

**Course syllabus**  
**MBMG 513: Gene Expression and Applications**  
**3 Credits (2-2-5)**  
**Academic Year 2023**

**Course schedule:**

Date: Oct 2 - Nov 2, 2023 (Monday-Friday)

Time: 09:30-16:30

**Room: C405**

**Course coordinator:** Kusol Pootanakit

Tel: 02-441-9003-7 ext. 1467, e-mail: kusol.poo@mahidol.ac.th

**Instructors:**

Apinunt Udomkit, Ph.D., Assoc. Prof.

Arpaporn Sutipatanasomboon, Ph.D.

Chalermporn Ongvarrasopone, Ph.D., Assoc. Prof.

Chalongrat Noree, Ph.D., Asst. Prof.

Duncan R. Smith, Ph.D., Prof.

Kanokporn Triwitayakorn, Ph.D., Assoc. Prof.

Kusol Pootanakit, Ph.D., Asst. Prof.

Nattaya Srisawad, Ph.D.

Panadda Boonserm, Ph.D., Assoc. Prof.

Poochit Nonejuie, Ph.D., Asst. Prof.

Saovaros Svasti, Ph.D., Assoc. Prof.

Sarin Chimnarok, Ph.D., Assoc. Prof.

Supajit Sraphet, Ph.D.

**Lab supporting Staff:**

Chanikarn Boonchuay

Dr. Thaneeya Nantapojd

Pannaphan Makarathut

**Course Schedule:**

<b>Date/ time</b>	<b>Topics/Details</b>	<b>Number of Hours</b>	<b>Class Activity/ Teaching Media</b>	<b>Lecturer</b>
(A407) Oct 2 9:30-11:30 13:30-16:30	1. Course overview/ Applications in PCR	2	Lecture	Kusol Pootanakit
	2. <i>In-silico</i> primer design	1-2	Lecture-Lab	Kusol Pootanakit
(C405) Oct 3 9:30-11:30 13:30-16:30	3. cDNA and genomic libraries	2	Lecture	Panadda Boonserm
	4. PCR Lab (PCR and gel preparation)	3	Lab	Kusol Pootanakit Apinunt Udomkit
Oct 4 9:30-12:30 13:30-16:30	PCR Lab (continued) (PCR and agarose gel electrophoresis)	3	Lab	Kusol Pootanakit Apinunt Udomkit
	Self-study	3	Assignment due	
(A407) Oct 5 9:30-11:30 13.30-15.30	5. Expression in <i>E. coli</i> of cloned DNA molecules	2	Lecture	Panadda Boonserm
	6. Sequence alignments	1-2	Lecture-Lab	Kusol Pootanakit
(C405) Oct 6 9:30-11:30 13.30-16:30	7. Cloning in bacteria other than <i>E. coli</i>	2	Lecture	Poochhit Nonejuie
	Self-study	3	Assignment due	
(A407) Oct 9 12:30-15:00 15:00-16:30	Examination (I): - Applications in PCR - cDNA and genomic libraries - Expression in <i>E. coli</i> of cloned DNA molecules - Cloning in bacteria other than <i>E. coli</i>	2.5	Written examination	Kusol Pootanakit
	Self-study	1.5	Assignment due	
Oct 10	MU Graduation Ceremony **No CLASS**			
(C405) Oct 11 9:30-11:30 13:30-15:30	8. Gene expression in yeast	2	Lecture	Chalongrat Noree
	9. Gene expression in animal: transgenic and knockout animals	2	Lecture	Saovaros Svasti
(C405) Oct 12 9:30-11:30 13:30-16:30	10. Concepts in plant cells and development	2	Lecture	Arpaporn Sutipatanasomboon
	18. Self-study	3	Assignment due	
Oct 13	Anniversary of the Death of King Bhumibol *NO CLASS*			

Date/ time	Topics/Details	Number of Hours	Class Activity/ Teaching Media	Lecturer
(C405) Oct 16 9:30-11:30	11. Gene expression in plants	2	Lecture	Arpaporn Sutipatanasomboon
13:30-16:30	Self-study	3	Assignment due	
Oct 17	Self-study		Assignment due	
(C405) Oct 18 12:30-15:00	Examination (II): - Gene expression in yeast - Gene expression in animal: transgenic and knockout animals - Concepts in plant cells and development - Gene expression in plants	2.5	Written examination	Kusol Pootanakit
15:00-16:30	Self-study	1.5	Assignment due	
(A407) Oct 19 9:30-11:30	12. Post-transcriptional regulation	2	Lecture	Sarin Chimnaronk
13:30-15:30	13. Vaccine development (nucleic acid vaccine)	2	Lecture	Sarin Chimnaronk
(C405) Oct 20 9:30-12:30	14. Next-generation sequencing technologies and their applications	2	Lecture	Chalermporn Ongvarrasopone
13:30-16:30	15. Metagenomics	2	Lecture	Kusol Pootanakit
Oct 23	Chulalongkorn Day *NO CLASS*			
(C405) Oct 24 9:30-11.30	16. DNA markers	2	Lecture	Kanokporn Triwitayakorn
13.30-16.30	17. Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
(C405) Oct 25 9.30-16:30	17. Genomic DNA analysis	6	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
(C405) Oct 26 9.30-16:30	17. Genomic DNA analysis	6	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
(C405) Oct 27 9:30-11:30	18. Virus gene structure and regulation	2	Lecture	Duncan R. Smith
13:30-15:30	19. Synthetic Biology	2	Lecture	Alisa Vangnai

<b>(A111)</b> <b>Oct 30</b> <b>9:30-12:00</b>	Examination (III): - Post-transcriptional regulation - Vaccine development (nucleic acid vaccine) - Metagenomics - DNA markers - Next-generation sequencing technologies and their applications - Virus gene structure and regulation -Synthetic Biology			Kusol Pootanakit
<b>13:30-14:30</b>	20. Problem-based final assignment	0.5	Discussion	Kusol Pootanakit
<b>Nov 2</b>	<b>Special Symposium</b> AI-Driven Drug Discovery	All Day	Talks	Venue: Prince Mahidol Hall
<b>(C405)</b> <b>Nov 3</b> <b>9:30-12:00</b>	Poster presentation	2.5	Student Presentation	All teaching staff

### Evaluation Plan for Learning Outcome

Learning Outcome	Activity	Evaluated in Week	Evaluation Ratio
1. Acquire new knowledge and innovation in gene expression and applications (2.1, 2.2, 2.3)	Assignment, quiz, written examination	1-4	60%
2. Integrate comprehensive knowledge in gene expression to solve scientific research questions (3.1, 3.2, 3.3)	Problem-based learning, presentation (oral and poster)	1-4	10%
3. Analyze and present lab data by using appropriate information and communication technologies (5.1, 5.2)	Presentation (report, lab notebook)	1-4	10%

4. Demonstrate scientific integrity, responsibility, and safety practice (1.1, 1.2, 1.3)	Class attendance, Lab performance	1-4	15%
5. Demonstrate teamwork, interpersonal skills and responsibilities for the work assigned (4.1, 4.2)	Class participation, Group presentation, Group assignment	1-4	5%

Student's achievement will be graded using symbols: A, B+, B, C+, C, D+, D and F based on the criteria as follows:

<b>Percentage</b>	<b>Grade</b>	<b>Description</b>
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

Updated: Sep 5, 2023