NS5008: NEUROPHARMACOLOGY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Neuropharmacology

Subject Code
NS - Neuroscience
Course Number
5008

Academic Unit
Neuroscience (NS)

College/School
College of Biomedicine (BD)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract
Neuropharmacology is the study of the action mechanism and effect of drugs on the nervous system (NS) through their binding to a specific receptor. These drugs include anaesthetic, analgesic, anti-seizure, hypnotic, narcotic, psychotic,

and other drugs modulating the function of the NS. Therefore, this course aims to provide students with an overview of neuropharmacological principles, such as the mechanism of action of major neurotransmitters, or ligands, and their receptors (e.g., GABA receptors) in the synaptic transmission of the diseased brain, and its modulation and intervention by drugs to reduce or treat the symptoms of major neurological diseases, such as neurodegenerative, neurovascular, seizure, and psychiatric disorders. Additionally, this course covers several neuroscience fields to discuss how dysfunction of the nervous system leads to prevalent neurological disorders such autism. These fields, including the function of cell adhesion and scaffolding proteins, regulation of excitation and inhibition in central nervous system, and mechanistic mechanisms of neurological disorder risk genes in nervous system function, will provide a detailed picture how disorders and diseases are caused, and how drugs could be involved to study the underlying mechanisms.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Learning the basic principle of pharmacology.			x	x
2	Learning the general concepts of the anatomy, physiology, and function of the nervous system.			x	x
3	Understanding the function of major neurotransmitter systems in physiological or pathological conditions.			x	x
4	Obtaining knowledge of the causes and pathobiology of major neurological and psychiatric disorders and the pharmacological treatment to reduce their symptoms and underlying causes.		x	x	
5	Learning to apply neuropharmacological concepts to aid the development of drugs for the modulation of dysfunctional synapses and neuronal signaling in the diseased brain.		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	Provide the basic and essential knowledge about the principle of neuropharmacology and its application to reduce or treat the symptoms of various neurological and psychiatric disorders. Provide fundamental knowledge regarding the functions of the nervous system at the molecular and cellular levels. In particular, the regulations of key synaptic proteins as well as the effects of their high risky mutations identified in human neurological disorders will be discussed.	1, 2, 3, 4, 5	2 hours/week
2	Tutorials	Quizzes and interactive sessions with Q&A to consolidate and deepen understanding of the material delivered in lectures.	1, 2, 3, 4, 5	1 hour/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Quizzes after lectures	1, 2, 3, 4, 5	50	-	No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Assessment Rubrics (AR)

Assessment Task

Quiz

Criterion

Testing students' ability in the learning and understanding of lecture contents.

Excellent

(A+, A, A-) Outstanding level of performance on all the CILOS. Strong evidence of original thinking; good organization, capacity to analyse & synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

Good

(B+, B, B-) Substantial level of performance on all the CILOS. Evidence of grasp of subject, some evidence of critical capacity & analytic ability; reasonable understanding of issues; evidence of familiarity with literature.

Fair

(C+, C, C-) Satisfactory level of performance on the majority 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.

Marginal

(D) The 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) 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.

Assessment Task

Final exam

Criterion

(1). Testing students' ability to understand and summarize key points in the content of lectures.
(2). Testing students' ability to apply the knowledge from lecture to the answer to current questions in neuropharmacology with critical and logical thinking.

Excellent

(A+, A, A-) Outstanding level of performance on all the CILOS. Strong evidence of original thinking; good organization, capacity to analyse & synthesize; superior grasp of subject matter; evidence of extensive knowledge base.

Good

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Part III Other Information

Keyword Syllabus

Pharmacology basics, Pharmacokinetics and Pharmacodynamics, Receptor Pharmacology, Neuropharmacology, Neuronal communication and neurotransmitter release, Neurotransmitters receptors, Neurological and Psychiatric diseases, Drug application in the study of CNS function

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Goodman & Gilman's "The pharmacological basis of therapeutics" Mc Graw Hill Ed. 14 th Ed, 2022.
2	Katzung "Basic & Clinical Pharmacology" Mc Graw Hill Ed. 14 th Ed, 2017.
3	Nestler Hyman & Malenka's "Molecular Neuropharmacology" McGraw Hill Ed. 4 th Ed, 2020.