Course Syllabus
MBNS 650 Developmental Neuroscience
Academic Year 2-2023

Course ID and Name: MBNS 650 Developmental Neuroscience

Course coordinator: Assoc. Prof. Nuanchan Chutabhakdikul, Ph.D.
Tel: 02-441-9003-7 ext. 1203
Email: nuanchan.chu@mahidol.edu

Instructors:

1. Prof. Dr. Banthit Chetsawang, Ph.D.
2. Assoc. Prof. Dr. Nuanchan Chutabhakdikul, Ph.D.
3. Assoc. Prof. Dr. Sujira Mukda, Ph.D.
4. Assoc. Prof. Dr. Vorasith Siripornpanich, MD, Ph.D.
5. Asst. Prof. Dr. Sukonthar Ngampramuan, Ph.D.
6. Asst. Prof. Dr. Jiraporn Panmanee, Ph.D.
7. Assoc. Prof. Dr. Naiphinich Kotchabhakdi, Ph.D. (Guest lecturer)
8. Assoc. Prof. Dr. Wipawan Thangnipon, Ph.D. (Guest lecturer)
9. Dr. Dollada Srisai, Ph.D., D.V.M. (Guest lecturer)
10. Dr. Anuck Sawangjit, Ph.D. (Guest lecturer)

Supporting Staff:

1. Somsong Phuengsukdaeng
2. Sasithorn Prommet

Credits: 2 (2-0-4)
Curriculum: Master of Science Program in Neuroscience (Required course)
Doctor of Philosophy Program in Neuroscience (Required course, plan 2.2)
Semester: 2/2023
Pre-requisites: None

Course learning outcomes (CLOs)

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

1. Explain the contemporary concepts and the molecular mechanisms that control each step of brain development (PLO1) I
2. Understand the neural correlates of behavioral development and discuss various factors that could affect the brain and behavioral development (PLO1) I, R
3. Demonstrate an understanding of essential knowledge acquired for future research in the field of developmental neuroscience (PLO2) I, R
4. Gain abilities to translate scientific evidence from developmental neuroscience to support child care and education (PLO5,6) P, R

Alignment of teaching and assessment methods to course learning outcome:

Course learning outcome	Teaching method	Assessment method
1. Explain the contemporary concepts and the molecular mechanisms that control each step of brain development (PLO1)	(1) Lectures (2) In-class discussion	(1) Quiz (2) Written examination
2. Understanding the neural correlates of behavioral development, discuss various factors that might affect the brain and behavioral development (PLO1)	(1) Lectures (2) In-class discussion	(1) Quiz (2) Written examination
3. Demonstrate understanding an essential knowledge acquired for future research relevant to developmental neuroscience and the implication on child care and education (PLO2)	(1) Select interesting paper in the field of developmental neuroscience, read and critically thinking about the gap for future research. Preparing the presentation.	(1) Weekly meetings to assess the progress and to observe student's ability to solve the problem while preparing the presentation (2) Evaluation of Oral presentation
4. Gain abilities to translate scientific evidence in developmental neuroscience to support child care and education (PLO5,6)	(1) Individual assignment to write one brief topic to translate neuroscience research for guiding practice in child care and education	(1) Weekly meetings to assess the progress and to observe the student's ability to solve the problem while preparing a brief. (2) Evaluation of the brief essay

Course description:

Current concepts concerning the cellular and molecular mechanisms of the brain development e.g., the neural induction and neurulation; the neural patterning; the Neurogenesis and Neural Differentiation; the axonal growth and guidance, dendritic growth; the target selection & formation of topographic maps; the development of glial cells; the growth factors and naturally occurring cell death; the neural migration and cortical lamination; the synapse formation and refinement; the development and migration of interneurons; the neural regeneration and repair; sleep for cognitive development; the fetal programming of brain development; the neural correlate of behavioral development; the gut microbiome in brain development and diseases; the factors influencing brain development.

Course schedule: MBNS 650 Developmental Neuroscience

Date: 9 February 2024 – 15 March 2024

Hybrid class: Onsite at Rooms A107, Institute of Molecular Biosciences

Online class via Zoom Meeting

Periods	Date	Time	Topics	Instructors
1	9 Feb 2024	09.00-9.30 9.30-11.30	Course orientation L1: Neural Induction and Neurulation	Nuanchan Nuanchan
2	12 Feb 2024	9.30-11.30	L2: Neural patterning	Nuanchan
3	14 Feb 2024	9.30-11.30	L3: Neurogenesis and Neural Differentiation	Nuanchan
4	14 Feb 2024	13.00-15.00	L4: Axonal growth and guidance, Dendritic growth	Wipawan
5	16 Feb 2024	9.30-11.30	L5: Target Selection & formation of Topographic maps	Naiphinich
6	16 Feb 2024	13.00-15.00	L6: Development of glial cells	Jiraporn
7	19 Feb 2024	9.30-11.30	L7: Growth factors and Naturally occurring cell death	Banthit
8	19 Feb 2024	13.00-15.00	L8: Neuronal migration and cortical lamination	Nuanchan
Exam I	23 Feb 2024	09.00-12.00	Midcourse Examination (L1-L8)	Somsong
9	21 Feb 2024	9.30-11.30	L9: Synapse formation and refinement	Nuanchan
10	28 Feb 2024	9.30-11.30	L10: Development and migration of interneurons	Nuanchan
11	28 Feb 2024	13.00-15.00	L11: Neural regeneration and repair	Sukonthar
12	1 Mar 2024	9.30-11.30	L12: Fetal programming of brain development	Nuanchan
13	1 Mar 2024	**14.00-16.00**	L13: Sleep for cognitive development	**Anuck**
14	4 Mar 2024	**10.00-12.00**	L14: Gut microbiome in brain dev. and diseases	**Dollada**
15	4 Mar 2024	13.00-15.00	L15: Neural correlates of behavioral development	Vorasith
16	6 Mar 2024	9.30-11.30	L16: Factors influencing brain development	Sujira
Exam II	11 Mar 2024	09.00-12.00	Final Examination (L9-L16)	Somsong
Present	15 Mar 2024	09.00-16.00	Student's presentation	Instructors

***MAP-C student can join the recurring Zoom meeting for all topics.**

Assessment criteria:

Assessment criteria	Assessment method	Scoring rubrics
Written examination (50%)	(1) Multiple choices questions (2) Short essay questions	(1) Scoring directly from MCQs answer (2) Scoring using keywords answer
Quiz (10%)	(1) Quiz after the class	(1) Scoring using keywords answer
Oral Presentation (20%)	(1) Oral presentation	(1) Information and organization of the topic presented (2) Verbal and Non-verbal communication, English proficiency
Write a brief topic on important concept of brain development to communicate with parent and teacher (10%)	(1) write one brief topic to translate neuroscience research for guiding practice in child care and education	(1) Evaluate whether the brief demonstrate knowledge of the topic, accuracy, extensiveness, perspective of knowledge which student exhibits, and easy to understand by public
Class attendance and participation in in-class discussion (10%)	(1) Numbers of classes signed in (2) Direct observation	(1) Eligible if signed in the class more than 80% (2) observation of class participation (e.g., discussion, asking the questions)

Student's achievement will be graded as A, B+, B, C+, C, D+, D and F based on the following criteria;

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

Oral presentation performance evaluation rubric (10% of total score)					
Criteria	**Excellent (score = 5)**	**Very good (score = 4)**	**Adequate (score = 3)**	**Limited (score = 2)**	**Poor (score = 1)**
Information quality and organization of the topic presented (including answering the questions) (2.5%)	The main points are presented explicitly with impressive detail and organization. Information is linked directly to the topic of presentation.	The main points are presented with enough detail. Information is well-organized and linked to the topic given.	The main points are somewhat clear but could add some more detail. Information is organized and linked to the topic given.	The main points are not clear and lack detail. Information is loosely organized and some are off-topic.	The main points are missed and have no detail. Information is disorganized and off-topic.
Verbal communication and English proficiency (2.5%)	Speaker's voice is very steady, clear, and confident. Spoken language is very fluent and grammatically corrected.	Speaker's voice is steady and confident. Spoken language is fluent and mostly grammatically corrected.	Speaker's voice is moderately confident but could be developed. Spoken language is mediocre and has some grammatical errors.	Speaker's voice is unsteady and lacks confidence. The use of spoken language needs to be improved, and many errors can be recognized.	Speaker fails to deliver proper presentation orally. Unable to deliver presentations via spoken English language.
Non-verbal communication (2.5%)	Speaker appears to be comfortable and confident. Effective uses of eye contact and gestures are presented to support the presentation.	Speaker appears to be fairly confident. Eye contacts and gestures are generally used.	Speaker appears to be generally at ease. The moderate use of eye contact and gesture but not effective.	The speaker appears uneasy, insecure or panicked. Eye contact and gesture are rarely used.	The speaker is uncomfortable with the presentation. No eye contact or gesture is presented.
Visual tools (2.5%)	Visual aids are very creative, easy to read, and greatly enhance the presentation.	Visual aids are typically clear and easy to follow.	Visual aids are good in terms of quality, but some points can be improved.	Limited visual aids are used or difficult for audiences to follow the topic.	No visual aids are used, and the audiences do not seem interested in the presentation.

Date revised: November 25, 2023