City University of Hong Kong
Course Syllabus

offered by Department of Chemistry
with effect from Semester A 2022/23

Part I   Course Overview

Course Title:	Advanced Neurobiology
Course Code:	CHEM8009
Course Duration:	1 semester
Credit Units:	4 credits
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	BCH8009 Advanced Neurobiology
Exclusive Courses: *(Course Code and Title)*	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[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			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. Teaching and Learning Activities (TLAs)

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lectures, tutorials and laboratory demonstrations	Lectures, tutorials, small group laboratory demonstrations of neuronal anatomy (rat).	✓				
Lectures, tutorials and laboratory demonstrations	Lectures, tutorials, and small group laboratory demonstrations of brain and vagal nerve that regulate gastric or pancreatic functions.		✓			
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: 60%						
Short Quizzes	✓	✓	✓	✓	20%	
Tutorial Discussion	✓	✓	✓	✓	20%	
Lab Practice/ Report			✓		10%	
Oral Presentation				✓	10%	
Examination: 40% (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 in Semester A 2022/23 and thereafter

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					

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)
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.	
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2.2 Additional Readings

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