

**City University of Hong Kong**  
**Course Syllabus**  
**offered by Department of Biomedical Sciences**  
**with effect from Semester A 2022/2023**

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**Part I Course Overview**

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

## Part II Course Details

### 1. Abstract

This course aims to provide a solid foundation in the field of neuroscience at cellular and organismal levels, and 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 nervous system
- *Cellular neurophysiology*: synapses, and circuits
- *Systems neuroscience*: integration of molecular mechanisms, anatomical circuits, and behavioural analysis to understand 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 <sup>#</sup>	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes		
			A1	A2	A3
1.	Describe the anatomy of 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.	General overview to discover how the brain generates learning and memory, what is consciousness and why do we have pain and pleasure.	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 self-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. Teaching and Learning Activities (TLAs)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		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%					
Participation: Attendance	✓	✓	✓	30%	
Coursework	✓	✓		30%	
Active Participation in Discussion	✓	✓	✓	40%	
Examination: 0%					
				100%	

## 5. Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
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
Tutorial Discussion	Participation in class and discussion				
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 before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
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
Tutorial Discussion	Participation in class and discussion					
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**

Larry R. Squire, Darwin Berg, Floyd E. Bloom, Sascha du Lac, Anirvan Ghosh & Nicholas C. Spitzer (2012), *Fundamental Neuroscience* (4th edition) Academic Press USA