

NS8002: ADVANCED NEUROSCIENCE

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Advanced Neuroscience

Subject Code

NS - Neuroscience

Course Number

8002

Academic Unit

Neuroscience (NS)

College/School

College of Biomedicine (BD)

Course Duration

One Semester

Credit Units

3

Level

R8 - Research Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BMS8108 Advanced Neuroscience

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to provide a vision of the frontier of neuroscience. Organized by the topics of the traditional textbook, this course will go beyond the introductory level of neuroscience and dive into the actual academic world. After a recap

of basic neuroscience, equipping students with the necessary knowledge, each lecturer will focus on their own research field and explain how they developed the scientific question, formed the hypothesis, designed the experiments, and finally reached the conclusion in detail. The course encourages interaction between lecturers and students to prepare students for future academic seminars. Through these lectures, the students will have a glimpse of the frontier of neuroscience and learn stories behind the scenes. The students will be evaluated through short quizzes, writing assignments, and active participation in discussions. The course aims to bridge the gap between the classroom and formal academic conferences.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the anatomy of the central and peripheral nervous system at cellular, histological, and regional systems levels.	30	x		
2	General overview to discover how the brain processes sensory information, generates learning and memory, develops degeneration or diseases.	40	x	x	
3	Explain how to do neuroscience research and describe the frontier neuroscience research methods.	30	x	x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture, tutorial	To demonstrate neuronal anatomy, perception, cognition, and brain disorders.	1, 2	3 Hours/week
2	Lecture, tutorial	To demonstrate the frontier research work and methods.	2, 3	3 Hours/week
3	Lecture, tutorial	Internet resources and literature will be reviewed. Students will evaluate, discuss, and report their findings.	1, 2, 3	3 Hours/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Participation: Attendance	1, 2, 3	30	-	No
2	Coursework: quizzes, reports, etc.	1, 2, 3	60	-	Yes
3	Active Participation in Discussion	1, 2, 3	10	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)**Assessment Task**

Short Quizzes (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to show the learning progress and express the knowledge

Excellent

(A+, A, A-) Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

Good

(B+, B, B-) Substantial performance on all CILOs. Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.

Fair

(C+, C, C-) Satisfactory performance on the majority of CILOs possibly with a few weaknesses. Being able to profit from the course experience; understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal

(D) Barely satisfactory performance on a number of CILOs. Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure

(F) Unsatisfactory performance on a number of CILOs. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature

Assessment Task

Tutorial Discussion (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Participation in class and discussion

Excellent

(A+, A, A-) Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

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Assessment Task

Oral Presentation and/or reports (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to analyse and express the synthesis of ideas or test/report results in a clear and cogent manner

Excellent

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Assessment Task

Short Quizzes (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to show the learning progress and express the knowledge

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(A+, A, A-) Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

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Part III Other Information

Keyword Syllabus

- The basic structure features of the nervous system;
- Cellular neurophysiology: neurons, synapses, electrotonic properties, neurotransmitters, receptors, long-term potentiation;
- Systems neuroscience: perception, sensory, motor system, cognition, learning and memory, brain diseases;
- Frontier neuroscience research methods and tools.

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Larry R. Squire, Darwin Berg, Floyd E. Bloom, Sascha du Lac, Anirvan Ghosh & Nicholas C. Spitzer (2012), Fundamental Neuroscience (4th edition) Academic Press USA
2	Bear Mark, Barry Connors, and Michael A. Paradiso. (2020) Neuroscience: Exploring the brain, enhanced edition: Exploring the brain. Jones & Bartlett Learning.
3	Kandel, Eric R., James H. Schwartz, Thomas M. Jessell, Steven Siegelbaum, A. James Hudspeth, and Sarah Mack, eds. (2000) Principles of neural science. New York: McGraw-hill.