

Course Syllabus  
MBMB 502 **Cell Biology**  
Academic year 20xx

<b>Course ID and Title</b>	MBMB 502 <b>Cell Biology</b>
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<b>Instructors:</b>	Assoc. Prof. Kanokporn Triwitayakorn, Ph.D. Assoc. Prof. Soraya Chaturongakul, Ph.D. Asst. Prof. Alisa Tubsuwan, Ph.D. Asst. Prof. Alita Kongchanagul, Ph.D. Asst. Prof. Narisorn Kitiyanant, Ph.D. Asst. Prof. Natee Jearawiriyapaisarn, Ph.D. Asst. Prof. Dr. Phatchariya Phannasil, Ph.D. Chutima Thepparit, Ph.D. Duangnapa Kovanich, Ph.D. Ekkaphot Khongkla, Ph.D. Ittipat Meewan, Ph.D. Promsin Masrinoul, Ph.D. Siraprapa Boobphahom, Ph.D.
<b>Credits:</b>	3 (2-2-5)
<b>Curriculum:</b>	Master of Science Program in Molecular and Integrative Biosciences (required course) Doctor of Philosophy Program in Molecular and Integrative Biosciences (required course)
<b>Semester offering:</b>	First semester

**Pre-requisites:** None

**Course learning outcomes (CLOs):**

**By the end of the course, students should be able to:**

1. Demonstrate core principles and comprehensive knowledge of cell structure and function and apply them to molecular and integrative biosciences research
2. Apply both classical and applied techniques in cell biology basic mammalian cell culture and cell application techniques to solve scientific research questions
3. Demonstrate scientific integrity, responsibility, and safety practice
4. Demonstrate leadership, teamwork, interpersonal skills, and responsibilities for the assignments

**Course description**

Cell Structure and organelles; Cellular Compartments and intracellular Sorting; Membrane Transport; Cell Signaling and Transduction; Cell Cycle and division; Cellular Response to Stress; Cell Aging and senescence; Cell Death; Cell Adhesion, Cell Junction and Extracellular Matrix; Cell Specialization; Stem Cells and Tissue Renewal; Cell Immunity; Cell Metabolism; Plant Cell Biology; Cellular Network Analysis & Data Visualization; Basic Mammalian Cell Culture Techniques; Compound treatments & DNA Transfection; MTT Assay; Flow Cytometry; Immunofluorescence; Confocal Microscopy

**Alignment of Teaching and Assessment Methods to Course Learning Outcomes:**

Course Learning Outcomes	Teaching Method	Assessment Method
1. Demonstrate core principles and comprehensive knowledge of cell structure and function and apply them to molecular and integrative biosciences research	<ol style="list-style-type: none"> <li>1. Lecture</li> <li>2. Class Discussion</li> </ol>	<ol style="list-style-type: none"> <li>1. Q&amp;A during lecture</li> <li>2. Discussion performance</li> <li>3. Written Examination</li> <li>4. Assignment</li> </ol>
2. Apply basic mammalian cell culture and cell application techniques to solve scientific research questions	<ol style="list-style-type: none"> <li>1. Lab practice</li> <li>2. Lab discussion</li> </ol>	<ol style="list-style-type: none"> <li>1. Lab performance</li> <li>2. Direct observation</li> <li>3. Lab report</li> <li>3. Discussion performance</li> </ol>

<p>3. Demonstrate scientific integrity, responsibility, and safety practice</p>	<p>1. Lecture 2. Hands-on practice 3. Lab safety guidelines</p>	<p>1. Assignment/Lab report 2. Examination 4. Class attendance 5. Direct observation/Lab performance</p>
<p>4. Demonstrate leadership, teamwork, interpersonal skills, and responsibilities for the assignments</p>	<p>1. Lecture 2. Class Discussion 3. Hands-on practice 4. Group assignments</p>	<p>1. Q&amp;A during lecture 2. Discussion performance 3. Lab performance 4. Assignment</p>

## Course Schedule, learning activity, and assessment:

	Activities	Description	Assessment methods	Instructor	Time
<b>Week 1</b>					
Day 1					
L01	Interactive Lecture, Class discussion	Cell Structure & Organelles	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	SB	9.00-11.00
L02	Interactive Lecture, Class discussion	Intracellular Protein Sorting	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	CT	13.00-15.00
Day 2	Self-study				
Day 3					
L03	Interactive Lecture, Class discussion	Membrane Transport	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	EK	9.00-11.00
L04	Interactive Lecture, Class discussion	Cell Signaling & Transduction	1. Q&A during lecture 2. Discussion performance 3. Written Examination	DK	13.00-15.00

			4. Assignment		
Day 4	Self-Study				
Day 5					
L05	Interactive Lecture, Class discussion	Cell Cycle & Division	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	IM	9.00-11.00
<b>Week 2</b>					
Day 1					
L06	Interactive Lecture, Class discussion	Cellular Response to Stress	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	AK/ PM	9.00-11.00
L07	Interactive Lecture, Class discussion	Cell Aging & Senescence	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	AK	13.00-15.00
Day 2	Self-study				
Day 3					
L08	Interactive Lecture, Class discussion	Cell Death	1. Q&A during lecture 2. Discussion performance 3. Written Examination	AK/ PM	9.00-11.00

			4. Assignment		
L09	Interactive Lecture, Class discussion	Cell Adhesion, Cell Junction & Extracellular Matrix	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	NoK/SCC	13.00-15.00
Day 4	Self-study				
Day 5	Self-study				
L10	Interactive Lecture, Class discussion	Cell Specialization	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	NoK	9.00-11.00
<b>Week 3</b>					
Day 1	Self-study				
L11	Interactive Lecture, Class discussion	Stem Cells and Tissue Renewal	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	AT/ NoK	9.00-11.00
L12	Interactive Lecture, Class discussion	Cell Immunity	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	AK	13.00-15.00
Day 2	Self-study				

Day 3					
L13	Interactive Lecture, Class discussion	Cell Metabolism	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	PP	9.00-11.00
L14	Interactive Lecture, Class discussion	Plant Cell Biology	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	KT	13.00-15.00
Day 4					
Self-study					
Day 5					
	Interactive Lecture, Class discussion	Cellular Network Analysis & Data Visualization	1. Q&A during lecture 2. Discussion performance 3. Written Examination 4. Assignment	EK/DK	9.00-11.00
<b>Week 4 (Laboratory session)</b>					
To analyze cell cycle, cytotoxicity, and cytoskeletal changes in response to chemical compounds/ modulation of gene expression.					
Day 1	Hands-on practice	Basic Mammalian Cell Culture Techniques: Cell Plating		PP, EK, CT	9.00-16.00
Day 2	Hands-on practice	Compound treatments & DNA Transfection		PP, EK, IM	9.00-16.00
Day 3	Hands-on practice	MTT assay		PP, EK	9.00-12.00

	Hands-on practice	Flow cytometry		NJ, EK	13.00-16.00
Day 4	Hands-on practice	Immunofluorescence (IF) Staining		AK, EK, CT	9.00-16.00
Day 5	Hands-on practice	IF Staining & Confocal Microscopy		AK, EK, SB	9.00-12.00
	Presentation, lab discussion	Presentation & Discussion, Reflection & After action review		All staff	13.00-16.00

Note: The laboratory session will be organized as a project-based learning.

#### Assessment Criteria:

Assessment Criteria	Assessment Method	Scoring Rubric
Examination/Assignment 50%	(1) Written examination (2) Assignment	1. Comprehension
Laboratory performance 20%	(1) Direct observation (2) In-class discussion	(1) Ability to follow procedure or to design a procedure for the experiment (2) Use of equipment (3) Working area and safety
Lab report 10%	(1) Lab report	(1) Writing style (2) Lab report submission (3) Lab report content (4) Data analysis, interpretation of data, and conclusion
Group presentation/ discussion 20%	(1) Presentation (2) Discussion	(1) Presentation (2) Ability to apply knowledge to solve research problems



Assessment Criteria	Assessment Method	Scoring Rubric
		(3) Ability to answer questions
Class participation 10%	(1) Direct observation (2) Class discussion	(1) Class participation (2) Group work (3) Group presentation

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

Percentage range	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 of revision: 30 Jan 2024