Course Syllabus

MBNS 605 Neurochemistry

Academic Year 2022

Course ID and Name: MBNS 605 Neurochemistry

Course coordinator: Prof. Banthit Chetsawang, Ph.D.
Tel: 02-441-9003-7 ext. 1206
Email: banthit.che@mahidol.ac.th

Instructors:

1. Prof. Piyarat Govitrapong, Ph.D. (piyarat.gov@mahidol.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)
6. Assist. Prof. Sujira Mukda, Ph.D. (sujira.muk@mahidol.ac.th)
7. Assist. Prof. Narisorn Kitiyanant, Ph.D. (narisorn.kit@mahidol.ac.th)
8. Lect. Jiraporn Panmanee, Ph.D. (jiraporn.pam@mahidol.ac.th)

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: Second 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 regulation of neuronal signaling functions. (PLO2) I

2. Explain the principles and concepts of the chemical and functional organization of the nervous system at the cellular and molecular levels. (PLO2) I
3. Demonstrate an understanding of essential knowledge acquired for further approaches relevant to neurochemical research. (PLO3) 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: 09.00 – 11.00 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.	6 March 2023	09.00-11.00	Chemical neurotransmission and signal transduction	Banthit
2.		13.00-15.00	Synaptic, presynaptic proteins and cell adhesion molecule	Nuanchan
3.	8 March 2023	09.00-11.00	Acetylcholine	Nuanchan
4.		13.00-15.00	Serotonin, histamine and melatonin	Banthit
5.	10 March 2023	09.00-11.00	Catecholamine	Piyarat
6.		13.00-15.00	Amino acid neurotransmitters	Banthit
7.	13 March 2023	09.00-11.00	Neuropeptide	Piyarat
8		13.00-15.00	Atypical neurotransmitters	Sujira
Exam I	20 March 2023	09.00-16.00	Exam 1 (Topics 1-8)	Somsong
9.	22 March 2023	09.00-11.00	Neurochemistry of learning and memory	Wipawan
10.		13.00-15.00	Nuclear hormone receptor signaling	Nuanchan
11.	24 March 2023	09.00-11.00	Neural stem cells	Wipawan
12.		13.00-15.00	Recombinant DNA and protein technology	Jiraporn
13.	27 March 2023	09.00-11.00	Up-and down-regulation of gene expression	Saovaros
14.		13.00-15.00	Transgenic animal	Narisorn
Exam II	3 April 2023	09.00-16.00	Examination II (Topics 9-14)	Somsong
15.	7 April 2023	09.00-11.00	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%)	Numbers of classes signed in	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 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 failed to comply with this regulation.

Date revised: October 17, 2022