Course syllabus
MBMG 513 Gene Expression and Applications
3 Credits (2-2-5)
Academic Year 2022

Course schedule:
Date: Monday-Friday
Time: 09:30-16:30

Course coordinator: Kusol Pootanakit
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Instructors:
Apinunt Udomkit, Ph.D., Assoc. Prof.
Arpaporn Sutipatanasomboon, Ph.D.
Chalermporn Ongvarrasopone, Ph.D., Assoc. Prof.
Chalongrat Noree, Ph.D., Asst. Prof.
Chanan Angsuthanasombat, Ph.D., 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.
Saovaros Svasti, Ph.D., Assoc. Prof.
Sarin Chimnaronk, Ph.D., Assoc. Prof.
Supajit Sraphet, Ph.D.

Lab supporting Staff:
Chanikarn Boonchuay
Htut Htut Htoo

Course Schedule:

Date/ time	Topics/Details	Number of Hours	Class Activity/ Teaching Media	Lecturer
Sep 26 9:30-11:30	PCR principles and applications	2	Lecture	Kusol Pootanakit
13:30-16:30	*In-silico* primer design	1-2	Lecture-Lab	Kusol Pootanakit
Sep 27 9:30-11:30	cDNA and genomic libraries	2	Lecture	Panadda Boonserm
13:30-16:30	PCR Lab (PCR and gel preparation)	3	Lab	Kusol Pootanakit Apinunt Udomkit
Sep 28 9:30-12:30	PCR Lab (PCR and agarose gel electrophoresis)	3	Lab	Kusol Pootanakit Apinunt Udomkit
13:30-16:30	Sequence alignments	1-2	Lecture-Lab	Kusol Pootanakit
Sep 29 9.30-11.30	Recombinant selection and screening	2	Lecture	Kusol Pootanakit
13.30-15.30	Expression in *E. coli* of cloned DNA molecules	2	Lecture	Panadda Boonserm
Sep 30	Self-study	3	Assignment due	
	Self-study	3	Assignment due	
Oct 3 12:30-15:00	Examination (I): - PCR principles and applications - cDNA and genomic libraries - Recombinant selection and screening - Expression in *E. coli* of cloned DNA molecules	2.5	Written examination	Kusol Pootanakit
15:00-16:30	Self-study	1.5	Assignment due	
Oct 4 9:30-11:30	Cloning in bacteria other than E. coli	2	Lecture	Chanan Angsuthanasombat
13:30-15:30	Gene expression in yeast	2	Lecture	Chalongrat Noree
Oct 5 9:30-11:30	Gene expression in animal: transgenic and knockout animals	2	Lecture	Saovaros Svasti
13:30-15:30	Concepts in plant cells and development	2	Lecture	Arpaporn Sutipatanasomboon
Oct 6 9:30-12:30	Self-study	3		
13:30-16:30	Self-study	3		
Oct 7 9:30-11:30	Gene expression in plants	2	Lecture	Arpaporn Sutipatanasomboon
13:30-15:30	Self-study	2	Lecture	Chalongrat Noree

Date/ time	Topics/Details	Number of Hours	Class Activity/ Teaching Media	Lecturer
Oct 10 12:30-15:00	Examination (II): - Cloning in bacteria other than E. coli - 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	
Oct 11 9:30-11:30	Post-transcriptional regulation	2	Lecture	Sarin Chimnaronk
13:30-15:30	Mobile genetic elements	2	Lecture	Apinunt Udomkit
Oct 12 9:30-11:30	DNA markers	2	Lecture	Kanokporn Triwitayakorn
13:30-16:30	Self-study	3	Assignment due	
Oct 13	Anniversary of the Death of King Bhumibol *NO CLASS*			
Oct 14	Bridge Public holiday *NO CLASS*			
Oct 17 9:30-12.00	Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
13.30-16.30	Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
Oct 18 9.30-12.00	Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
13.30-16.30	Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
Oct 19 9.30-12.00	Genomic DNA analysis	3	Lab	Apinunt Udomkit Kanokporn Triwitayakorn Supajit Sraphet Nattaya Srisawad
13.30-15:30	Virus gene structure and regulation	2	Lecture	Duncan R. Smith

Date/ time	Topics/Details	Number of Hours	Class Activity/ Teaching Media	Lecturer
Oct 20 9:30-11:30	Next-generation sequencing technologies and their applications	2	Lecture	Chalermporn Ongvarrasopone
13:30-16:30	Self-study	3	Assignment due	
Oct 21 9:30-12:30	Self-study	3	Assignment due	
13:30-15:30	Self-study	3	Assignment due	
Oct 24	Day off for Chulalongkorn Day *NO CLASS*			
Oct 25 9:30-12:00	Examination (III): - Post-transcriptional regulation - Mobile genetic elements - DNA markers - Virus gene structure and regulation - Next-generation sequencing technologies and their applications			Kusol Pootanakit
13:30-14:30	Problem-based final assignment	1	Discussion	Kusol Pootanakit
Oct 28 9.30-12.00	Poster presentation	2.5	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:

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