

Course Syllabus
MBMB 646 Proteomics technology and applications
Academic Year 2025

Course ID and Title: MBMB 646 Proteomics technology and applications

Course Coordinator: Dr. Duangnapa Kovanich, Ph.D.

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Instructor:

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Support Staff:

Credits: 1(X-X-X)

Curriculum: Master of Science Program in Molecular and Integrative Biosciences
(Elective course)
Doctor of Philosophy Program in Molecular and Integrative Biosciences
(Elective course)

Semester: X^{XX} Semester

Pre-Requisites:

None.

Course Learning Outcomes (CLOs):

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

1. Describe the practical and theoretical knowledge in MS-based proteomics.
2. Describe the common workflows for the large-scale analysis of proteins.
3. Describe the fundamental knowledge about quantification of proteomes
4. Understand how to identify and quantify proteins from mass spectrometry data
5. Describe the analysis of post-translational modifications and protein-protein interactions

Alignment of Teaching and Assessment Methods to Course Learning Outcomes:

Course Learning Outcomes	Teaching Method	Assessment Method
1. Describe the practical and theoretical knowledge in MS-based proteomics	Lecture	Exam

Course Learning Outcomes	Teaching Method	Assessment Method
2. Describe the common workflows for the large-scale analysis of proteins	Lecture	Exam
3. Describe the fundamental knowledge about quantification of proteomes	Lecture	Exam
4. Understand how to identify and quantify proteins from mass spectrometry data	Lecture	Exam In-class discussion
5. Describe the analysis of post-translational modifications and protein-protein interactions	Lecture Discussion Student Presentation	Oral presentation In-class discussion

Course Description:

This course aims to provide students with a comprehensive understanding of mass spectrometry and its application in proteomics. It equips them with the knowledge and skills necessary to design and conduct proteomics experiments, from sample preparation to data analysis, while keeping up-to-date with the latest advancements in mass spectrometry technology.

Course Schedule:

(Classroom **XXX** and Lab Classroom **XXX**)

	Activities	Description	Time	Instructors and Assistants
Monday, XXX XX, 20XX				
1	Lecture	Introduction to mass spectrometry and LC-MS/MS for proteomics	13.00-16.00	DK
Tuesday, XXX XX, 20XX				
2	Lecture	Proteomics workflows and protein identification	13.00-16.00	DK
Wednesday, XXX XX, 20XX				
3	Lecture	Proteomics data analysis and repository	13.00-16.00	DK
Thursday, XXX XX, 20XX				

4	Student Presentation	Proteomics of protein post-translation modification	13.00-16.00	DK, OR
Friday, XXX XX, 20XX				
5	Student Presentation Lecture and class discussion	Protein-protein interaction analysis	13.00-16.00	DK, OR

Assessment Criteria:

Assessment Criteria		Description (in Details)	Scoring Rubric
1	Class Attendance (10%)	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	Exam (50%)	Correctness and completion (100%)	Raw scores will be adjusted to be in a range of 0-10%
3	Presentation (40%)	Participation and in-class discussion (10%)	<ul style="list-style-type: none"> • Active (4) • Fairly active (2-3) • Inactive (1)
		Presentation technique and use of visual aids (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Organization and time management (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) • Need to be improved (1)
		Content (60%)	Raw scores will be adjusted to be in a range of 0-10%
		Subject knowledge/answering questions (10%)	<ul style="list-style-type: none"> • Excellent (4) • Good (3) • Fair (2) <ul style="list-style-type: none"> • 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

Percentage	Grade	Description
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: 5 October 2023