of the Dean of the Faculty of Graduate Studies, Mahidol University.

8. Language

English is used in teaching as well as in all evaluation processes.

9. Program Structure

9.1 The number of credits to be studied throughout the program

- Not less than 36 credits

9.2 Curriculum Structure

Required courses	18 credits
Elective courses not less than	6 credits
Thesis	12 credits
Total not less than	36 credits

9.3 Course Requirements

9.3.1 Required Course

	Credits (lecture-lab-self study)
SCAN 502 Structural Neurobiology	3(2-3-5)
SCAN 521 Human Gross Anatomy Dissection	2(0-4-2)
SCAN 522 Structural Biology of Cell and Tissue	3(2-3-5)
SCAN 523 Structure and Development of Human Body	3(3-0-6)
SCAN 613 Seminar in Anatomy and Structural Biology I	1(1-0-2)
SCAN 614 Seminar in Anatomy and Structural Biology II	1(1-0-2)
SCID 500 Cell and Molecular Biology	3(3-0-6)
SCID 514 Animal Experimentation in Biomedical Research	1(0-2-1)
SCID 518 Generic Skills in Science Research	1(0-2-1)

9.3.2 Elective Courses

	Credits (lecture-lab-self study)
SCAN 620 Selected Topics in Cellular Neuroscience	1(1-0-2)
SCAN 621 Essential Topics in Integrative Developmental Biology	1(1-0-2)
SCAN 622 Human Embryonic Development	2(2-0-4)
SCAN 623 Selected Topics in Medical and Developmental Genetics	1(1-0-2)
SCID 507 Microscopic Technique	1(0-2-1)
SCID 508 Biomolecular and Spectroscopic Techniques	1(0-2-1)
SCID 509 Separation Techniques	1(0-2-1)
SCID 510 Immunological Methods	1(0-2-1)
SCID 511 Gene Technology	1(0-2-1)
SCID 513 Animal Cell Culture Techniques	1(0-2-1)
SCID 516 Biostatistics	3(3-0-6)
SCID 531 Microcomputer Applications	3(3-0-6)
SCID 532 Computer Programming	3(3-0-6)
SCID 533 Word Processing and Presentation Applications for Research	1(0-2-1)
SCID 534 Spreadsheet Application for Research	1(0-2-1)
SCID 535 Database Management for Research	1(0-2-1)

Note: Students can enroll in other courses offered by graduate programs of Mahidol University with approval from the program director and their major advisors.

9.3.3 Thesis

	Credits (lecture-lab-self study)
SCAN 698 Thesis	12 (0-48-0)

9.3.4 Research Projects of the Program

(1) Cellular and molecular biology research related to:

1. Shrimp biotechnology
2. Molecular mechanisms of the adaptation of aquatic animals and excretory systems
3. Molecular interactions and related receptors on the cell surface
4. Study of pathogenesis using a *C. elegans* cell model
5. Mechanism of organ injury using genetically modified mice

(2) Neuroscience research related to:

1. Mechanism of neurodegeneration at the cellular and molecular levels
2. Prevention of death of neurons in the model of Parkinson's disease
3. Neurotoxicology
4. Neurohormonal regulation of growth and reproduction in shrimp and shellfish
5. Gene expression related to neurological disorders

(3) Stem cells and embryo technology in mammals research related to:

1. Study of embryonic stem cell changes

(4) Reproductive biology and endocrinology in economic animals related to

1. Endocrine stimulation of the reproductive process in abalone and shrimp
2. Characteristics and distribution of neuropeptides in abalone and shrimp
3. Mechanism of germ cell growth
4. Reproductive biology in shrimp
5. Modification of genes in aquatic animals to accelerate reproduction

(5) Cancer research related to:

1. Cancer cell metastasis
2. Medicinal herb properties for anti-viral and anti-cancer effects

9.3.5 Definition of Course Codes

The 4-digit character has the following meaning:

The first 2 digits are the abbreviations for the faculty responsible for teaching and learning.

SC refers the Faculty of Science

The next 2-digit letter is the abbreviation of the department responsible for teaching and learning.

AN refers Department of Anatomy

BT refers the Department of Biotechnology

BC refers to the Department of Biochemistry

ID refers to the inter-departmental courses

The 3 numbers, 5xx, 6xx, 7xx and 8xx represents graduate course levels.

9.4 Study Plan

Year	Semester 1	Semester 2
1	SCID 500 Cell and Molecular Biology 3(3-0-6) SCID 518 Generic Skills in Science Research 1(1-0-2) SCAN 523 Structure and Development of Human Body 3(3-0-6) SCAN 521 Human Gross Anatomy Dissection 2(0-4-3) Electives 3 Credits Total 12 Credits	SCAN 502 Structural Neurobiology 3(2-3-5) SCAN 522 Structural Biology of Cell and Tissue 3(2-3-5) SCID 514 Animal Experimentation in Biomedical Research 1(0-2-1) Electives 3 Credits Total 10 Credits
2	SCAN 613 Seminar in Anatomy and Structural Biology I 1(1-0-2) SCAN 698 Thesis 6(0-24-0) Total 7 Credits	SCAN 614 Seminar in Anatomy and Structural Biology II 1(1-0-2) SCAN 698 Thesis 6(0-24-0) Total 7 Credits

10. Thesis requirements

Research topics for Thesis must be related to anatomy and structural biology to create knowledge. Thesis work must be published in Proceedings or journals.

10.1 Evaluation process

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

11. Graduation criteria

- 1) The duration of the study is in accordance with the study plan.

- 2) Must complete the thesis according to the number of credits required.
- 3) Must pass the English language examination according to the criteria of the Faculty of Graduate Studies, Mahidol University
- 4) Must participate in soft skill activities according to the criteria of the Faculty of Graduate Studies, Mahidol University
- 5) Must submit a Thesis, and conduct a final oral examination, which is open for interested parties to listen.
- 6) Must have at least one research paper published in peer-reviewed national or international Proceedings or journals, with the student's name as the first author.

12. Appeal Procedure

Students can appeal directly to the Dean of the Faculty of Graduate Studies, either in the form of self-contact or as a document.

13. Teaching and learning activities

Teaching and learning activities are organized by linking and integrating knowledge using various teaching materials and educational technology. Teaching methods include:

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

14. Learning Resources

14.1 The Faculty of Science has a library, a computer room and electronic database in the field of the Program. There is a computer network system that can be accessed locally or remotely.

14.2 The department has enough laboratory space in addition to the central facilities provided by the Faculty of Science.

14.3 There are classrooms, teaching media, educational materials, with audio-visual equipment that are sufficient for teaching such as multimedia projectors, computers, WI-FI high speed internet, etc.

14.4 Environment and atmosphere are conducive to effective learning.

15. Job opportunity

- Academic staff in anatomy and structural biology in educational institutions
- Researchers in medical science and related science in public and private academic institutions
- Scientists in academic or research institutes