

Course Syllabus
MBNS 600 Neurobiology
Academic Year 2024

Course ID and Name: MBNS 600 Neurobiology

Course coordinator: Assoc. Prof. Sujira Mukda, Ph.D.; Asst. Prof. Jiraporn Panmanee, Ph.D.

Tel: 02-441-9003-7 ext. 1437

Email: sujira.muk@mahidol.edu; jiraporn.pam@mahidol.edu

Instructors:

1. Prof. Banthit Chetsawang, Ph.D.
2. Assoc. Prof. Nuanchan Chutabhakdikul, Ph.D.
3. Assoc. Prof. Sujira Mukda, Ph.D.
4. Asst. Prof. Sukonthar Ngampramuan, Ph.D.
5. Asst. Prof. Narisorn Kittiyasant, Ph.D.
6. Asst. Prof. Jiraporn Panmanee, Ph.D.
7. Lecturer Dr. Anuck Sawangjit, Ph.D.

Supporting Staff:

1. Kanda Putthaphongpuek
2. Somsong Phengsukdaeng
3. Sasithorn Prommet
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) |
2. Understand the fundamental concepts on the cellular and anatomical organization of the human nervous system. (PLO2) |
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) |
4. Apply information technology and interpersonal communication skills through discussion of interesting topics in the field of neurobiology. (PLO4) | (PLO5) |

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.	<p>(1) Describe and demonstrate the morality, ethics, and ethical code of conduct for researchers.</p> <p>(2) Demonstrate appropriate methods for citing references, non-plagiarism with case studies and assignments.</p> <p>(3) Assign tasks, data collection and presentation with emphasis on honesty.</p>	<p>(1) Evaluation from evaluating non-plagiarism scores in report submission.</p> <p>(2) Evaluation from group activities, student punctuality and honesty.</p>
2. Understand the fundamental concepts on the cellular and anatomical organization of the human nervous system.	<p>(1) Lecture</p> <p>(2) Laboratory practice by observation of brain specimens, microscopic slides, and diagrams.</p> <p>(3) In-class discussion</p>	<p>(1) Written examination</p> <p>(2) Laboratory examination</p> <p>(3) Oral comprehensive examination</p>
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.	<p>(1) Lecture</p> <p>(2) Laboratory practice by observation of brain specimens, microscopic slides, and diagrams.</p> <p>(3) In-class discussion</p>	<p>(1) Written examination</p> <p>(2) Laboratory examination</p> <p>(3) Oral comprehensive examination</p>
4. Apply information technology and interpersonal communication skills through discussion of interesting topics in the field of neurobiology.	<p>(1) Group discussion and individual assignment</p>	<p>(1) Evaluation from academic presentation with suitable use of information technology, mathematical and statistical analyses in assigned topic</p>

Course learning outcome	Teaching method	Assessment method
		(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: 10.00-16.00 (9.00-11.00 for L6 & L13, and 14.00-16.00 for L14)

Venue: Lecture: Room A107, Institute of Molecular Biosciences

Lab: D401-02 (fourth floor), Institute of Molecular Biosciences

Teaching Schedule

MBNS 600 Neurobiology

Lecture : 5 Aug 2024 – 9 Sep 2024 | Lab : 28 Aug 2024 – 30 Aug 2024 |

Course duration : 5 Aug 2024-9 Sep 2024

Course Coordinator: Assoc. Prof. Sujira Mukda; Jiraporn Panmanee, Ph.D.

Tel: 02-441-9003-7 ext. 1206, 1437

Email: sujira.muk@mahidol.edu; jiraporn.pam@mahidol.edu

Date	Time	Topic	Lecturer
5 Aug 2024	09.30-10.00	Course Orientation	Jiraporn (Zoom)
5 Aug 2024	10.00-12.00	L1: Cell biology of neurons, neuroglia, and supporting elements	Nuanchan
5 Aug 2024	13.00-15.00	L2: Anatomical terms & External structures of the brain	Sujira
7 Aug 2024	10.00-12.00	L3-1: Electrical activities of neuron and glial cells L3-2: Blood circulation of the brain, CSF pathway and blood-brain barrier	Sukonthar
7 Aug 2024	13.00-15.00	L4: Spinal cord	Sukonthar
9 Aug 2024	09.00-11.00	L6: Reticular formation	Jiraporn (Zoom)
9 Aug 2024	13.00-15.00	L5: Brainstem and diencephalon	Sujira
14 Aug 2024	10.00-12.00	L7: Motor pathways	Narisorn
14 Aug 2024	13.00-15.00	L8: Basal ganglia and cerebellum	Narisorn
16 Aug 2024	10.00-12.00	L9: Somatosensory system	Banthit
16 Aug 2024	13.00-15.00	L10: Visual system	Banthit
19 Aug 2024	09.00-16.00	Written Exam I (L1-L7)	Somsong
21 Aug 2024	10.00-12.00	L11: Auditory and vestibular systems	Sujira
21 Aug 2024	13.00-15.00	L12: Hypothalamus and autonomic nervous system	Sukonthar
23 Aug 2024	09.00-11.00	L13-1: Cerebrum and cerebral cortex L13-2: Brain and language	Jiraporn (Zoom)
23 Aug 2024	13.00-15.00	L15: Cognition and executive brain functions	Nuanchan
26 Aug 2024	14.00-16.00	L14: Limbic system, basal forebrain, learning and memory	Anuck (Zoom)
Lab Session			
27 Aug 2024	9.00-12.00	Lab #1: Microscopic structure and ultrastructure of neurons, glia, and peripheral nerve	Nuanchan/ Ekkaphot/ Sirapapa

Date	Time	Topic	Lecturer
	13.00-15.00	Lab #2: Gross structure of the Brain	Sujira
28 Aug 2024	09.00-11.00	Lab #3: Brain vascular supply, and CSF pathway	Sukonthar/ Ekkaphot/ Sirapapa
	13.00-15.00	Lab #4: Anatomy and microscopic structure of the spinal cord	Sukonthar/ Ekkaphot/ Sirapapa
29 Aug 2024	9.00-12.00	Lab #5: Brain structures in motor pathway, limbic system and cerebellum	Narisorn/ Sujira
	13.00-16.00	Lab #6: Sensory organs and pathways	Banthit/ Narisorn/ Ekkaphot
30 Aug 2024	9.00-11.00	Lab #7: Hypothalamus	Sukonthar/ Sirapapa
	12.00-16.00	Lab #8: Brainstem and diencephalon Lab #9: Functional localization of cerebral cortex	Sujira/ Narisorn
6 Sep 2024	09.00-12.00	Student Presentation	Faculty Staff
9 Sep 2024	09.00-16.00	Laboratory Exam (Lab #1-9) and Written Exam II (L8-L15)	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 15-20 minutes. Evaluation of presentation performance will be assessed according to rubric scoring method.

Presentation date and time	Topics
Presentation Date: 6 Sep 2024 Time: 9.00-12.00	Theme: Neuroplasticity: Mechanisms and Implications (2 students/ group if possible) Group 1: Mechanisms and Factors influencing neuroplasticity Group 2: Neuroplasticity in neurological disorders and related research

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 (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 (2.5%)	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 (2.5%)	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: 10 July 2024