

## Course Syllabus

MBMG 500 Essentials in Molecular Biology

Academic year 2024

**Course ID and Name:** MBMG 500 Essentials in Molecular Biology

**Course coordinator:** Prof. Apinunt Udomkit

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### Instructors:

1. Prof. Chanan Angsuthanasombat
2. Prof. Chalernporn Ongvarrasopone
3. Prof. Panadda Boonserm
4. Asst. Prof. Duangrudee Tanramluk
5. Asst. Prof. Poochit Nonejuie
6. Lect. Ittipat Meewan

**Credits:** 2 (2-0-4)

**Curriculum:** Master of Science Program in Molecular Genetics and Genetic Engineering  
(required course)

Doctor of Philosophy Program in Molecular Genetics and Genetic  
Engineering (required course for students from B. Sc.)

**Semester offering:** First semester

**Pre-requisites:** None

### Expected learning outcomes:

1. Explain the fundamental structures, properties and functions of cells and biomolecules
2. Compare and analyze molecular processes and mechanisms of regulation in prokaryotes and eukaryotes
3. Describe principles of basic techniques and bioinformatics tools necessary for molecular biology research
4. Show disciplines and responsibility for assigned works
5. Use appropriate information technology to explore literatures in Molecular Biology

Alignment of teaching and assessment methods to course learning outcome:

Program learning outcomes	Course learning outcomes	Teaching methods	Assessment methods
Ph.D. (PLO1, PLO2) M.Sc. (PLO2, PLO3)	1. Explain the fundamental structures, properties and functions of cells and biomolecules	1. lecture 2. active learning 3. discussion	1. class participation 2. assessment of assigned work
Ph.D. (PLO1, PLO2) M.Sc. (PLO2, PLO3)	2. Compare and analyze molecular processes and mechanisms of regulation in prokaryotes and eukaryotes	1. lecture 2. active learning 3. discussion	1. class participation 2. assessment of assigned work
Ph.D. (PLO1, PLO2) M.Sc. (PLO2, PLO3)	3. Describe principles of basic techniques and bioinformatics tools necessary for molecular biology research	1. lecture 2. active learning 3. discussion	1. class participation 2. assessment of assigned work
Ph.D. (PLO1) M.Sc. (PLO1, PLO4)	4. Show disciplines and responsibility for assigned works	1. Assignment	1. assessment of assigned work
Ph.D. (PLO1) M.Sc. (PLO5)	5. Use appropriate information technology to explore literatures in Molecular Biology	1. Assignment	1. assessment of assigned work

**Course description:**

Overview of cell structure and function; structure of nucleic acids; genes and genome organization; DNA replication; transcription; translation; protein structure and function; lipids and carbohydrates; protein trafficking; isolation, purification and detection of nucleic acids; basic DNA cloning; polymerase chain reaction (PCR) and DNA sequencing; basic bioinformatics; basic protein analysis

## Course schedule:

Date: Monday, Tuesday, Thursday

Time: 09.30-11.30 and 13.30-15.30

Room C405

Date/Time	Topic/Details	Number of Hours	Class Activities/Teaching Media	Lecturers
<b>Mon, Aug 5</b> 09.00-09.30	Introduction to the course	0.5		Apinunt
09.30-11.30	1 Overview of cell structure and function	2	Lecture, active learning, class discussion	Ittipat
13.30-15.30	2 Genes and genome organization	2	Lecture, active learning, class discussion	Poochit
<b>Tue, Aug 6</b>	MB Graduate student orientation			
<b>Thu, Aug 8</b> 09.30-11.30	3 Structure of nucleic acids	2	Lecture, active learning, class discussion	Poochit
13.30-15.30	4 DNA replication	2	Lecture, active learning, class discussion	Poochit
<b>Tue, Aug 13</b> 09.30-11.30	5 Transcription	2	Lecture, active learning, class discussion	Poochit
13.30-15.30	6 Viral gene structure and regulation	2	Lecture, active learning, class discussion	Ittipat
<b>Thu, Aug 15</b> 09.30-11.30	7 Protein synthesis and turnover	2	Lecture, active learning, class discussion	Ittipat
13.30-15.30	8 Protein structure and function	2	Lecture, active learning, class discussion	Ittipat
<b>Mon, Aug 19</b> 09.30-11.30	9 Lipids and carbohydrates	2	Lecture, active learning, class discussion	Chanan
13.30-15.30	10 Protein trafficking	2	Lecture, active learning, class discussion	Poochit
<b>Tue, Aug 20</b> 09.30-11.30	11 Isolation and purification of nucleic acids	2	Lecture, active learning, class discussion	Poochit
13.30-15.30	12 Basic principles of DNA cloning	2	Lecture, active learning, class discussion	Chalernporn
<b>Thu Aug 22</b> 09.30-11.30	13 Detection of nucleic acids	2	Lecture, active learning, class discussion	Poochit

Date/Time	Topic/Details	Number of Hours	Class Activities/Teaching Media	Lecturers
13.30-15.30	14 Basic Bioinformatics	2	Lecture, active learning, class discussion	Duangrudee
Mon, Aug 26 13.30-15.30	15 Basic principles of protein analysis	2	Lecture, active learning, class discussion	Panadda

#### Assessment Criteria:

CLOs	Assessment criteria	Evaluated in week	Evaluation ratio
CLO1, CLO2, CLO3	1. class participation 2. assessment of assigned work	1-4	95%
CLO4, CLO5	1. assessment of assigned work	1-4	5%

Student's achievement will be graded using symbols: A, B<sup>+</sup>, B, C<sup>+</sup>, C based on the criteria as follows:

Percentage	Grade	Description
80–100	A	Excellent
75–79	B+	Very Good
70–74	B	Good
65–69	C+	Fairly Good
60–64	C	Fair
55–59	D+	Poor
50–54	D	Very Poor
0–49	F	Fail

*Date revised: 12 July 2024*