

**City University of Hong Kong
Course Syllabus**

**offered by Department of Neuroscience
with effect from Semester A 2024/25**

Part I Course Overview

Course Title:	Advanced Neuroscience
Course Code:	NS8002
Course Duration:	One semester
Credit Units:	3
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	BMS8108 Advanced Neuroscience
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Part II Course Details

1. Abstract

This course aims to provide a solid foundation in the field of neuroscience at cellular and organismal levels, as well as the concepts of integrative neurobiology. This is targeted for graduate students who are interested in professional fields in animal and human neurophysiology, research, and medicine or veterinary sciences. Students are encouraged to build broad and strong academic foundations.

- *Neuroanatomy*: structure and function of the nervous system
- *Cellular neurophysiology*: synapses and circuits
- *Systems neuroscience*: integration of molecular mechanisms, anatomical circuits, and behavioral analysis to understand the function of neural systems
- *Fundamental topics in biological neuroscience*:
 - › Learning and memory
 - › Pain and pleasure
 - › Satiety and obesity

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting	Discovery-enriched curriculum related learning outcomes		
			A1	A2	A3
1.	Describe the anatomy of the central and peripheral nervous system at cellular, histological, and regional systems levels.	30%	√		
2.	Explain the action potential and membrane potentials, channels and channel blockers, synaptic receptors, transmitter release, and sensory transduction.	30%	√	√	
3.	Discover how the brain generates learning and memory, what consciousness is, and why we have pain and pleasure generally.	40%	√	√	√
		100%			

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.

3. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.						Hours/week
		1	2	3				
Lecture, tutorial	To demonstrate neuronal anatomy.	√						39 hours in total
Lecture, tutorial	To review literature about electrical physiological recordings. The students will report their findings.		√					
Lecture, tutorial, presentation	Internet resources and literature will be reviewed. Students will evaluate, discuss, and present their findings.			√				

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3					
Continuous Assessment: 100%								
Short Quizzes	√	√					30%	
Tutorial Discussion	√	√	√				30%	
Oral Presentation	√	√	√				40%	
Examination: 0%								
							100%	

5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Short Quizzes	Ability to show the learning progress and express the knowledge	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.	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.	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.	Barely satisfactory performance on a number of CILOs. Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	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
2. Tutorial Discussion	Participation in class and discussion					
3. Oral Presentation	Ability to analyse and express the synthesis of ideas or test/report results in a clear and cogent manner					

Applicable to students admitted in Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Short Quizzes	Ability to show the learning progress and express the knowledge	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.	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.	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.	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
2. Tutorial Discussion	Participation in class and discussion				
3. Oral Presentation	Ability to analyse and express the synthesis of ideas or test/report results in a clear and cogent manner				

Part III Other Information

1. Keyword Syllabus

- The basic structure features of nervous system
- Cellular neurophysiology: neurons, synapses, electrotonic properties, neurotransmitters, receptors, long-term potentiation
- Systems neuroscience: sensory, motor system, autonomic function and behavioural analysis
- Brain-generated learning and memory, pain perception

2. Reading List

2.1 Compulsory Readings

Nil

2.2 Additional Readings

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
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