



Program Structure and Specification
Master of Science Program in Biochemistry
(International Program)
Curriculum Last Revised in 2018
for
Students Entering in Academic Year 2018

1. Program Title Master of Science Program in Biochemistry (International Program)

2. Name of Degree

Full name : Master of Science (Biochemistry)
 Abbreviation : M.Sc. (Biochemistry)

3. Responsible Units

3.1 Department of Biochemistry, Faculty of Science, Mahidol University
 3.2 Faculty of Graduate Studies, Mahidol University

4. Philosophy and Expected Learning Outcomes of the Program

4.1 Philosophy of the Program:

To produce graduate students (M.Sc.) knowledgeable in biochemistry and molecular biology with high quality research output, having good research ethics and morality, and able pass on correct and trustable knowledge in biochemistry and molecular biology to the society.

4.2 Expected Learning Outcomes of the Program:

Expected Learning Outcomes of our master program are formulated according to the recommended “Standard for Doctoral Degrees in the Molecular Biosciences” published by International Union of Biochemistry and Molecular Biology in 2011 as following:

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

- 4.2.1 demonstrate proper ethical conduct for research and scientific professions.
- 4.2.2 demonstrate effective English communication skills in both verbal and writing.
- 4.2.3 independently operate international-standard laboratory experiments in biochemistry.
- 4.2.4 apply in-depth knowledge in biochemistry for evaluation and discussion of new research finding as well as for research communication.
- 4.2.5 generate research output with quality acceptable by scientific community, especially in biochemistry and molecular biology.

5. Admission Requirements

5.1 Applicants must hold, or expect to hold before enrollment, a bachelor's degree in any area of science or a bachelor's degree in clinical and health sciences with GPA of at least 2.50. Applicants from institutions outside Thailand must hold the equivalent of a Thai bachelor's degree from a college or university recognized by Office of the Higher Education Commission.

- 5.2 Applicants must meet the minimum English language proficiency requirement set by the Faculty of Graduate Studies, Mahidol University.
- 5.3 Applicants whose credentials differ from above requirement could apply to the program if the permission is granted by the Administrative Program Committee in concurrence with the Faculty of Graduate Studies.

6. Selection Method

Applicants are selected based on academic/research credentials and interview according to rules and regulation of the Faculty of Graduate Studies, Mahidol University. International applicants may be subjected to phone/online interview and must provide proof of financial support during the study period to be considered for admission. Final judgment will be made under the consideration of the Administrative Program Committee in concurrence with the Dean of Faculty of Graduate Studies, Mahidol University.

7. Academic System

7.1 Semester system

Semester

7.2 Credit Assignment

The number of credits assigned to each subject is determined as follows:

- 7.2.1 Lecture or discussion consuming 15 hours per semester is equal to 1 credit hour.
- 7.2.2 Laboratory or practice consuming 30 hours per semester is equal to 1 credit hour.
- 7.2.3 Thesis consuming 45 hours per semester is equal to 1 credit hour.

8. Language

English is used in teaching and learning as well as in the assessment processes.

9. Registration

- 9.1 Students must register as full time students.

- 9.2 Students must register for no less than 9 credits and no more than 15 credits per regular semester, or according to program study plan.

10. Evaluation and Graduation Requirements

10.1 Evaluation

Student evaluation is in accordance with the rules and regulations of Mahidol University. (See details at <http://www.grad.mahidol.ac.th>)

10.2 Graduation Requirements

All master's degree students must

- 10.2.3 register for no less than 24 credits of coursework and 12 credits of thesis. Total credits acquired must be no less than 36 credits. A cumulative GPA must be 3.00 or more.
- 10.2.4 pass the English Proficiency Examination offered by the Faculty of Graduate Studies, Mahidol University or equivalent.
- 10.2.5 pass the professional and personal skills development according to the rules and regulations of the Faculty of Graduate Studies, Mahidol University.
- 10.2.6 present thesis and pass the oral thesis defense examination according to the rules and regulations of the Faculty of Graduate Studies, Mahidol University.
- 10.2.7 obtain at least one publication or a manuscript that has been accepted for publication as a journal article or a conference proceeding at the national or international level according to the rules and regulations of the Faculty of Graduate Studies, Mahidol University.

11. Library

Our Stang Mongkolsuk Library possesses more than 10,000 books. Many journals can be accessed online. Besides, a lot of text books and journals (in both electronic and printed formats) are available at other libraries within Mahidol University.

12. Program Structure

12.1 The number of credits required for the program

Number of credits required for the program is at least 36 credits

12.2 Curriculum Structure

The program is set according to the Ministry of Education Announcement titled “Standard Criteria for Graduate Studies 2005”, with specified plan A(2) curriculum.

12.2.1 Required Courses	14	credits
12.2.2 Elective Courses at least	10	credits
12.2.3 Dissertation	12	credits
Total no less than	36	credits

12.3 Course Requirements

12.3.1	<u>Required Courses</u>		<u>Credits (lecture-lab-self study)</u>
	SCID 502 Cell Science		2 (2-0-4)
	SCID 506 Concepts of Molecular Bioscience		2 (2-0-4)
	SCID 518 Generic Skills in Science Research		1 (1-0-2)
	SCBC 603 Advanced Biochemistry Laboratory		2 (0-4-2)
	SCBC 604 Biochemistry Seminar I		1 (1-0-2)
	SCBC 606 Biochemistry Seminar II		1 (1-0-2)
}	SCBC 609 Structure and Mechanism of Enzymes		2 (2-0-4)
	SCBC 610 Modern Metabolism		2 (2-0-4)
	SCBC 612 Functional Genetics and Genomics		2 (2-0-4)
*	SCBC 619 Integrated Skills in Biochemical Research		3 (2-2-5)

Note: { Students select to enroll one of these three courses most related to the student's research.

* New course

12.3.2	<u>Elective Courses</u>		<u>Credits (lecture-lab-self study)</u>
	SCID 500 Cell and Molecular Biology		3 (3-0-6)
	SCID 503 Systemic Bioscience		3 (3-0-6)
	SCID 507 Microscopic Technique		1 (0-2-1)
	SCID 508 Biomolecular and Spectroscopy 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 512 Receptor Binding and Enzyme Kinetic Assays		1 (0-2-1)
	SCBT 602 Gene Regulation		3 (3-0-6)

Note: Besides the above elective courses, students can enroll in other courses offered by graduate programs of Mahidol University with approval from the program director, major advisor, or program administrative committee.

12.3.3 <u>Thesis</u>	SCBC 698 Thesis	<u>Credits (lecture-lab-self study)</u>
		12 (0-48-0)

12.3.4 Research Projects of the Program

Staff at the Department of Biochemistry has received many research grants from local agencies (e.g. National Science and Technology Development Agency (NSTDA), Thailand Research Fund (TRF), TRF-Golden Jubilee, National Research Council of Thailand (NRCT)) and overseas granting agencies (e.g. World Health Organisation (WHO), Wellcome Trust and Third World Academy of Science (TWAS)). Major research interests in the Department are:

- Parasite and bacterial biochemistry and molecular biology
- Protein and enzyme structure and function
- Molecular metabolism and gene regulation
- Biochemistry and molecular biology of cancers
- Plant biochemistry
- Biochemistry and molecular biology of shrimp pathogens
- Biological and biomedical nanotechnology
- Bone metabolism and ion transport
- Systems biology and bioinformatics

12.4 **Course Code Explanation**

Two first letters represent the abbreviated name of Faculty

SC = Faculty of Science

GR = Faculty of Graduate Studies

The third and fourth letters represent the abbreviated name of responsible units

ID = Inter-departmental Courses

BC = Department of Biochemistry

BT = Department of Biotechnology

MI = Department of Microbiology

PM = Department of Pharmacy

TX = Toxicology Graduate Program

The first numbers (5XX and 6XX) represent postgraduate program level.

12.5 Study Plan

Year	Semester 1				Semester 2		
	Course	Subject	Credit	Course	Subject	Credit	
1	SCID 502	Cell Science	2(2-0-4)	SCBC 603	Advanced Biochemistry Laboratory	2(0-4-2)	
	SCID 506	Concepts of Molecular Bioscience	2(2-0-4)	SCBC 612	Functional Genetics and Genomics	2(0-4-2)*	
	SCID 518	Generic Skills in Science Research	1(1-0-2)				
	SCBC 609	Structure and Mechanism of Enzymes	2(2-0-4)*				
	SCBC 610	Modern Metabolism	2(2-0-4)*				
		Elective Courses	4 credits		Elective Courses	6 credits	
	SCID 500	<i>Recommended elective course</i> Cell and Molecular Biology	3(3-0-6)				
		Total	9-11 credits			Total	8-10 credits
2	SCBC 604	Biochemistry Seminar I	1(1-0-2)	SCBC 606	Biochemistry Seminar II	1(1-0-2)	
	SCBC 619	Integrated Skills in Biochemical Research	3(2-2-5)				
	SCBC 698	Thesis	2(0-8-0)	SCBC 698	Thesis	5(0-20-0)	
		Total	6 credits			Total	6 credits
3	SCBC 698	Thesis	5(0-20-0)				
		Total	5 credits				

* Students select to enroll 1 of these 3 courses most related to the student's research.

13. Thesis Research Proposal Presentation

In the second year of study, students must submit a document to the Faculty of Graduate Studies for appointment of Thesis Proposal Committee consisting of at least 2 faculty members, one of which is student's major advisor while another one (or more) can be any academic staff either within or outside Mahidol University. After approval of thesis research proposal, this same committee will serve as Thesis Advisory Committee monitoring and providing guidance to student regarding his/her master's research.

14. Thesis Defense

Upon completion of master's research and thesis writing along with approval from the Thesis Advisory Committee, students must submit a document to the Faculty of Graduate Studies for appointment of the Thesis Defense Committee consisting of at least 4 members: a committee chair, an external examiner and the Thesis Advisory Committee (at least 2 members). After passing the oral thesis defense, students must submit the final thesis to the Faculty of Graduate Studies.

15. Collaboration with Other Departments

Many of our faculty members are members of multidiscipline research centers such as Center for Excellence in Protein and Enzyme Technology, Center of Excellence for Vectors and Vector-Borne Diseases, Center of Excellence for Shrimp Molecular Biology and Biotechnology, Center of Calcium and Bone Research, Center for Neuroscience, Integrative Computational Bioscience Center. We also have collaborations with scientists at other research institutes and universities in Thailand and overseas.

16. Students Job Opportunities

A large number of our student alumni work as teachers in school, researchers or research assistance in research institutes, technical specialists for scientific products, sales representative of scientific products, or as scientists in food, pharmaceutical, cosmetic and chemical industries.