

**City University of Hong Kong  
Course Syllabus**

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

**Part I Course Overview**

<b>Course Title:</b>	Advanced Neurobiology
<b>Course Code:</b>	CHEM8009
<b>Course Duration:</b>	1 semester
<b>Credit Units:</b>	4 credits
<b>Level:</b>	R8
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	BCH8009 Advanced Neurobiology
<b>Exclusive Courses:</b> <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 neurobiology 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 and are urged not to specialize too heavily.

- *Neuroanatomy*: structure and function of nervous system
- *Cellular neurophysiology*: synapses, and circuits
- *Systems neuroscience*: integration of molecular mechanisms, anatomical circuits, and behavioral analysis to understand function of neural systems
- *Fundamental topics in biological neuroscience*:
  - Brain-generated 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.	20%			
2.	Describe the circuitry and neurochemistry of the vagus nerve and major brain regions.	20%			
3.	Explain the action potential and membrane potentials, channels and channel blockers, synaptic receptors, transmitter release, and sensory transduction.	30%			
4.	General overview to discover how the brain generates learning and memory, what is consciousness and why do we have pain and pleasure.	30%			
		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. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lectures, tutorials and laboratory demonstrations	Students will learn neuronal anatomy (rat) in lectures, tutorials, and small group laboratory demonstrations.	✓				
Lectures, tutorials and laboratory demonstrations	Students will learn brain and vagal nerve that regulate gastric or pancreatic functions in lectures, tutorials, and small group laboratory demonstrations.		✓			
Lectures, tutorials and laboratory practices	Lectures, tutorials and small group laboratory practices to perform electrical physiological recordings. The students will report their findings.			✓		
Lectures, tutorials, written reports, oral presentations	Lectures and tutorials, in which internet resources and literature will be reviewed. Students will evaluate, discuss, and present their findings in the form of written reports and oral presentations.				✓	

### 4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: <u>60%</u>						
Short Quizzes	✓	✓	✓	✓	20%	
Tutorial Discussion	✓	✓	✓	✓	20%	
Lab Practice/ Report			✓		10%	
Oral Presentation				✓	10%	
Examination: <u>40%</u> (duration: 2 hours)						
					100%	

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM:

**“A minimum of 40% in both coursework and examination components.”**

## 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						
2. Tutorial Discussion						
3. Lab Practice/ Report						
4. Oral Presentation						
5. Examination						

Applicable to students admitted from 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					
2. Tutorial Discussion					
3. Lab Practice/ Report					
4. Oral Presentation					
5. Examination					

## 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 behavioral analysis
- Brain-generated learning and memory, pain perception

### 2. Reading List

#### 2.1 Compulsory Readings

1.	
2.	
3.	
...	

#### 2.2 Additional Readings

1.	Michael J. Zigmond (1999), Fundamental Neuroscience (2th edition) Academic Press USA
2.	
3.	
...	