

Course Syllabus
MBNS 605 Neurochemistry
Academic Year 2023

Course ID and Name: MBNS 605 Neurochemistry
Course coordinator: Prof. Banthit Chetsawang, Ph.D.
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Instructors:

1. Prof. Piyarat Govitrapong, Ph.D. (piyarat.gov@mahidol.ac.th, piyarat@cgi.ac.th)
2. Prof. Banthit Chetsawang, Ph.D. (banthit.che@mahidol.ac.th)
3. Assoc. Prof. Wipawan Thangnipon, Ph.D. (wipawan.tha@mahidol.ac.th)
4. Assoc. Prof. Nuanchan Chutabhakdikul, Ph.D (nuanchan.chu@mahidol.ac.th)
5. Assoc. Prof. M.L. Saovaros Svasti, Ph.D. (saovaros.sva@mahidol.ac.th)
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8. Lect. Jiraporn Panmanee, Ph.D. (jiraporn.pam@mahidol.ac.th)
9. Lect. Siraprapa Boobphahom, Ph.D. (s.boobphahom@gmail.com)

Supporting Staff:

1. Somsong Phengsukdaeng (somsong.phe@mahidol.edu)

Credits: 2 (2-0-4)

Curriculum: Master of Science Program in Neuroscience (core course)
Doctor of Philosophy Program in Neuroscience (core course for B.Sc. Graduates)

Semester offering: First semester

Pre-requisites: -

Course learning outcomes (CLOs)

Upon completion of this course, students should be able to:

1. Understand chemical neurotransmitters, presynaptic proteins and cell adhesion molecules, chemically mediated synaptic transmission, neurotransmitter receptors, receptor-activated phosphoinositide

- turnover, G-proteins, cyclic nucleotides, and phosphorylation in the regulation of neuronal signaling functions. (PLO2-R)
2. Explain the principles and concepts of the chemical and functional organization of the nervous system at the cellular and molecular levels. (PLO3-R)
 3. Demonstrate an understanding of essential knowledge acquired for further approaches relevant to neurochemical research. (PLO1-I, PLO4-R, PLO5-R)

Alignment of teaching and assessment methods to course learning outcome:

Course learning outcome	Teaching method	Assessment method
1. Understand chemical neurotransmitters, presynaptic proteins and cell adhesion molecules, chemically mediated synaptic transmission, neurotransmitter receptors, receptor-activated phosphoinositide turnover, G-proteins, cyclic nucleotides, and phosphorylation in regulation of neuronal signaling functions.	(1) Lecture	(1) Quiz (2) Written examination
2. Explain the principles and concepts of the chemical and functional organization of the nervous system at the cellular and molecular levels.	(1) Lecture	(1) Quiz (2) Written examination
3. Demonstrate an understanding of essential knowledge acquired for further approaches relevant to neurochemical research	(1) Group discussion	(1) Participation

Course description:

The course emphasizes on principles of chemical transmission; second messenger; signaling transduction; neurotransmitters; neurotransmitter receptors; nuclear hormone receptor signaling; advances in neuronal stem cell research and molecular biology.

Course schedule:

Date: Monday, Wednesday and Friday

Time: 10.00 – 12.00 and 13.00 – 15.00

Rooms: Class activity will be held onsite at Room A107, Molecular Biosciences (MB) Building, Mahidol University, Salaya, Nakhon Pathom, or online platform through videoconferencing application, either through WebEx or Zoom depending on the situation of the COVID-19 pandemic in Thailand.

Topics	Date	Time	Lecture topics	Instructors
1.	Sep. 25, 2023	09.30-10.00	Orientation	Banthit
		10.00-12.00	Chemical neurotransmission and signal transduction	Siraprapa
2.		13.00-15.00	Synaptic, presynaptic proteins and cell adhesion molecule	Nuanchan
3.	Sep. 27, 2023	10.00-12.00	Acetylcholine	Nuanchan
4.		13.00-15.00	Serotonin, histamine and melatonin	Banthit
5.	Sep. 29, 2023	10.00-12.00	Catecholamine	Piyarat
6.		13.00-15.00	Amino acid neurotransmitters	Banthit
7.	Oct. 2, 2023	10.00-12.00	Neuropeptide	Piyarat
8.		13.00-15.00	Atypical neurotransmitters	Sujira
Exam I	Oct. 6, 2023	09.00-16.00	Exam 1 (Topics 1-8)	Somsong
9.	Oct. 9, 2023	10.00-12.00	Neurochemistry of learning and memory	Wipawan
10.		13.00-15.00	Nuclear hormone receptor signaling	Nuanchan
11.	Oct. 11, 2023	10.00-12.00	Neural stem cells	Wipawan
12.		13.00-15.00	Recombinant DNA and protein technology	Jiraporn
13.	Oct. 16, 2023	10.00-12.00	Up-and down-regulation of gene expression	Saovaros
14.		13.00-15.00	Transgenic animal	Narisorn
Exam II	Oct. 20, 2023	09.00-16.00	Examination II (Topics 9-14)	Somsong
15.	Oct. 27, 2023	09.00-12.00	Group discussion on integrated neurochemistry research topics	Lecture team

Assessment criteria:

Assessment criteria	Assessment method	Scoring rubrics
Quiz and Written examination (70%)	Short essay questions or multiple-choice questions	Scoring directly from correct answers and keywords.
Group discussion on assigned topic (15%)	Direct observation	observation of class participation (e.g., discussion, asking the question)

Participation in in-class activities (5%)	Direct observation	observation of class participation (e.g., discussion, asking the question)
Class attendance (10%)	Number of class attendance	Scoring directly from signing in each class

Student's achievement will be graded using symbols: A, B+, B, C+, C, D+, D, and F based on the distribution of student scores from the whole course as follows:

Percentage	Grade
85 -100	A
80 – 84	B+
70 - 79	B
60 - 69	C+
50 - 59	C
45 - 49	D+
40 – 44	D
< 40	F

Notice:

1. Since this course is a core requirement course, if students receive a final grade below “B”, they will need to re-enroll in this course in the next academic year.
2. According to the Faculty of Graduate Studies regulation, enrolled students must attend classes for more than 80% of the total class time. Therefore, students would be disqualified from the examination if they failed to comply with this regulation.

Updated: February 26, 2023