

Course Syllabus
MBMB 634 Drug Discovery and Development
Academic Year 2025

Course ID and Name: MBMB 634 Drug Discovery and Development

ชมชม ๖๓๔ การค้นพบและการพัฒนาฯ

Course Coordinator: Ittipat Meewan, Ph.D.

Tel: 02 441 9003-7 ext. 1272

E-mail: ittipat.mee@mahidol.edu

Instructors:

1. Dr. Ittipat Meewan
2. Assist. Prof. Dr. Jiraporn Panmanee

Supporting Staff:

1. XX

Credits: 1 (0-2-1)

Curriculum: Master of Science Program in Molecular and Integrative Biosciences (elective course)

Doctor of Philosophy Program in Molecular and Integrative Biosciences (elective course)

Semester offering:

Pre-requisites: None

Course learning outcomes (CLOs):

By the end of this course, students are able to:

1. Describe the principles of selecting and validating biomolecular targets essentials for drug discovery (PLO2)
2. Apply the principles screening and validation throughout the drug discovery and development process (PLO1, PLO2)
3. Integrate their acquired knowledge and skills in a mini project focused on drug discovery and development (PLO1, PLO2)
4. Critically evaluate the recently published literature in the drug discovery and development field (PLO1, PLO2, PLO4)
5. Demonstrate the professional and interpersonal works (PLO 3)

Alignment of teaching and assessment methods to course learning outcome:

Course learning outcome	Teaching method	Assessment method
1. Describe the principles of selecting and validating biomolecular targets essentials for drug discovery	(1) Lecture/In-class discussion (2) Lab (3) Assignment	(1) In-class discussion (2) Assignment
2. Apply the principles screening and validation throughout the drug discovery and development process	(1) Lecture/In-class discussion (2) Lab (3) Assignment	(1) In-class discussion (2) Assignment
3. Integrate their acquired knowledge and skills in a mini project focused on drug discovery and development	(1) Lecture/In-class discussion (2) Mini project	(1) In-class discussion (2) Oral presentation
4. Critically evaluate the recently published literature in the drug discovery and development field	(1) Paper discussion (2) Assignment	(1) In-class discussion (2) Paper discussion (3) Assignment
5. Demonstrate the professional and interpersonal works	(1) Lecture/In-class discussion (2) Mini project (3) Assignment	(1) In-class discussion (2) Oral presentation (3) Assignment

Course learning outcome	Teaching method	Assessment method

Course description:

Fundamentals of Drug Discovery and Development; Drug Discovery and Development Process; Selection and Validation for Drug Target for the Treatment; Bioinformatic Tools for Drug Target Selection; Virtual and High-Throughput Screening, Pharmacology Importance and Selection Criteria of Drug Candidates; Drug Optimization and Lead Optimization; Activity and Toxicity Evaluation

พื้นฐานของการค้นพบและการพัฒนา ยา กระบวนการค้นพบและพัฒนา การคัดเลือกและการตรวจสอบเป้าหมายของยาสำหรับการรักษา เครื่องมือชีวสารสนเทศสำหรับการเลือกเป้าหมายของยา การคัดกรองเสมือนจริงและการคัดกรองแบบสมรรถนะสูง ความสำคัญทางเภสัชวิทยาและเกณฑ์การคัดเลือกสารเคมีที่มีศักยภาพในการเป็นยา การปรับปรุงโครงสร้างเพื่อเพิ่มประสิทธิภาพ การทดสอบฤทธิ์และความเป็นพิษของยา

Course schedule:

Date: XX

Time: XX

Venue: Institute of Molecular Biosciences, Mahidol University, Salaya

	Activities	Description	Time	Instructor
Monday, xxx xx, 20xx				
1	Lecture and Discussion overview and background	1. Course introduction 2. History of drug discovery and development 3. Overview of modern process/technology in drug discovery and development	9.00-11.00	IM
2	Lecture and Discussion	1. The principle of target selection and identification 2. Drug pocket selection	13.00-16.00	IM
3	Lecture and Discussion	1. Database for drug discovery and development 2. Protein modeling and visualization	9.00-12.00	JP
4	Lab	1. Homology modeling 2. Pocket selection	13.00-15.00	JP
5	Lecture and Discussion	1. Principle of computer-aided drug screening 2. Molecular docking and molecular dynamics simulation 3. Virtual screening	9.00-12.00	IM
6	Lab	1. Basic tools for molecular docking 2. Virtual screening	13.00-15.00	IM
7	Lecture and Discussion	1. Roles of pharmacology in drug candidate selection 2. Physiological prediction	10.00-12.00	JP
8	Lecture and Discussion	1. Lead optimization 2. Ligand based drug design	13.00-16.00	IM
9	Lab	1. Available tools for ADME prediction based on structures	10.00-12.00	JP

10	Lecture and Discussion	1. Activity validation 2. Toxicity assessment	13.00-16.00	IM
11	Paper discussion	1. Case study of drug discovery	9.00-12.00	IM/JP
12	Problem based project	1. Individual project	13.00-16.00	IM/JP
13	Student presentation	1. Individual project	9.00-12.00 13.00-16.00	IM/JP
14	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.		IM/JP

Assessment Criteria:

Assessment Criteria		Description (in Details)	Scoring Rubric
1	Class Attendance (5%)	Showing up in the class (5%)	<ul style="list-style-type: none"> • Full attendance (4) • ~ 80% attendance (3) • ~ 60% attendance (2) • < 50% attendance (1)
2	Assignment (20%)	Content accuracy (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Creativity (5%)	<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 (3%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		On-time submission (2%)	<ul style="list-style-type: none"> • On-time (4) • Late (2-3) • Very late (1)
3	Quiz / Exercise (10%)	Depending on the correctness and completion (10%)	Raw scores will be adjusted to be in a range of 0-10%

Assessment Criteria		Description (in Details)	Scoring Rubric
4	Discussion Performance (20%)	Participation and performance (5%)	<ul style="list-style-type: none"> • Active (4) • Fairly active (2-3) • Inactive (1)
		Professional and interpersonal skills (responsibility, teamwork, and leadership) (5%)	<ul style="list-style-type: none"> • Active (4) • Fairly active (2-3) • Inactive (1)
		Creative and high-order thinking skills (10%)	<ul style="list-style-type: none"> • Highly expressed (4) • Fairly expressed (2-3) • Not shown (1)
5	Reflection (10%)	Knowledge sharing (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Inventive and creative thinking skills (2.5%)	<ul style="list-style-type: none"> • Highly expressed (4) • Fairly expressed (2-3) • Not shown (1)
		Communication skills (2.5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (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)
6	Presentation (35%)	Organization (5%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Content (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Subject knowledge/answering questions (10%)	<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)
		Time management (5%)	<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: 15 March 2024