Mahidol University
Institute of Molecular Biosciences

Program Specification
Master of Science Program in Molecular Genetics and Genetic Engineering
(International Program)

Revised Program 2018

1. Program Title Master of Science Program in Molecular Genetics and Genetic Engineering (International Program)

2. Name of the final award

Full name : Master of Science (Molecular Genetics and Genetic Engineering)
Abbreviation : M.Sc. (Molecular Genetics and Genetic Engineering)

3. Responsible Units

3.1 Awarding Institution: Faculty of Graduate Studies, Mahidol University
3.2 Teaching Institution: Institute of Molecular Biosciences, Mahidol University

4. Status of the Program and Program Accreditation

4.1 This program was revised in 2018.
4.2 This program has been implemented since the first semester of academic year 2018.
4.3 This program was endorsed by the Mahidol University Academic Committee in the 4/2018 meeting on 14th February 2018 and approved in the 532th meeting of the Mahidol University Council on 16th May 2018.

5. Philosophy of the Program

The M.Sc. program philosophy is to produce graduates with specialized knowledge and skills in Molecular Biology/Genetics and related fields and ability to apply their proficiency for the benefit of society and mankind.

6. **Expected learning outcomes**

Upon graduation, the graduates should be able to
6.1 Integrate comprehensive knowledge in Molecular Biology and related disciplines to solve scientific research problems.
6.2 Conduct systematic research in Molecular Biology with specialized technical skills.
6.3 Present research findings in Molecular Biology to scientific community.
6.4 Demonstrate scientific integrity including ethical responsibilities and safety practices as appropriate.
6.5 Acquire professional and interpersonal skills for lifelong learning.

7. Admission Requirements

7.1 Holding a Bachelor's degree in biological sciences or medical sciences
7.2 Having cumulative GPA not less than 2.50
7.3 Having an English Proficiency examination score as the requirement of Faculty of Graduate Studies
7.4 Applicants who do not meet any of the above requirements may be considered by the Program Director and the Dean of the Faculty of Graduate Studies.

8. Selection Process

8.1 Applicants must pass an English proficiency test (TOEFL/IELTS/MU GRAD Test) as required by the Faculty of Graduate Studies.
8.2 Undergraduate students who is studying in the final year at Mahidol University with a cumulative GPA of at least 3.0 can apply via the direct admission track offered by the Faculty of Graduate Studies.
8.3 Applicants who have qualified English score are selected for an interview conducted in English by the program's faculties. Justification is based on five criteria: English proficiency, knowledge, research skills, intelligence and personality.

9. Educational Management System

9.1 System:
Semester; 15 weeks per semester

9.2 Credit assignment:
Lecture consuming 1 hour per week (or 15 hours per semester) is equal to 1 credit hour.
Laboratory consuming 3 hours per week (or 45 hours per semester) is equal to 1 credit hour.

10. Subject benchmark statements

To ensure that on graduating with the Master of Science degree in Molecular Genetics and Genetic Engineering, our graduates will demonstrate both academic and research excellence in molecular biology at international standard. Our program is benchmarked against the "Standard for Doctoral Degrees in the Molecular Biosciences" guidelines (2011) of the International Union of Biochemistry and Molecular Biology (IUBMB). Accordingly, the expected learning outcomes of our graduate programs aligned well with the IUBMB-recommended guidelines.

11. Program Structure

11.1 Number of credits: no less than 36 credits

11.2 Curriculum structure

The curriculum is organized in accordance with plan A (2) of The Standard Criteria for Graduate Studies 2015 of the Ministry of Education as follows:

Required courses	20	credits
Elective courses no less than	4	credits
Thesis	12	credits
Totally no less than	36	credits

11.3 Courses offered

11.3.1 Required courses

		Credits (lecture-lab-self-study)
MBMG 500	Essentials in Molecular Biology	2 (2-0-4)
MBMG 512	DNA Engineering	2 (1-2-3)
MBMG 513	Gene Expression and Applications	3 (2-2-5)
MBMG 514	Protein Structure and Function	3 (2-2-5)
MBMG 515	Protein Technologies and Applications	2 (1-2-3)
MBMG 516	Cell Technologies and Applications	3 (1-6-4)
MBMG 521	Molecular Genetics and Genetic Engineering Seminar I	1 (1-0-2)
MBMG 522	Molecular Genetics and Genetic Engineering Seminar II	1 (1-0-2)
MBMG 615	Research Rotations in Molecular Biology	3 (0-9-3)

11.3.2 Elective courses

MBMG 601	Current Topics in Molecular Biology	1 (1-0-2)
SCID 500	Cell and Molecular Biology	3 (3-0-6)
SCID 518	Generic Skills in Science Research	1 (1-0-2)
GRID 521	Research Ethics	1 (1-0-2)

Note: 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.

11.3.3 Thesis

		Credits (lecture-lab-self-study)
MBMG 698	M.Sc. Thesis	12 (0-36-0)

11.4 Course Code Description

The first two letters represent the abbreviated name of the Institute/Faculty

MB = Institute of Molecular Biosciences

SC = Faculty of Science

The last two letters represent the abbreviated name of responsible units

MG = Molecular Genetic and Genetic Engineering Program

ID = Inter-departmental Course

11.5 Research

The program offers research projects in different topics such as:

- Molecular Medicine
- Molecular Biology for Agricultural and Industrial Applications
- Molecular Microbiology
- Bio-Energy Research
- Structural Molecular Biology
- Bioinformatics
- Multi-Omics
- Drug Discovery
- Genome Editing and Cell-Based Technology

11.6 Study Plan

Year	Semester 1	Semester 2
1	MBMG 500 Essentials in Molecular Biology 2 (2-0-4) MBMG 512 DNA Engineering 2 (1-2-3) MBMG 513 Gene Expression and Applications 3 (2-2-5) Elective course not less than 3 credits **Total 10 credits**	MBMG 514 Protein Structure and Function 3 (2-2-5) MBMG 515 Protein Technologies and Applications 2 (1-2-3) MBMG 516 Cell Technologies and Applications 3 (1-6-4) MBMG 615 Research Rotations in Molecular Biology 3 (0-9-3) **Total 11 credits**
2	MBMG 521 Molecular Genetics and Genetic Engineering Seminar I 1 (1-0-2) Elective course not less than 1 credit MBMG 698 Thesis 6 (0-18-0) **Total 8 credits**	MBMG 522 Molecular Genetics and Genetic Engineering Seminar II 1 (1-0-2) MBMG 698 Thesis 6 (0-18-0) **Total 7 credits**

12. Graduation requirements

To graduate and be awarded their degree, students must:

12.1 Total time of study should not exceed the study plan.

12.2 Students must complete courses as stated in the curriculum at least 24 credits including thesis (12 credits) and 36 credits in total with a minimum CUM-GPA of 3.00.

12.3 Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.

12.4 Students must participate in skill development activities of the Graduate Studies, Mahidol University

12.5 Students must submit theses and pass the thesis defense by following Regulations of Mahidol University on Graduate Studies.

12.6 Theses are required to publish in an international academic journal or proceedings that is listed by the Faculty of Graduate Studies, Mahidol University.

13. Job opportunities

Graduates from the program may work as

13.1 Academic staff in Molecular Genetics and relevant disciplines in the university

13.2 Researchers in research institutes, universities or private sectors

13.3 Others such as sale representatives or product specialists