Course Syllabus

MBNS 600 Neurobiology

Academic Year 1-2026

Course ID and Name: MBNS 600 Neurobiology

Course coordinator: Asst. Prof. Jiraporn Panmanee, Ph.D.

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Instructors:

1. Prof. Dr. Banthit Chetsawang
2. Assoc. Prof. Dr. Nuanchan Chutabhakdikul
3. Assoc. Prof. Dr. Sujira Mukda
4. Asst. Prof. Dr. Sukonthar Ngampramuan
5. Asst. Prof. Dr. Narisorn Kitiyanant
6. Asst. Prof. Dr. Jiraporn Panmanee
7. Lecturer Dr. Siraprapa Boobphahom
8. Lecturer Dr. Ekkaphot Khongkla
9. Dr. Anuck Sawangjit

Supporting Staff:

1. Somsong Phengsukdaeng
2. Kanda Putthaphongpheuk
3. Prapan Premsawat
4. Kornkanok Promthep

Credits: 3 (2-2-5)

Curriculum: Master of Science Program in Neuroscience (required course)

Doctor of Philosophy Program in Neuroscience (required course for B.Sc. Graduates)

Semester offering: First semester

Pre-requisites: None

Course learning outcomes (CLOs)

Upon completion of this course, students are able to:

1. Understand moral responsibility in neurobiology research and follow the ethical code of conduct. (PLO1) I

2. Understand the fundamental concepts on the cellular and anatomical organization of the human nervous system. (PLO2) I
3. Analyze the theoretical knowledge and experimental approaches in the understanding of the neurophysiological processes of neurons and glial cells contributed to sensory perception, neural control of behaviors, and cognitive functions of the human brain. (PLO3) I
4. Apply information technology and interpersonal communication skills through discussion of interesting topics in the field of neurobiology. (PLO4) I (PLO5) I

Alignment of teaching and assessment methods to course learning outcome:

Course learning outcome	Teaching method	Assessment method
1. Understand moral responsibility in neurobiology research and follow the ethical code of conduct.	(1) Describe and demonstrate the morality, ethics, and ethical code of conduct for researchers. (2) Demonstrate appropriate methods for citing references, non-plagiarism with case studies and assignments. (3) Assign tasks, data collection and presentation with emphasis on honesty.	(1) Evaluation from evaluating non-plagiarism scores in report submission. (2) Evaluation from group activities, student punctuality and honesty.
2. Understand the fundamental concepts on the cellular and anatomical organization of the human nervous system.	(1) Lecture (2) Laboratory practice by observation of brain specimens, microscopic slides, and diagrams. (3) In-class discussion	(1) Written examination (2) Laboratory examination (3) Oral comprehensive examination
3. Analyze the theoretical knowledge and experimental approaches in the understanding of the neurophysiological	(1) Lecture (2) Laboratory practice by observation of brain specimens, microscopic slides, and diagrams.	(1) Written examination (2) Laboratory examination (3) Oral comprehensive examination

Course learning outcome	Teaching method	Assessment method
processes of neurons and glial cells contributed to sensory perception, neural control of behaviors, and cognitive functions of the human brain.	(3) In-class discussion	
4. Apply information technology and interpersonal communication skills through discussion of interesting topics in the field of neurobiology.	(1) Group discussion and individual assignment	(1) Evaluation from academic presentation with suitable use of information technology, mathematical and statistical analyses in assigned topic (2) Evaluation from direct observation during group activity.

Course description:

This course focuses on fundamental theories and laboratory practice on the human nervous system including the organization of the nervous system, the relationship between the brain, mind and behavior, the concept of chemical neurotransmission and neurotransmitters, evolution of the neural circuitry from animals to humans, development of the nervous system and anatomical and functional studies of each brain region.

Course schedule:

Date: Monday, Wednesday, and Friday

Time: **Lecture**: 10.00-12.00; 13:30-15:30 (Monday, Wednesday, and Friday)

Lab: Please refer to the schedule for date and time details on each date. (1-week, consecutive days)

Venue: **Lecture**: Room MB2-103, Vaccine building, Institute of Molecular Biosciences

Lab: D401-02 (fourth floor), Institute of Molecular Biosciences, Mahidol, Salaya: Onsite only

Teaching Schedule

MBNS 600 Neurobiology

Lecture: 10 Aug 2026 – Sep 2026 | **Lab:** 3 Sep 2026 – 8 Sep 2026 |

Course duration : 13 Aug 2026 - 15 Sep 2026

Course Coordinator: Asst. Prof. Dr.Jiraporn Panmanee, Ph.D.

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Date	Time	Topic	Lecturer
11 Aug 2026 (Tue)	09.30-10.00	**Course Orientation**	Jiraporn (A401)
11 Aug 2026 (Tue)	10.00-12.00	**L1:** Cell biology of neurons, neuroglia, and supporting elements	Ekkaphot (A401)
11 Aug 2026 (Tue)	13.30-15.30	**L2:** Anatomical terms & External structures of the brain	Narisorn (A401)
14 Aug 2026	10.00-11.30	**L3-1:** Neuronal electrical activity and the functional role of glial cells in synaptic transmission	Siraprapa
14 Aug 2026	13.00-14.30	**L3-2:** Blood circulation of the brain, CSF pathway and blood-brain barrier*	Sukonthar
14 Aug 2026	14.30-16.30	**L4:** Spinal cord	Sukonthar
17 Aug 2026	10.00-12.00	**L5:** Brainstem and diencephalon	Sujira
17 Aug 2026	13.30-15.30	**L6:** Visual system	Banthit
19 Aug 2026	10.00-12.00	**L7:** Somatosensory system and special senses (smell and taste)	Ekkaphot
19 Aug 2026	13.30-15.30	**L8:** Reticular formation*	Jiraporn
20 Aug 2026 (Tue)	10.00-12.00	**L9:** Hypothalamus and autonomic nervous system*	Sukonthar
21 Aug 2026	10.00-12.00	**L10:** Motor pathways*	Narisorn
21 Aug 2026	13.30-15.30	**L11:** Basal ganglia and cerebellum	Narisorn
24 Aug 2026	10.00-12.00	**L12:** Auditory and vestibular systems*	Sujira
24 Aug 2026	13.30-15.30	**Self-study**	

Date	Time	Topic	Lecturer
26 Aug 2026	10.00-16.00	**Written Exam I (L1-L8)** ***Evaluated by assignments/in-class activity**	Jiraporn/Somsong
28 Aug 2026	10.00-12.00	**L13-1:** Cerebrum and cerebral cortex **L13-2:** Brain and language	Jiraporn
28 Aug 2026	13.30-15.30	**L14**: Limbic system, basal forebrain, learning and memory*	Anuck
31 Aug 2026	10.00-12.00	**L15:** Cognition and executive brain functions*	Nuanchan
31 Aug 2026	13:30-16.30	Lab #1: Microscopic structure and ultrastructure of neurons, glia, and peripheral nerve	Ekkaphot/ Siraprapa
1 Sep 2026	9.00-12.00	Lab #2 Gross structure of the Brain	Sujira/Jiraporn
1 Sep 2026	13.30-16.30	Lab #3: Brain vascular supply, and CSF pathway	Sukonthar/ Siraprapa
2 Sep 2026	9.00-12.00	Lab #4: Anatomy and microscopic structure of the spinal cord	Sukonthar/ Siraprapa
2 Sep 2026	13.30-16.30	Lab #5: Motor pathways, basal ganglia and cerebellum	Narisorn/ Sujira
3 Sep 2026	9.00-12.00	Lab #6: Visual system	Sujira/ Narisorn
3 Sep 2026	13:30-16:30	Lab #7: Hypothalamus	Sukonthar/ Siraprapa
4 Sep 2026	9.00-12.00	Lab #8: Sensory organs and pathways Visual system	Banthit/ Ekkaphot
4 Sep 2026	13:30-16:30	Lab #9: Brainstem and diencephalon Lab #10: Functional localization of cerebral cortex and limbic system	Narisorn/Sujira/Jiraporn
9 Sep 2026	10.00-16.00	**Student Presentation**	Faculty Staff
11 Sep 2026	09.00-16.00	**Laboratory Exam (Lab1-11) and Written Exam II (L9-L15)** ***Evaluated by assignments/in-class activity**	Jiraporn/Somsong

Student presentation sessions:

To encourage sharing knowledge and boost presentation skills, students will be assigned with the topic to be presented in class. Each presentation should take 30-40 minutes. Evaluation of presentation performance will be assessed according to rubric scoring method.

Presentation date and time	**Topics**
Presentation Date: 9 **Sep** 2026 Time: 10.00-16.00	Theme: **See list below** (2-4 students/ group)

Theme:

No.	Presentation Topic
1	Neurobiological Roles of Neurotransmitters in Mental Health and Disease
2	Neural Plasticity and Learning
3	Neurobiology of Stress
4	Brain Reward Circuitry and Addiction
5	Neurobiology of Sleep and Circadian Rhythms
6	Neurobiology of Anxiety and Fear
7	Gut-Brain Axis and Mental Health
8	Neurobiology of Alzheimer's Disease
9	Neurobiology of Memory
10	Neurobiology of Emotion and Mood Disorders

Assessment Criteria:

Assessment Criteria	Assessment Method	Scoring Rubric
Assignments/ Examination (60%)	(1) Multiple choices questions (2) Short essay questions (3) Take-home assignments	(1) Comprehension (2) Scoring directly from true/false answer
Laboratory performance (25%)	(1) Direct observation (2) Practical examination (3) In-class discussion	(1) Comprehension (2) Scoring directly from true/false answer
Presentation of assigned topics (10%)	(1) Short presentation	(1) Information quality and organization of topic presented (2) Verbal communication and English proficiency

Assessment Criteria	Assessment Method	Scoring Rubric
		(3) Visual tools
Class attendant (5%)	(1) Number of classes signed in (2) Direct observation	(1) Student participation in class

Grading and evaluation

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
85-100	A	Excellent
80-84	B+	Very good
70-79	B	Good
60-69	C+	Fairly good
50-59	C	Fair
45-49	D+	Poor
40-44	D	Very poor
< 40	F	Failing

ATTENTION

(1) Since this course is a core requirement course, if students receive final grade below "B", they will need to re-enroll this course in the next academic year.

(2) According to the Faculty of Graduate Studies regulation, enrolled students are required to attend classed more than 80% of total class time. Students will be disqualified from examination if they fail to comply with this regulation.

Scoring rubric for evaluation of student presentation (10% for each presentation)

Presentation performance evaluation rubric (10% of total score)					
Criteria	**Outstanding (score = 5)**	**Above average (score = 4)**	**Average (score = 3)**	**Below average (score = 2)**	**Poor (score = 1)**
Information quality and organization of topic presented (including answering the questions) (5%)	The information presented is accurate, comprehensive, and well-organized, with a clear and logical structure	The information presented is mostly accurate and well-organized, with a clear structure	The information presented is generally accurate and adequately organized, with a clear structure	The information presented is partially accurate and poorly organized, with a confusing structure	The information presented is inaccurate and poorly organized, with a very confusing structure
Delivery (5%)	Uses clear and confident language, maintains strong eye contact, uses appropriate and effective nonverbal communication, and adapts to the audience in a seamless way	Uses clear and confident language, maintains strong eye contact, uses appropriate nonverbal communication, and adapts to the audience	Uses clear language, maintains some eye contact, and uses appropriate nonverbal communication, but may not adapt to the audience as well	Uses unclear language, lacks eye contact, and does not use appropriate nonverbal communication	Does not use clear language, lacks eye contact, and does not use appropriate nonverbal communication
Visual tools (5%)	The visual tools used (e.g., slides, charts, diagrams) are visually appealing, relevant, and effectively support the presentation	The visual tools used are visually appealing and relevant, but could be better integrated into the presentation	The visual tools used are adequate and relevant, but could be improved	The visual tools used are poorly designed and not well integrated into the presentation	The visual tools used are not relevant or effective

Date revised: 27 June, 2026