Course Syllabus

MBNS 650 Developmental Neuroscience

Academic Year 2-2025

Course ID and Name: MBNS 650 Developmental Neuroscience

Course coordinator: Assoc. Prof. Nuanchan Chutabhakdikul, Ph.D.
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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. Wipawan Thangnipon, Ph.D. (Guest lecturer)
8. Dr. Dollada Srisai, Ph.D., D.V.M. (Guest lecturer)
9. Dr. Anuck Sawangjit, Ph.D. (Guest lecturer)

Supporting Staff:

1. Somsong Phuengsukdaeng
2. Prapan Premsawat

Credits: 2 (2-0-4)

Curriculum: Master of Science Program in Neuroscience
Doctor of Philosophy Program in Neuroscience (Plan 2.2)

Semester: 2/2025

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 (PLO2) I, R
2. Understand the neural correlates of behavioral development and discuss various factors that could affect the brain and behavioral development (PLO2) I, R
3. Demonstrate an understanding of essential knowledge acquired for future research in the field of developmental neuroscience (PLO3) I, R
4. Gain abilities to translate scientific evidence from developmental neuroscience to support child care and education (PLO1, 4, 5) 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 (PLO2)	(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 (PLO2)	(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 development (PLO3)	(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 (PLO1, 4, 5)	(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: 10 February 2026 – 11 March 2026

Venue: Onsite at Rooms A107, Institute of Molecular Biosciences and Online* via Zoom meeting

Periods	Date	Time	Topics	Instructors
	10 Feb 2026	9.00-10.00	Course orientation*	Nuanchan
1	11 Feb 2026	9.30-11.30	L1: Neural Induction and Neurulation	Nuanchan
2	11 Feb 2026	13.00-15.00	L2: Neural Patterning	Nuanchan
3	13 Feb 2026	9.30-11.30	L3: Neurogenesis and Neural Differentiation	Nuanchan
4	16 Feb 2026	9.30-11.30	L4: Development of Glial Cells	Jiraporn
5	16 Feb 2026	13.00-15.00	L5: Axonal Growth and Guidance, Dendritic Growth*	Wipawan
6	18 Feb 2026	9.30-11.30	L6: Target Selection & Formation of Topographic Maps	Nuanchan
7	18 Feb 2026	13.00-15.00	L7: Neuronal Migration and Cortical Lamination	Nuanchan
8	20 Feb 2026	9.30-11.30	L8: Synapse Formation and Refinement	Nuanchan
Exam I	23 Feb 2026	09.00-12.00	Midcourse Examination (L1-L8)	Somsong
9	25 Feb 2026	9.30-11.30	L9: Development and Migration of Interneurons	Nuanchan
10	25 Feb 2026	13.00-15.00	L10: Growth Factors, Naturally Occurring Cell Death	Banthit
11	27 Feb 2026	9.30-11.30	L11: Neural Regeneration and Repair	Sukonthar
12	27 Feb 2026	13.00-15.00	L12: Neural Correlates of Behavioral Development	Vorasith
13	2 Mar 2026	9.30-11.30	L13: Fetal Programming of Brain Development	Nuanchan
14	4 Mar 2026	10.00-12.00	L14: Gut Microbiome in Brain Development & Diseases*	Dollada
15	4 Mar 2026	14.00-16.00	L15: Sleep for Cognitive Development*	Anuck
16	6 Mar 2026	9.30-11.30	L16: Factors Influencing Brain Development	Sujira
Exam II	9 Mar 2026	09.00-12.00	Final Examination (L9-L16)	Somsong
Present	11 Mar 2026	09.00-12.00	Student's presentation	Instructors

Zoom Link: https://zoom.us/j/93520128170?pwd=8ww0OELMLR8DKc5TAjuAOVMoD6JXDB.1

Meeting ID: 935 2012 8170 Passcode: 005166

Assessment criteria:

Assessment criteria	Assessment method	Scoring rubrics
Written examination (60%)	(1) Multiple choices questions (2) Short essay questions	(1) Scoring directly from MCQs answer (2) Scoring using keywords answer
Oral Presentation (15%)	(1) Oral presentation performance	(1) Information and organization of the topic presented (2) Verbal and Non-verbal communication, English proficiency
Design a visually appealing poster or infographic that conveys key insights from neuroscience research regarding an essential issue in brain development (15%)	(1) Quality of the brief, poster, or infographic	(1) Students' knowledge and accuracy about the topic. (2) The content is informative, evidence-based, and applicable to both parents and teachers. (3) Use clear and simple language to convey complex neuroscience concepts to ensuring the content is clear and easily understandable for the 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 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 (15% 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) (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 (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: 29 Dec, 2025