NS5002: NEUROBIOLOGY OF DISEASE

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Neurobiology of Disease

Subject Code
NS - Neuroscience
Course Number
5002

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
The aim of this course is to provide student with an understanding of pathophysiology and therapy for a wide spectrum of Neurological disorders. Assuming students have acquired knowledge of advanced neuroscience and molecular and

cellular neuroscience, therefore primary focus will be on degenerative disorders (e.g. Parkinson), acute injury (e.g. stroke); neurodevelopmental disorders (e.g. Autism) and neuropsychiatric disorders (e.g. Schizophrenia). For each disease discussed, the section will be organized to introduce fundamental aspects of nervous system dysfunction, molecular mechanisms underlying disease pathogenesis, current treatments, and on-going translational research for therapeutic invention. The class format will be a mix of lecture-based sessions and discussions of scientific articles. The topics will be addressed through scientific, literary and popular media in a combination of lectures and tutorials. There will be many opportunities for interactive group work and sharing of ideas during the classes. With these approaches, students will gain an understanding of disease presentation and current knowledge gap as well as preclinical models for investigating pathogenesis and developing new drug of human brain disorders.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Obtain a working knowledge of anatomy and physiology of the central nervous system.	15	x		
2	Understand the symptoms, signs and basic principles of major traumatic, neurodegenerative, neurodevelopmental disorders of the nervous system.	20	x	x	
3	Able to know experimental models for investigating neurological disorders. Able to know the updated molecular mechanisms underlying pathogenesis of multiple neurological disorders.	20	x	x	x
4	Ability to present, interpret, and critically analyze preclinical studies of human disease reported in the scientific literatures.	15		x	x
5	Understand the basic principles and modalities of current treatments for multiple brain disorders. Gain ability to explain the utility and limitations of animal models for developing effective therapies for neurological disorders.	20		x	x
6	Identify knowledge gaps in our current understanding of biological mechanisms and treatment strategies for brain disorders .	10		x	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 & Tutorials	Learning and interactive discussion based on a combination of lectures and models to introduce brain structure and function pathogenesis of brain disorders and current and future treatments .	1, 2, 3, 4, 5, 6	
2	Class discussion	Interactive discussions on scientific topics, preclinical studies in the scientific literatures and knowledge gaps will promote broader perspectives and a deeper critical understanding of the complex connections between issues of profound importance.	4, 5, 6	
3	Group presentation/ projects	Projects based task will be assayed to small groups by means of writing an essay or ppt presentation to demonstrate the creative, collaborative, and communication skills.	3, 4, 5, 6	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Quizzes after lectures	3, 4, 5	25	-	No
2	Projects based poster/platform Presentation or writing assay	4, 6	25	-	Yes
3	Class discussion, assignments, and attendance	1, 2, 3, 4, 5, 6	20	-	No

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

2

Assessment Rubrics (AR)

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

Criterion
Correction

Excellent
(A+, A, A-) >75% of corrected questions.

Good
(B+, B, B-) >60 to74% of corrected questions

Fair
(C+, C, C-) 45% to 59% of corrected questions

Marginal
(D) 40% to 44% of corrected questions

Failure
(F) Do not hand in the assignment on time, or correctly answered < 40% of the questions.

Assessment Task
Projects based poster/platform group presentation or writing assay (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
The content, literature review and logic of the assay (75%). The session of questions and answer (25%).

Excellent
(A+, A, A-) Demonstrates a high level of knowledge and integration regarding content, literatures, and issues. Provide clear answers with detailed explanations for questions.

Good
(B+, B, B-) Demonstrates a well-developed knowledge regarding content, literatures, and proposed topics. Provide clear answers for questions.

Fair
(C+, C, C-) Demonstrates basic knowledge regarding content, literatures, and proposed topics. Provide answers partially for questions.

Marginal
(D) Demonstrates knowledge regarding content, literatures, and proposed topics but lack of logic and details.

Failure
(F) Lack ability to demonstrate the content, literatures, and proposed topics without logic and details.

Assessment Task
Class discussion, assignments, and attendance (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

To be able to define the scientific concept and principles clearly and logical with integration. Able to discuss current limitations, advanced therapeutic platforms and ethical concerns with critical thinking. Raise up good questions will add additional mark.

Excellent

(A+, A, A-) Demonstrates a high level of understanding for the content with substantial integration. Develops deep thinking for discussed issues.

Good

(B+, B, B-) Demonstrates understanding of the content and develops deep thinking for discussed issues.

Fair

(C+, C, C-) Demonstrate a basic content. The discussed issues are easy to understand but lacking of details

Marginal

(D) Demonstrates a correct content but poor writing without discussion.

Failure

(F) Do not submit the assay or not involved in any discussion.
The content is poorly written.

Assessment Task

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

Criterion

Correction of answers and able to describe key points of scientific based issues.

Excellent

(A+, A, A-) >75% of corrected questions.
Clearly define and describe all key points for the issues.

Good

(B+, B, B-) >60 to74% of corrected questions.
Describe majority of key points for the issues.

Fair

(C+, C, C-) 45% to 59% of corrected questions.
Describe a few key points for issues.

Marginal

(D) 40% to 44% of corrected questions.
No key pointes are described.

Failure

(F) The students failed to solve the problems or submit a report.

Assessment Task

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

Criterion

Correction

Excellent

(A+, A, A-) >75% of corrected questions.

Good

(B+, B) >60 to 74% of corrected questions

Marginal

(B-, C+, C) 45% to 59% of corrected questions

Failure

(F) Do not hand in the assignment on time, or correctly answered < 40% of the questions.

Assessment Task

Projects based poster/platform group presentation or writing assay (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

The content, literature review and logic of the assay (75%). The session of questions and answer (25%).

Excellent

(A+, A, A-) Demonstrates a high level of knowledge and integration regarding content, literatures, and issues. Provide clear answers with detailed explanations for questions.

Good

(B+, B) Demonstrates a well-developed knowledge regarding content, literatures, and proposed topics. Provide clear answers for questions.

Marginal

(B-, C+, C) Demonstrates basic knowledge regarding content, literatures, and proposed topics. Provide answers partially for questions.

Failure

(F) Lack ability to demonstrate the content, literatures, and proposed topics without logic and details.

Assessment Task

Class discussion, assignments, and attendance (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

To be able to define the scientific concept and principles clearly and logical with integration. Able to discuss current limitations, advanced therapeutic platforms and ethical concerns with critical thinking. Raise up good questions will add additional mark.

Excellent

(A+, A, A-) Demonstrates a high level of understanding for the content with substantial integration. Develops deep thinking for discussed issues.

Good

(B+, B) Demonstrates understanding of the content and develops deep thinking for discussed issues.

Marginal

(B-, C+, C) Demonstrate a basic content. The discussed issues are easy to understand but lacking of details

Failure

(F) Do not submit the assay or not involved in any discussion.
The content is poorly written.

Assessment Task

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

Criterion

Correction of answers and able to describe key points of scientific based issues.

Excellent

(A+, A, A-) >75% of corrected questions. Clearly define and describe all key points for the issues.

Good

(B+, B) >60 to74% of corrected questions. Describe majority of key points for the issues.

Marginal

(B-, C+, C) 45% to 59% of corrected questions. Describe a few key points for issues.

Failure

(F) Not reaching marginal levels.

Part III Other Information

Keyword Syllabus

1. Introduction: Course introduction & overview of neurological disorders; Formation and functional diversity of the nervous system.
2. Neurodegenerative disorders: Parkinson’ s disease; Alzheimer’ s disease; Multiple Sclerosis; Huntington’ s disease
3. Traumatic injury induced neurological disorders: Traumatic brain injury; Spinal cord injury; Pain
4. Neurodevelopmental disorders: Genetic etiologies for the neurological diseases; Disorders of intellectual, learning and speaking (Autism, Attention deficit hyperactive disorder, Dyslexia); Disorders of motor coordination (Cerebral palsy, Dyspraxia and SMA)
5. Neuropsychiatric disorders: Schizophrenia and Bipolar disorder; Obsessive Compulsion and addictive Disorder
6. Group based project: Poster or topical presentations

Reading List

Compulsory Readings

	Title
1	We set no compulsory textbooks for the course.

Additional Readings

	Title
1	"" Cutting edge" recent publications, and review articles"
2	Diseases of the Nervous System 2nd Edition - May 18, 2021, Harald Sontheimer eBook ISBN: 9780128213964