The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	Neurosciences and Behavior
2	Course number	0500309
3	Credit hours (theory, practical)	8
	Contact hours (theory, practical)	
4	Prerequisites/corequisites	
5	Program title	MD
6	Program code	05
7	Awarding institution	The University of Jordan
8	Faculty	Medicine
9	Department	All departments
10	Level of course	Undergraduate
11	Year of study and semester (s)	Third year/ second semester
12	Final Qualification	MD
13	Other department (s) involved in teaching the course	Anatomy, physiology, pathology, pharmacology, microbiology, biochemistry, clinical
14	Language of Instruction	English
15	Date of production/revision	February 2022

16. Course Coordinator:

Dr Maha ELBeltagy
M.elbeltagy@ju.edu.jo

17. Other instructors:

Prof Faisal Mohammad : physiology
Prof Munir Gharaibeh: pharmacology
Prof Mohammad Al-Salem and Dr Maha Beltagy and: Anatomy
Prof Mamoun Ahram and Dr Diala Abu Hassan: Biochemistry
Dr Anas Abu Humaidan: Microbiology
Dr Nesreen abu shaheen : Histopathology

18. Course Description:

This is an 8 hour credit course that is intended to provide students with an understanding of the essential principles of neurological function, anatomy, disease and treatment.
It gives the essential anatomical and physiological principles and an in-depth understanding of CNS diseases and their pathogenesis and histopathological features. The pharmacology part covers the main principles of treating CNS disorders.
The course includes one practical credit hour to cover anatomy, physiology and histopathology lab sessions.
The course also includes 1 hour of behavioural sciences.

19. Course aims and outcomes:

A- Aims:

By the end of this course, the student should be able to:

1. Describe and identify the gross morphology and microanatomy of the central and peripheral nervous system.
2. Identify the organs of the special senses and describe their anatomical features and histology.
3. Describe the functions of the central and peripheral and relate structure to function.
4. Describe the functions of the organs of the special senses and relate structure to function.
5. List molecules involved in the normal functioning of the central and peripheral nervous systems, their characteristics and regulation.
6. List the pathologic disorders that affect the central and peripheral nervous systems, their pathogenesis, manifestations, and histological features.
7. List the infectious diseases of the CNS, including their etiologic agents, pathogenesis, manifestations and diagnosis.
8. List most important drugs used in the treatment of disorders that affect the central and peripheral nervous systems including their pharmacologic properties, indications, doses and side effects.
9. Describe the epidemiology of diseases that affect the nervous system.
10. Introduced to taking history and performing physical examination of the central and peripheral nervous system.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to :

- Describe the location and gross features of spinal cord.
- Describe the meninges and spaces surrounding spinal cord.
- Describe the anatomical organization of the Ascending and Descending tracts.
- Define the major clinical manifestations of injuries affecting ascending and descending tracts.
- Describe the blood supply and venous drainage of spinal cord

- Understand the functions of ascending tracts in pain, temperature, touch and pressure sensation.
- Understand the function of descending tracts in different body movements.
- Define the general external features for each part of the brainstem.
- Distinguish sections of Medulla Oblongata, Pons and Midbrain at characteristic levels and relate these to the external features.
- Recognize the important internal structures of each part and describe their functions.
- Understand the paths taken by the major ascending and descending tracts and recognize associated brainstem nuclei.
- Identify the name and number of each Cranial Nerve.
- Summarize what structures are innervated by each nerve, identifying motor, sensory and parasympathetic innervations.
- Define the major clinical manifestations of each cranial nerve injury.
- Describe the different lobes of the cerebrum, sulci and gyri on the different surfaces of the cerebral hemisphere.
- Describe Fibers and functional areas of the cerebral cortex.
- Identify clinical manifestations of lesions of different cortical areas
- Describe course and distributions of the cerebral blood vessels both carotid and basilar systems.
- Outline arteries sharing in circulus arteriosus.
- Describe clinical manifestations related to different types of cerebral hemorrhage .
- Describe the main connections of the thalamic nuclei.
- Describe different parts of hypothalamus, subthalamus, epithalamus and metathalamus
- Identify clinical syndromes related to diencephalon
- Describe the parts and boundaries of each part of the lateral ventricle.
- Describe the parts and boundaries of the third and fourth ventricles.
- Explain cerebrospinal fluid circulation.
- Name the cerebral meanings and subarachnoid cisterns.
- Outline sites of epidural anesthesia and CSF puncture.
- Distinguish the different parts of horizontal section including the basal ganglia.
- Locate the different fibres passing through the different parts of internal capsule.
- Describe clinical manifestation of lesions of different parts of basal ganglia and internal capsule
- Describe the external features, lobes, subdivisions of the cerebellum and function of each.
- Describe the internal structures and nuclei of cerebellum.
- Illustrate the cerebellar peduncles and fibres passing through each one.
- Name the different components of the limbic system.
- Describe clinical manifestation of lesions of different parts of limbic system
- Describe the formation and differentiation of the neural tube.
- Mention the derivatives of the neural crest.
- Describe the congenital anomalies of the different part of the CNS

- Understand the different sizes of axons, their classification and the meaning of their diversity (e.g. Muscle spindle) .
- Understand the factors of lamination, cytoarchitecuring, lamination of the cord. Differences among the regions of the cord.
- list the causes of intracranial hemorrhage and differentiate between them in different clinical scenarios.
- Differentiate types of traumatic brain injury and understand their clinical significance
- List the causes of brain edema and differentiate between them in different clinical scenarios
- Describe the difference between communicating and non-communicating hydrocephalus and list their causes.
- Describe the pathogenesis of demyelinating diseases and their clinical presentation.
- In depth understanding of multiple sclerosis: its pathogenesis, clinical presentation, histological features, diagnosis and prognosis.
- Describe the concept of neurodegenerative diseases and their pathogenesis.
- In depth understanding of Alzheimer disease and frontotemporal dementia as examples of neurodegenerative diseases causing dementia and cognitive problems.
- In depth understanding of Parkinson disease and Huntington chorea as examples of neurodegenerative diseases causing motor dysfunction.
- In depth understanding of spinoserebellar ataxias as examples of neurodegenerative diseases causing coordination problems.
- To recognize the histopathological features of all the diseases mentioned above, mainly the type of protein accumulated in each disease and its microscopic diagnosis.
- To categorize brain tumors into main types depending on cell of origin.
- To know the clinical presentation of brain tumors and how to investigate them
- To understand the genetic changes in CNS tumors and apply this knowledge in diagnosing and predicting outcome of each tumor.
- To be able to know when to suspect familial syndromes related to CNS tumors and apply this knowledge in clinical scenarios
- To identify the main histological features of each CNS tumor.
- To be able to critically analyze histopathological reports diagnosing CNS tumors Know the main ascending and descending pathways
- List PNS tumors and the syndromes related to them.
- List types of peripheral neuropathies and understand their pathogenesis.
- Define the role of nervous system in motor functions and sensation.
- Identify functional structures for special senses (vision, hearing, smelling and tasting).
- Explain functional mechanisms involved in (vision, hearing, smelling and tasting) sensation.
- Identify the tactile and proprioception sensory pathway and its function
- Identify the pain and thermal sensory pathway and its function
- Learn the neuronal circuits of spinal reflexes and their function in every day activity
- Understand the role of brain stem in motor control
- Describe the role of the basal ganglia in the motor regulation
- Know the effect of basal ganglia dysfunction in motor disorders
- Describe the role of the cerebellum in the motor regulation
- Know the effect of cerebellum dysfunction in motor disorders
- Understand the role of brain stem in motor control the motor cortex (mi) and corticospinal tract role in conscious motor orders

- Identify the function of different parts of the cerebral cortex
- To differentiate the stages of sleep and its electrographic measurement of sleep
- Recognize the mechanisms of slow wave sleep
- Recognize the mechanisms of rapid eye movement sleep
- Recognize the endogenous sleep factors
- Understand the effects of sleep loss on brain function
- Describe the organization and basic functions of the nervous system (Central and Peripheral Nervous Systems – CNS & PNS).
- Distinguish between nuclei and ganglia, nerves and tracts, gray matter and white matter.
- Distinguish the histological characteristics and the functions of neurons and neuroglia.
- Identify the major divisions of the CNS and PNS.
- Understand the effects of different drugs on sleep
- Learn the main bacterial, viral, and parasites that most commonly couse iunfection for the CNS
- Identify the types and pharmacology of general anesthetics
- Understand and know the molecular mechanisms of visual transduction and their regulation in addition to the genetics of color blindness
- Know what stem cells are, their types and characteristics
- Know the basics and challenges of using stem cells in cell based therapy
- Understand ethics related to using stem cells for treatment
- Know the principles of using stem cells in the treatment of neurodegenerative diseases
- Identify the types and pharmacology of analgesics
- Know the main sedative – hypnotics and their uses
- Know the pharmacology of antidepressants, and their types
- Identify the main antipsychotics drugs and their side effects
- Understand and know the definitions, types, characteristics of neurotransmitters in addition to their synthesis and its regulation with an emphasis of small-molecule neurotransmitters.

20. Topic Outline and Schedule:

LECTURE DISTRIBUTION:

	theory	practical
anatomy	20	4
physiology	20	2
pathology	8	1
pharma	10	
micro	5	
biochemistry	3	
Behavioral sciences	13	
PBL	2	

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
Live and online Lectures
On line supplementary materials
Lab sessions

Due to the continuation of COVID 19 outbreak, this year the course will be mixed live and online teaching methods.

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:
Midterm
Practical exam
Final Exam

23. Course Policies:

A- Full attendance is expected.

B- Incomplete exams are held for students who did not attend regular exams if they present acceptable reasons to relevant committee.

C- An incomplete exam is held next to the course for eligible students according to faculty regulation.

C- Health and safety procedures: we call the student emergency clinic or civil defense office for emergency cases

24. Required equipment:

Data show for power point presentation.

25. References:

1) Guyton and Hall Textbook of medical physiology, 13th edition, Hall.

2) Ganong's review of medical physiology, 25th edition. Barrett, Barman, Boitano, Brooks.

3) Biochemistry (Lippincott illustrated reviews series) 6th edition, Farrier.

4) Basic clinical parasitology. F. A. Neva & H.W. Brown. Prentice Hall International Editions.

5) Sherries Medical Microbiology, 6th edition, Ryan, Ray, Ahmad, Drew.

6) Robbins & Cotran Pathologic Basis of Disease, 0th edition, Kumar, Abbas, Aster.

7) Basic and Clinical Pharmacology, 13th edition, Katzung, Trevor.

8) Snell Clinical Neuroanatomy 9th Edition, Richard Snell.

Name of Course Coordinator: Dr. Maha ELBeltagy

Signature: -Maha elbeltagy---------- Date: ----21-2-2022----------

Head of curriculum committee/Department: ----------

Signature: ----------

Head of Department: ----------

Signature: ----------

Head of curriculum committee/Faculty: ----------

Signature: ----------

Dean: ----------
Signature: ----------

Copy to:
Head of Department
Assistant Dean for Quality assurance