

Course Syllabus
MBMB 629 Cancer Biology and Precision Medicine
Academic Year 2025

Course ID and Title: MBMB 629 Cancer Biology and Precision Medicine

Course Coordinator: Asst. Prof. Phatchariya Phannasil, Ph.D.

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Instructor:

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Credits: 2 (2-0-4)

Curriculum: Master of Science Program in Molecular and Integrative Biosciences (International Program) (Multidisciplinary Program) (Elective course)

Doctor of Philosophy Program in Molecular and Integrative Biosciences (International Program) (Multidisciplinary Program) (Elective course)

Semester: 2nd Semester

Pre-Requisites:

None.

Course Learning Outcomes (CLOs):

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

1. Explain the fundamental concepts and significance of cancer biology and precision medicine within the context of molecular and integrative biosciences. **(Knowledge)**
2. Apply molecular and cellular techniques, as well as analytical approaches, to investigate and interpret cancer-related biological processes. **(Skills)**
3. Adhere to professional and research ethics in data handling, scientific discussion, and collaborative work in cancer research. **(Ethics)**
4. Demonstrate effective communication, teamwork, and leadership through discussion, presentation, and critical evaluation of current cancer research literature. **(Characters)**

Alignment of Teaching and Assessment Methods to Course Learning Outcomes:

Course Learning Outcomes	Teaching Method	Assessment Method
1. Explain the fundamental concepts and significance of cancer biology and precision medicine within the context of molecular and integrative biosciences.	<ol style="list-style-type: none"> Lecture Paper Discussion Presentation 	<ul style="list-style-type: none"> Q&A during lecture Discussion performance Assignment Presentation Class participation/Reflection
2. Apply molecular and cellular techniques, as well as analytical approaches, to investigate and interpret cancer-related biological processes	<ol style="list-style-type: none"> Lecture Paper discussion Presentation 	<ul style="list-style-type: none"> Q&A during lecture Discussion performance Assignment Presentation Class participation/Reflection
3. Adhere to professional and research ethics in data handling, scientific discussion, and collaborative work in cancer research	<ol style="list-style-type: none"> Discussion Individual or group assignment/presentation 	<ul style="list-style-type: none"> Discussion performance Presentation Class participation/Reflection Assignment Class Attendance
4. Demonstrate effective communication, teamwork, and leadership through discussion, presentation, and critical evaluation of current cancer research literature	<ol style="list-style-type: none"> Paper Discussion Group Assignment Presentation 	<ul style="list-style-type: none"> Discussion performance Presentation Class participation/Reflection Assignment

Course Description:

Introduction to cancer biology; hallmarks of cancer; cancer metastasis; cancer metabolism; molecular targets for cancer therapy; precision medicine; techniques in cancer biology; target identification in cancer treatment; anti-cancer drug discovery; applications in cancer research.

Course Schedule:

(Classroom: Room A207-1 for all sessions, except on January 30 and February 6, 2026, which will be held at the 3rd-floor Library, Institute of Molecular Biosciences, Mahidol University.)

	Activities	Description	Time	Instructors and Assistants
Monday, Jan 26, 2026				
	Introduction	Orientation and overview of the class	8.30-9.00	PP
1	Interactive Lecture: Overview and Background	Overview of Cancer Biology: basis for cancer cells and hallmarks of cancers	9.00-12.00	PP
Tuesday, Jan 27, 2026				
2	Interactive Lecture: Lecture and class discussion	Cancer metastasis research and interventions	9.00-12.00	PP
Wednesday, Jan 28, 2026				
3	Interactive Lecture: Lecture and class discussion	Cancer metabolism research: the basis of cancer metabolism, metabolomics and metabolic target for cancer therapy	9.00-12.00	PP
Thursday, Jan 29 2026				
4	Interactive Lecture: Lecture and class discussion	Precision medicine: Molecular targets and cancer therapeutics in the future	9.00-12.00	PP
Friday, Jan 30, 2026				
5	Interactive Lecture: Lecture and class discussion	Techniques in cancer biology: Cell culture, cell cytotoxicity assay, wound healing assay, migration, invasion assay, and molecular techniques related to cancer research	9.00-12.00	PP
6	Paper discussion	Precision medicine based on basic knowledge of cancer biology and Techniques in cancer biology	1:00 – 4:00	PP
Monday, Feb 2, 2026				
7	Interactive Lecture: Lecture and class discussion	Target identification in cancer treatment	9.00-12.00	IM
Tuesday, Feb 3, 2026				
8	Interactive Lecture: Lecture and class discussion	Anti-cancer drug discovery	9.00-12.00	IM
Monday, Feb 6, 2026				

Friday, Feb 6, 2026				
9	Student's presentation, Question and answer	Research highlights in precision medicine and drug discovery in cancer	9.00-12.00	PP/IM
10	Student's Reflection	To provide students opportunities to describe their learning experiences received from this course and how it can be applied to their future learning.	1:00 – 4:00	PP/IM
11	After Action Review	To collect comments and suggestions from students for further course improvements.		

Assessment Criteria:

Assessment Criteria		Description (In Details)	Scoring Rubric
1	Class Attendance (10%)	Showing up in the class (10%)	<ul style="list-style-type: none"> • Full attendance (4) • ~ 80% attendance (3) • ~ 60% attendance (2) • < 50% attendance (1)
2	Assignment/Quiz (30%)	Content accuracy (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Creativity (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Sequencing of information (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Supporting evidence (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Grammar and originality (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)

Assessment Criteria		Description (In Details)	Scoring Rubric
		On-time submission (2.5%)	<ul style="list-style-type: none"> • On-time (4) • Late (2-3) • Very late (1)
3	Presentation (30%)	Organization (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Content (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Subject knowledge/answering questions (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Presentation technique and use of visual aids (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Creative and high-order thinking skills (5%)	<ul style="list-style-type: none"> • Highly expressed (4) • Fairly expressed (2-3) • Not shown (1)
		Professional and interpersonal skills (responsibility, teamwork, and leadership) (2.5%)	<ul style="list-style-type: none"> • Active (4) • Fairly active (2-3) • Inactive (1)
		Time management (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
Discussion performance (20%)		Subject knowledge/answering questions (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Creative and high-order thinking skills (5%)	<ul style="list-style-type: none"> • Highly expressed (4) • Fairly expressed (2-3) • Not shown (1)

Assessment Criteria		Description (In Details)	Scoring Rubric
		Participation & Communication Skills (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
Class participation/reflection		Quality of participation in class activities/discussion (4%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Readiness (2%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Engagement & academic attitude (2%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Reflection (2%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)

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

Date of Revision: 6 November 2025