Course Syllabus

MBMB 638 Fundamental Neuroscience

Academic Year 2025

Course ID and Title: MBMB 638 Fundamental Neuroscience

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Credits: 1(1-0-2)

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

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

Semester: 2nd Semester

Pre-Requisites:

None.

Course Learning Outcomes (CLOs):

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

1. Demonstrate honesty, punctuality, responsibility, and follow the institute regulation (PLO1)
2. Understand the fundamental concepts of neuroscience and the structure and organization of the nervous system. (PLO2)
3. Explain the concept of neural communication, signal transmission and cognitive processes (PLO2, PLO3)
4. Apply information technology and interpersonal communication skills through discussion and group presentation of interesting topics in the field of neurobiology (PLO4-5)

Alignment of Teaching and Assessment Methods to Course Learning Outcomes:

Course Learning Outcomes	Teaching Method	Assessment Method
1. Demonstrate honesty, punctuality, responsibility, and follow the institute regulation (PLO1)	1. Lecture 2. Class Discussion	1. Attendance (presence, absence, on-time?) 2. Task submission (on-time?) 3. Lab report writing (plagiarism?)
2. Understand the fundamental concepts of neuroscience and the structure and organization of the nervous system. (PLO2)	1. Lecture 2. Class Discussion	1. Q&A during lecture 2. Discussion performance 3. Quiz / short exercise 4. Assignment
3. Understand the fundamental concepts of neuroscience and the structure and organization of the nervous system. (PLO2, PLO3)	1. Lecture 2. Class Discussion 3. Assignment	1. Discussion performance 2. Report writing performance 3. Quiz / short exercise 4. Assignment
4. Apply information technology and interpersonal communication skills through discussion and group presentation of interesting	1. Group discussion and individual assignment 2. Class Discussion	1. Discussion performance 2. Presentation performance (lecture and lab session)

Course Learning Outcomes	Teaching Method	Assessment Method
topics in the field of neurobiology (PLO4-5)		

Course Description:

This course provides an introduction to the fundamental principles of neuroscience, exploring the structure and function of the nervous system, neural communication, sensory and motor systems, and basic cognitive processes.

Course Schedule:

(Classroom XXX)

	Activities	Description	Time	Instructors and Assistants
DAY1 Monday, XXX XX, 20XX				
1	**Lecture/Discussion: Introduction to Neuroscience and the Nervous System**	To go over the concept, organization and function of neuroscience and the human nervous system	9:30 – 10:30 AM	**JP/SM/NK**
2	**Lecture/Discussion: Neurons and Neural Communication**	To learn how our neuron communicates and works	11:00 – 12:00 AM	
3	**Lecture/Discussion: Synaptic Transmission and Neurotransmitters**	To understand deeper about the chemicals underlying neural communications	13:00 – 14:00 PM	
4	**Lecture/Discussion: Central Nervous System and Peripheral Nervous System**	To learn about the brain and spinal cord of CNS and the cranial and spinal nerves of PNS	14:30 – 15:30 PM	
DAY2 Tuesday, XXX XX, 20XX				
5	**Lecture/Discussion: Sensory Systems: Vision and Audition**	To understand how the sense of vision and hearing works	9:30 – 10:30 AM	**BC/JP/SM/NK**

	Activities	Description	Time	Instructors and Assistants
6	**Lecture/Discussion: Sensory Systems: Taste, Smell, and Somatosensation**	To understand how the sense of taste, smell and somatosensation	11:00 – 12:00 AM	
7	**Lecture/Discussion: Motor Systems and Movement (2 hr)**	To understand how our motor system organizes and works	13:00 – 15:00 PM	
DAY3 Wednesday, XXX XX, 20XX				
8	**Lecture/Discussion: Learning and Memory (2 hr)**	To learn about the process and brain regions involved in learning and memory	9:30 – 11:30 AM	**JP/SM/NK**
9	**Lecture/Discussion: Cognitive Processes: Attention and Perception (2 hr)**	To learn about the cognitive process and brain regions involved in attention and perception process	12:00 – 15:00 PM	
DAY4 Thursday, XXX XX, 20XX				
10	**Lecture/Discussion: Brain Development and Plasticity (2 hr)**	To go over about brain development and neural plasticity	9:30 – 11:30 AM	**JP/SM/NK**
11	**Lecture/Discussion: Neurological Disorders and Their Impact (2 hr)**	To study about several neurological disorders: brain pathology and therapeutic approaches	12:00 – 15:00 PM	
DAY5 Monday, XXX XX, 20XX				
12	**Written examination/ Take-home assignment/ open-book examination**	To assess student performance and understanding of the course objectives	9:00 AM – 16:00 PM	**JP/SM/NK**
DAY6 Wednesday, XXX XX, 20XX				
13	**Student Presentation**	To assess student performance on selected topics in fundamental neuroscience		**BC/JP/SM/NK**
14	**Student's Reflection**	To provide students opportunities to describe their learning experiences	9:00 – 12:00 PM	

	Activities	Description	Time	Instructors and Assistants
		received from this course and how it can be applied to their future learning.		
15	**After Action Review**	To collect comments, suggestions from students for further improvements of the course.	13:00-15:00 PM	

Assessment Criteria:

Assessment Criteria		Description (in Details)	Scoring Rubric
1	**Participation and Attendance: 10%**	Showing up in the class (**5%**)	• Full attendance (**4**) • ~ 80% attendance (**3**) • ~ 60% attendance (**2**) • < 50% attendance (**1**)
2	**Assignments: 40%**	The presence of intro, methods, results, discussion, and conclusion **with no plagiarism** (**5%**)	• Complete (**4**) • ~ 80% complete (**3**) • ~ 60% complete (**2**) • < 50% complete (**1**)
		Data presentation (10**%**)	• Complete (**4**) • ~ 80% complete (**3**) • ~ 60% complete (**2**) • < 50% complete (**1**)
		Data analysis and interpretation (**15%**)	• Excellent (**4**) • Good (**3**) • Fair (**2**) • Need to be improved (**1**)
		English and writing skills (**5%**)	• Excellent (**4**) • Good (**3**) • Fair (**2**) • Need to be improved (**1**)
		Report format and typing errors (**2%**)	• Excellent (**4**)

Assessment Criteria		Description (in Details)	Scoring Rubric
			• Good (**3**) • Fair (**2**) • Need to be improved (**1**)
		On-time submission (**3%**)	• On-time (**4**) • Late (2-3) • Very late (1)
3	**Quizzes and Exams: 40%**	Depending on the correctness and completion (4**0%**)	**Raw scores will be adjusted to be in a range of 0-40%**
4	**Presentation: 10%**	Participation and performance (3**%**)	• Active (**4**) • Fairly active (**2-3**) • Inactive (**1**)
		Professional and interpersonal skills (responsibility, teamwork, and leadership) (3**%**)	• Active (**4**) • Fairly active (**2-3**) • Inactive (**1**)
		Creative and high-order thinking skills (4**%**)	• Highly expressed (**4**) • Fairly expressed (**2-3**) • Not shown (**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

Percentage	Grade	Description
0–49	F	Fail

Date of Revision: Sep 2023