

NS8105: SENSORY AND MOTOR NEUROSCIENCE

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Sensory and Motor Neuroscience

Subject Code

NS - Neuroscience

Course Number

8105

Academic Unit

Neuroscience (NS)

College/School

College of Biomedicine (BD)

Course Duration

One Semester

Credit Units

3

Level

R8 - Research Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil. Very basic undergraduate knowledge of fundamentals of cell biology, physics and neuroscience is assumed.

Precursors

Nil

Equivalent Courses

NS5005

Exclusive Courses

Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Know and understand the key stages of the visual pathway		x	x	x
2	Use an understanding of the visual system to explain visual illusions		x	x	
3	Know and understand the key stages of the auditory pathway		x	x	
4	Understand the chemical senses		x	x	x
5	Understand the sense of touch		x	x	x
6	Understand how the nervous system controls muscles		x		

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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Delivery of key knowledge	1, 2, 3, 4, 5, 6	2
2	Tutorials	Presentation sessions with Q&A to consolidate and deepen understanding of the material delivered in lectures.	1, 2, 3, 4, 5, 6	1

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Through presentations	1, 2, 3, 4, 5, 6	40	-	No
2	Summary report	1, 2, 3, 4, 5, 6	10	-	No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Assessment Rubrics (AR)

Assessment Task

Presentations (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Presentations will be designed to test students' knowledge, understanding, and ability to apply the material taught in recent lectures and tutorial demonstrations.

Excellent

(A+, A, A-) Candidate has comprehensive knowledge and deep understanding of the subject matter, as evidenced by very high performance.

Good

(B+, B, B-) Candidate has good knowledge and understanding of key concepts of neuroscience.

Fair

(C+, C, C-) Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.

Marginal

(D) Candidate has a minimal level of knowledge and understanding of key neuroscience concepts. There are numerous and significant gaps in their understanding, and there is a clear and pressing need for substantial improvement.

Failure

(F) Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.

Assessment Task

Final Exam (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Exam questions will be designed to test students' knowledge, understanding, and ability to apply the material taught in the entire course.

Excellent

(A+, A, A-) Candidate has comprehensive knowledge and deep understanding of the subject matter, as evidenced by very high test scores.

Good

(B+, B, B-) Candidate has good knowledge and understanding of key concepts of neuroscience.

Fair

(C+, C, C-) Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.

Marginal

(D) Candidate has a minimal level of knowledge and understanding of key neuroscience concepts. There are numerous and significant gaps in their understanding, and there is a clear and pressing need for substantial improvement.

Failure

(F) Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.

Assessment Task

Presentations (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Presentations will be designed to test students' knowledge, understanding, and ability to apply the material taught in recent lectures and tutorial demonstrations.

Excellent

(A+, A, A-) Candidate has comprehensive knowledge and deep understanding of the subject matter, as evidenced by very high performance.

Good

(B+, B) Candidate has good knowledge and understanding of key concepts of neuroscience.

Marginal

(B-, C+, C) Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.

Failure

(F) Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.

Assessment Task

Final Exam (for students admitted from Semester A 2022/23 to Summer Term 2024)

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Exam questions will be designed to test students' knowledge, understanding, and ability to apply the material taught in the entire course.

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(B-, C+, C) Candidate has a reasonable amount of knowledge and understanding of key concepts of neuroscience, but there are significant gaps.

Failure

(F) Candidate knows and understands basic concepts of neuroscience, but has substantial gaps.

Assessment Task

Summary report (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Students need to write an 1-2 pages summary report by choosing a sensory modality (e.g., vision, taste, smell, or touch). The report should include the key components in the corresponding sensory pathway, as well as their functions. Figures are encouraged to help illustrate the function.

Criterion

1. Coherent flow of information and clear connections between components.
2. Accurate representation of the sensory pathway and its key functions.
3. Clear structure with appropriate headings and logical progression.

Excellent

(A+, A, A-) Comprehensive coverage, well-organized, and logical with insightful conclusions.

Good

(B+, B, B-) Covers key components with some minor organizational issues.

Fair

(C+, C, C-) Basic information provided but lacks depth and organization.

Marginal

(D) Key components missing or poorly explained, lacks clarity.

Failure

(F) Minimal understanding of the topic and lacks coherent structure.

Assessment Task

Summary report (for students admitted from Semester A 2022/23 to Summer Term 2024)

Students need to write an 1-2 pages summary report by choosing a sensory modality (e.g., vision, taste, smell, or touch).

The report should include the key components in the corresponding sensory pathway, as well as their functions. Figures are encouraged to help illustrate the function.

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Excellent

(A+, A, A-) Comprehensive coverage, well-organized, and logical with insightful conclusions.

Good

(B+, B) Covers key components with some minor organizational issues.

Marginal

(B-, C+, C) Basic information provided but lacks depth and organization.

Failure

(F) Minimal understanding of the topic and lacks coherent structure.

Part III Other Information

Keyword Syllabus

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

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
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