MBMB

“The graduate program in Molecular and Integrative Biosciences (MBMB) builds upon the solid foundation of the previous graduate program in Molecular Genetics and Genetic Engineering (MGGE), which was first launched in 1995. The newly design program aims to empower students with cutting-edge knowledge and skills in the rapidly evolving fields of molecular biology and integrative biosciences. With a strong focus on interdisciplinary research and practical applications, the program provides a dynamic environment where students can thrive, grow, and prepare for the challenges of a global scientific landscape. Our mission is to nurture the next generation of scientists and innovators, equipping them with the expertise, critical thinking, and creativity needed to drive scientific discovery and contribute to advancements in health, biotechnology, and sustainable development.”

Program Specification
Doctoral Program in Molecular and Integrative Biosciences
(International Program / Revised Program in 2025)
(Multidisciplinary Program)

Name of Institution Mahidol University

Campus/Faculty/Department Institute of Molecular Biosciences

Program Title

Doctor of Philosophy Program in Molecular and Integrative Biosciences (International Program) (Multidisciplinary Program)

Degree Offered and Field of Study

Full Name: Doctor of Philosophy (Molecular and Integrative Biosciences)

Abbreviation: Ph.D. (Molecular and Integrative Biosciences)

Philosophy

The program intends to produce graduates with practical knowledge, technical expertise, and innovative thinking by focusing on outcome-based education and constructivist principles for their self-development of novel knowledge, sophisticated skills, and innovative concepts in Molecular and Integrative Biosciences

Program–Level Learning Outcomes: PLOs

When complete the learning of the program, students will be able to:

(1) Evaluate and integrate novel ideas to synthesize complex knowledge systems within the field of Molecular and Integrative Biosciences.

(2) Create and internationally publish high-quality research in Molecular and Integrative Biosciences.

(3) Adhere to and advise best practices for ethics and integrity in both personal and professional practices.

(4) Possess academic and research communication, leadership and adaptability in diverse, interdisciplinary, and international environments.

Career Opportunities of the Graduates

- Researcher
- Academic Personnel/Lecturer
- Entrepreneur / Innovator
- Product Specialist / Technical Support Staff
- Science Communicator

Curriculum Structure, Course of the Program and Credits

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.

2. Curriculum

2.1 Curriculum Structure

Plan 2.1 (students with a Master's degree):

- Required courses 9 credits
- Elective courses not less than 3 credits
- Dissertation 36 credits

Total not less than 48 credits

Plan 2.2 (students with a Bachelor's degree):

- Required courses 15 credits
- Elective courses not less than 9 credits
- Dissertation 48 credits

Total not less than 72 credits

2.2 Courses of the Program

2.2.1 Courses of the Program

a) Required Courses

For Plan 2.1 (for students with a Master's degree) **9 credits**

Course Code	Course Title	Credits (lect-lab-self)
MBMB 600	Graduate School Essentials for Ph.D. Students in Molecular and Integrative Biosciences	2 (2–0–4)
MBMB 604	Ph.D. Research Design in Molecular and Integrative Biosciences	1 (0–2–1)
MBMB 605	Ph.D. Seminar in Molecular and Integrative Biosciences	2 (2–0–4)
MBMB 606	Ph.D. Research Forum	2 (2–0–4)
MBMB 607	Ph.D. Research Communication to the General Public	2 (2–0–4)

For Plan 2.2 (for students with a Bachelor's degree) **15 credits**

Course Code	Course Title	Credits (lect-lab-self)
MBMB 600	Graduate School Essentials for Ph.D. Students in Molecular and Integrative Biosciences	2 (2–0–4)
MBMB 501	Molecular Biology	2 (1–2–3)
MBMB 502	Cell Biology	3 (2–2–5)
MBMB 503	Integrative Biosciences	1 (0–2–1)
MBMB 604	Ph.D. Research Design in Molecular and Integrative Biosciences	1 (0–2–1)
MBMB 605	Ph.D. Seminar in Molecular and Integrative Biosciences	2 (2–0–4)
MBMB 606	Ph.D. Research Forum	2 (2–0–4)
MBMB 607	Ph.D. Research Communication to the General Public	2 (2–0–4)

b) Elective Courses

Several elective courses may be recommended to students as specialized pathways, tailored to the relevance of their thesis projects, including but not limited to the following:

For Plan 2.1 (from M.Sc.) and **2.2 (from B.Sc.)**

Specific skills recommendation **Generic skills recommendation**

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 621	Advanced Current Topics in Molecular and Integrative Biosciences	1 (1–0–2)								
MBMB 622	Apprentice Teaching (Ph.D.)	1 (0–2–1)								
MBMB 623	Career Development for Molecular Biosciences Students (Ph.D.)	1 (0–2–1)								

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 624	Adeno-Associated Viral Vectors	1 (0–2–1)	■				■		■	
MBMB 625	Antibacterial and Bacteriophage	2 (1–2–3)		■		■				
MBMB 626	Bacteriology	2 (2–0–4)		■						
MBMB 627	Bio-Based Products for Sustainability	1 (0–2–1)						■		
MBMB 628	Biosensor Technology: Fundamentals and Applications	2 (2–0–4)			■		■	■		
MBMB 629	Cancer Biology and Precision Medicine	2 (2–0–4)	■		■	■				■

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 630	Cellular and Molecular Imaging	1 (1–0–2)	■		■	■	■		■	■
MBMB 631	CRISPR/Cas9 Genome Editing	1 (0–2–1)	■		■		■		■	
MBMB 632	DNA Barcoding	1 (0–2–1)						■		
MBMB 633	DNA Sequencing for Bacterial Pathogen Study	1 (0–2–1)		■						
MBMB 634	Drug Discovery and Development	1 (0–2–1)				■				■
MBMB 635	Environmental DNA (eDNA): Technique for Biodiversity Conservation	1 (0–2–1)						■		

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 636	Experimental Animals for Biosciences Research	1 (0–2–1)	■				■		■	■
MBMB 637	Fluorescent Protein Technology and Yeast Genome Engineering	1 (0–2–1)				■				
MBMB 638	Fundamental Neuroscience	1 (1–0–2)			■	■	■			
MBMB 639	Induced Pluripotent Stem Cell (iPSC) Generation and Characterization	1 (0–2–1)	■			■			■	
MBMB 640	Introduction to Machine Learning for Molecular Biosciences Research	1 (1–0–2)		■		■		■		■
MBMB 641	Lentiviral Vectors	1 (0–2–1)	■				■		■	

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 642	mRNA Vaccine Development	1 (0–2–1)								
MBMB 643	Omics in Gene Regulation Studies	1 (1–0–2)								
MBMB 644	PCR-Based Gene Mutagenization for Protein Engineering	1 (0–2–1)								
MBMB 645	Prime Editing Technique	1 (0–2–1)								
MBMB 646	Proteomics Technologies and Applications	1 (1–0–2)								
MBMB 647	Research to Business	1 (0–2–1)								

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 648	Starch Modification for Functional Food Innovation	1 (0–2–1)								
MBMB 649	Structural Bioinformatics and Drug Design	1 (0–2–1)								
MBMB 650	Technological Innovative Learning	2 (2–0–4)								
MBMB 651	Thalassemia: From Bench to Bedside	2 (1–2–3)								
MBMB 652	Vaccine Design	1 (1–0–2)								
MBMB 653	Vaccine Technology and Development	1 (1–0–2)								

Course Code	**Course Title**	**Credits** (lect-lab-self)	**Pathway 1**: Advanced Therapy Medicinal Products (ATMPs)	**Pathway 2**: Antibiotic Resistance	**Pathway 3**: Biosensor Technology	**Pathway 4**: Drug Discovery and Precision Medicine	**Pathway 5**: Integrative Neuroscience Research	**Pathway 6**: Sustainable AgriTech	**Pathway 7**: Thalassemia Research	**Pathway 8**: Vaccines and Antiviral Drugs
MBMB 654	Virological Techniques	2 (0–4–2)								
MBMB 655	Virus and Cell Interaction	2 (2–0–4)								
MBMB 656	Working with Pathogens in Secure Laboratory (BSL2/BSL3)	1 (0–2–1)								

In addition to elective courses mentioned above, students may register other graduate courses offered by other Mahidol University's international (graduate) programs or the ones offered by international (graduate) programs of other universities according to the students' interest with the approval of the curriculum committee or their advisor.

c) Dissertation

For Plan 2.1 (for students with a Master's degree) **36 credits**

Course Code	Course Title	Credits (lect-lab-self)
MBMB 699	Dissertation	36 (0–108–0)

For Plan 2.2 (for students with a Bachelor's degree) **48 credits**

Course Code	Course Title	Credits (lect-lab-self)
MBMB 799	Dissertation	48 (0–144–0)

2.3 Study Plan

For Plan 2.1 (for students with a Master's degree)

Year	Semester 1			Semester 2		
1	**MBMB 600**	Graduate School Essentials for Ph.D. Students in Molecular and Integrative Biosciences	2 (2–0–4)	**MBMB 604**	Ph.D. Research Design in Molecular and Integrative Biosciences	1 (0–2–1)
	MBMB 605	Ph.D. Seminar in Molecular and Integrative Biosciences	2 (2–0–4)	**-**	**Qualifying Examination**	-
	Elective course		1 credit	**MBMB 699**	Dissertation	7 (0–21–0)
		Total	**5 Credits**		**Total**	**8 credits**
2	**MBMB 699**	Dissertation	7 (0–21–0)	**MBMB 606**	Ph.D. Research Forum	2 (2–0–4)
	Elective course		1 credit	**MBMB 699**	Dissertation	7 (0–21–0)
				Elective course		1 credit
		Total	**8 credits**		**Total**	**10 credits**
3	**MBMB 607**	Ph.D. Research Communication to the General Public	2 (2–0–4)	**MBMB 699**	Dissertation	8 (0–24–0)
	MBMB 699	Dissertation	7 (0–21–0)			
		Total	**9 credits**		**Total**	**8 credits**
Grand Total = 48 credits (as a minimum)						

For Plan 2.2 (for students with a Bachelor's degree)

<table>
<tr><th>Year</th><th colspan="3">Semester 1</th><th colspan="3">Semester 2</th></tr>
<tr><td rowspan="5">1</td><td>MBMB 600</td><td>Graduate School Essentials for Ph.D. Students in Molecular and Integrative Biosciences</td><td>2 (2–0–4)</td><td>-</td><td>Qualifying Examination</td><td>-</td></tr>
<tr><td>MBMB 501</td><td>Molecular Biology</td><td>2 (1–2–3)</td><td colspan="3" rowspan="3">• Collect elective courses (at least 6 credits) following recommended specialized pathway (consult with tentative thesis advisor), <u>or</u>
• Choose any elective courses (at least 6 credits) as you like (no pathway)</td></tr>
<tr><td>MBMB 502</td><td>Cell Biology</td><td>3 (2–2–5)</td></tr>
<tr><td>MBMB 503</td><td>Integrative Biosciences</td><td>1 (0–2–1)</td></tr>
<tr><td></td><td>Total</td><td>8 Credits</td><td></td><td>Total</td><td>6 credits</td></tr>
<tr><td rowspan="5">2</td><td>MBMB 604</td><td>Ph.D. Research Design in Molecular and Integrative Biosciences</td><td>1 (0–2–1)</td><td>MBMB 606</td><td>Ph.D. Research Forum</td><td>2 (2–0–4)</td></tr>
<tr><td>MBMB 605</td><td>Ph.D. Seminar in Molecular and Integrative Biosciences</td><td>2 (2–0–4)</td><td>MBMB 799</td><td>Dissertation</td><td>8 (0–24–0)</td></tr>
<tr><td>MBMB 799</td><td>Dissertation</td><td>8 (0– 24–0)</td><td rowspan="2">Elective course</td><td rowspan="2"></td><td rowspan="2">1 credit</td></tr>
<tr><td>Elective course</td><td></td><td>1 credit</td></tr>
<tr><td></td><td>Total</td><td>12 credits</td><td></td><td>Total</td><td>11 credits</td></tr>
<tr><td rowspan="3">3</td><td>MBMB 607</td><td>Ph.D. Research Communication to the General Public</td><td>2 (2–0–4)</td><td>MBMB 799</td><td>Dissertation</td><td>8 (0–24–0)</td></tr>
<tr><td>MBMB 799</td><td>Dissertation</td><td>8 (0–24–0)</td><td>Elective course</td><td></td><td>1 credit</td></tr>
<tr><td></td><td>Total</td><td>10 credits</td><td></td><td>Total</td><td>9 credits</td></tr>
<tr><td rowspan="2">4</td><td>MBMB 799</td><td>Dissertation</td><td>8 (0–24–0)</td><td>MBMB 799</td><td>Dissertation</td><td>8 (0–24–0)</td></tr>
<tr><td></td><td>Total</td><td>8 credits</td><td></td><td>Total</td><td>8 credits</td></tr>
<tr><td colspan="7">Grand Total = 72 credits (as a minimum)</td></tr>
</table>

Admission and Graduation Requirements

Admission Requirements

Plan 2.1 For students with a Master's degree

(1) Holding a Master's Degree or equivalent in biological sciences or other related fields.
(2) Have cumulative GPA not less than 3.50.
(3) Have and English Proficiency Examination score as the requirement of Faculty of Graduate Studies.
(4) Other requirements shall follow those that specified by the Faculty of Graduate Studies.
(5) Qualifications different from (2) – (4) may be considered by the Program Administrative Committee and the Dean of the Faculty of Graduate Studies.

Plan 2.2 For students with a Bachelor's degree

(1) Holding a Bachelor's Degree or equivalent in biological sciences or other related fields.
(2) Have cumulative GPA not less than 3.50.
(3) Have and English Proficiency Examination score as the requirement of Faculty of Graduate Studies.
(4) Other requirements shall follow those that specified by the Faculty of Graduate Studies.
(5) Qualifications different from (2) – (4) may be considered by the Program Administrative Committee and the Dean of the Faculty of Graduate Studies.

Graduation Requirements

(1) Students must complete their courses as stated in the curriculum with a minimum CUM-GPA of 3.00.
(2) Students must pass the Qualifying Examination.
(3) Pass English Proficiency test following the Faculty of Graduate Studies's criteria.
(4) Propose Dissertation to the committee appointed by the Faculty Graduate Studies and to the public and pass oral thesis examination as the final stage.
(5) The complete or part of the thesis has to be published, or at least accepted to be published, in a qualified international journal as announced by the committee,

granted a patent, accepted as an innovation, or acknowledged as a creative product to be applied commercially, socially, and economically. In the case of innovative or creative product, the thesis shall be evaluated by at least 3 external thesis committees from the same field or related field who are knowledgeable, experienced, and highly recognized and approved by the University Council.

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

Faculty Members

Prof. **Apinunt Udomkit**, Ph.D. (Molecular Biology, University of Edinburgh, UK, 1996) Email: apinunt.udo@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/apinunt-profile/
Prof. **Duncan R. Smith**, Ph.D. (Biomolecular Science, Portsmouth Polytechnic, UK, 1987) Email: duncan.smi@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/duncan-profile/
Prof. **Panadda Boonserm**, Ph.D. (Biochemistry, University of Cambridge, UK, 2002) Email: panadda.boo@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/panadda-profile/
Assoc. Prof. **Chalongrat Noree**, Ph.D. (Biology, University of California, San Diego, USA, 2013) Email: chalongrat.nor@mahidol.edu Page: https://mb.mahidol.ac.th/web/en/chalongrat-profile/ Personal Website: https://norita251.wordpress.com/about-me/
Assoc. Prof. **Kanokporn Triwitayakorn**, Ph.D. (Plant Biology, Southern Illinois University Carbondale, USA, 2002) Email: kanokporn.tri@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/kanokporn-profile/
Assoc. Prof. M.L. **Saovaros Svasti**, Ph.D. (Biochemistry, Mahidol University, Thailand, 1998) Email: saovaros.sva@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/saovaros-profile/
Assoc. Prof. **Sarin Chimnaronk**, Ph.D. (Biosciences, The University of Tokyo, Japan, 2004) Email: sarin.chi@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/sarin-profile/

Assoc. Prof. **Soraya Chaturongakul**, Ph.D. (Microbiology, Cornell University, USA, 2006) Email: soraya.cha@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/soraya-profile/
Assoc. Prof. **Sujira Mukda**, Ph.D. (Neurosciences, Mahidol University, Thailand, 2006) Email: sujira.muk@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/sujira-profile/
Asst. Prof. **Alisa Tubsuwan**, Ph.D. (Biochemistry, Mahidol University, Thailand, 2012) Email: alisa.tub@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/alisa-profile/
Asst. Prof. **Duangrudee Tanramluk**, Ph.D. (Biochemistry, University of Cambridge, UK, 2010) Email: duangrudee.tan@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/duangrudee-profile/
Asst. Prof. **Jiraporn Panmanee**, Ph.D. (Biological Sciences, University of Liverpool, UK, 2020) Email: jiraporn.pam@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/jiraporn-profile/
Asst. Prof. **Narisorn Kitiyanant**, Ph.D. (Neurosciences, Mahidol University, Thailand, 2011) Email: narisorn.kit@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/narisorn-profile/
Asst. Prof. **Natee Jearawiriyapaisarn**, Ph.D. (Molecular Genetics and Genetic Engineering, Mahidol University, Thailand, 2009) Email: natee.jea@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/natee-profile/
Asst. Prof. **Phatchariya Phannasil**, Ph.D. (Biochemistry, Mahidol University, Thailand, 2015) Email: phatchariya.pha@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/phatchariya-profile/

Asst. Prof. **Poochit Nonejuie**, Ph.D. (Biology, University of California, San Diego, USA, 2014) Email: poochit.non@mahidol.edu Page: https://mb.mahidol.ac.th/web/en/poochit-profile/ Personal website: https://themicrobelab.wordpress.com
Chutima Thepparit, Ph.D. (Molecular Genetics and Genetic Engineering, Mahidol University, Thailand, 2005) Email: chutima.thp@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/chutima-profile/
Duangnapa Kovanich, Ph.D. (Biomolecular Mass Spectrometry and Proteomics, Utrecht University, The Netherlands, 2013) Email: duangnapa.kov@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/duangnapa-profile/
Ittipat Meewan, Ph.D. (Chemistry and Biochemistry, University of California, San Diego, USA, 2021) Email: ittipat.mee@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/ittipat-profile/
Kittiphong Paiboonsukwong, M.D., Ph.D. (Molecular Genetics and Genetic Engineering, Mahidol University, Thailand, 2004) Email: kittiphong.pai@mahido.ac.th Page: https://mb.mahidol.ac.th/web/en/kittiphong-profile/
Promsin Masrinoul, Ph.D. (Medical Science, Osaka University, Japan, 2011) Email: promsin.mas@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/promsin-profile/
Siraprapa Boobphahom, Ph.D. (Biotechnology, Chulalongkorn University, Thailand, 2019) Email: siraprapa.boo@mahidol.ac.th Page: https://mb.mahidol.ac.th/web/en/Siraprapa-profile/

Contact us

Institute of Molecular Biosciences, Mahidol University

25/25 Phuttamonthon 4 Road

Salaya, Nakhon Pathom 73170, Thailand

tel: +66-2441-9003 to 7

Institute's email: mumb@mahidol.ac.th

Institute's website: https://mb.mahidol.ac.th/web/en/

Institute's facebook page: https://www.facebook.com/mb.mahidol

Institute's Line account

Program's website: https://mbmb4all.wordpress.com