

**City University of Hong Kong**  
**Course Syllabus**

**offered by Department of Neuroscience**  
**with effect from Semester A 2023/2024**

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**Part I Course Overview**

<b>Course Title:</b>	Sensory and Motor Neuroscience
<b>Course Code:</b>	NS5005
<b>Course Duration:</b>	One semester
<b>Credit Units:</b>	3
<b>Level:</b>	P5
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil. Very basic undergraduate knowledge of fundamentals of cell biology, physics and neuroscience is assumed.
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

## Part II Course Details

### 1. Abstract

This course aims to give students a very solid foundation in core aspects of neuroscience, namely how nervous systems collect information about their environment through sensory processes, and how they use this information to control voluntary movements of the body. The course will focus mostly on the mammalian nervous system, but examples from lower vertebrate and invertebrate systems may also be touched upon briefly. There will be a thorough examination of the structure and function of the major senses (vision, hearing, touch, smell, taste, balance) and an introduction to key stations of motor control, from motor units of skeletal muscle all the way to the role of cortex, cerebellum and basal ganglia in action planning and action selection. In addition, the lectures will introduce some of the key techniques used to study the role of neural activity in sensory and motor control, and touch on issues of multisensory-integration and sensory-motor interactions.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Know and understand the key stages of the visual pathway		✓		
2.	Use an understanding of the visual system to explain visual illusions		✓	✓	✓
3.	Know and understand the key stages of the auditory pathway		✓		
4.	Understand the chemical senses		✓		
5.	Understand the sense of touch		✓		
6.	Understand key principles of neural coding of sensory information		✓	✓	
7.	Understand the main methods used for studying sensory systems		✓	✓	
8.	Understand how the nervous system controls muscles		✓	✓	
9.	Understand how motor cortex encodes movement intentions		✓		
10.	Understand key interactions between motor cortex and subcortical motor structures (cerebellum, basal ganglia)		✓		
11.	Become familiar with phenomena of multisensory integration and sensory-motor interactions		✓		
12.	Be familiar with common pathologies affecting sensory and motor systems		✓	✓	
* If weighting is assigned to CILOs, they should add up to 100%.		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)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.	Hours/week (if applicable)
Lectures	Delivery of key knowledge	1-12	2
Tutorials	Online quizzes and interactive sessions with Q&A to consolidate and deepen understanding of the material delivered in lectures.	1,4-6,9-12	1
Practical demonstrations	Exploration of visual illusions, auditory phenomena through guided online experiments. Demonstrations of EMG and ERP measurements.	2, 3, 7, 8	1

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

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: <u>50</u> %								
Through online quizzes	✓	✓	✓	✓				
Examination: <u>50</u> % (duration: 2h , if applicable)								
							100%	

\* The weightings should add up to 100%.

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)*

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Online quizzes	Quiz questions will be designed to test students' knowledge, understanding, and ability to apply the material taught in recent lectures and tutorial demonstrations.	Candidate has comprehensive knowledge and deep understanding of the subject matter, as evidenced by very high test scores.	Candidate has good knowledge and understanding of key concepts of neuroscience.	Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.	Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.
2. Final Exam	Exam questions will be designed to test students' knowledge, understanding, and ability to apply the material taught in the entire course.	Candidate has comprehensive knowledge and deep understanding of the subject matter, as evidenced by very high test scores.	Candidate has good knowledge and understanding of key concepts of neuroscience.	Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.	Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.

**Part III Other Information** (more details can be provided separately in the teaching plan)

**1. Keyword Syllabus**

*(An indication of the key topics of the course.)*

Vision. Audition. Special Senses. Motor control. Sensory-motor interactions. Multisensory interactions.

**2. Reading List**

**2.1 Compulsory Readings**

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

Nil

**2.2 Additional Readings**

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	Consciousness and the Brain – Stanislas Dehaene
2.	Beyond Boundaries – Miguel Nicolelis
3.	Selected chapters of “Neuroscience” by Bear, Connors and Paradiso
4.	Selected chapters of “Auditory Neuroscience – Making Sense of Sound” by Schnupp, Nelken and King