

The Hashemite University



Deanship of Academic Development
and International Outreach

عمادة التطوير الأكاديمي
والتواصل الدولي

Syllabus*: Neuroscience I (CNS) (011501305)

Third Year–Second Semester 2023–2024

COURSE INFORMATION	
Course Name: Neuroscience I (CNS) Semester: Second Semester Department: Anatomy Physiology and Biochemistry Faculty: Medicine	Course Code: 011501305 Section: Preclinical Modules Core Curriculum: MD program
Day(s) and Time(s): Sunday-Thursday 9:30 am: 2 pm Classroom: Theoretical lectures: Hall 302 , faculty of medicine	Credit Hours: 4 Prerequisites: NA
COURSE DESCRIPTION	
The Neuroscience I (CNS) module is an intensive, multidisciplinary integrated 4 credit hour course designed to provide students with the basic sciences and clinical framework for topics of the central nervous system. The course is designed to assist the student in integrating the different disciplines' lectures and practical sessions in each part of the system, including anatomy, physiology, pathology, pharmacology, biochemistry, and community medicine.	
DELIVERY METHODS	
The course will be delivered through a combination of active learning strategies. These will include: <ul style="list-style-type: none">● PowerPoint lectures and active classroom-based discussion● Collaborative learning through integrated case studies● Relevant papers and reading materials.● E-learning resources: e-reading assignments and practice quizzes through Microsoft Team	

FACULTY INFORMATION

Course Coordinator	
Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Shaimaa Nasr Amin Professor of Medical Physiology 3020, Ibn Sina Medical Faculties Complex +962 (05)3903333 ext. 5409 shaimaa@hu.edu.jo Sunday 11 am-1 pm Tuesday 11 am-1 pm <i>Or by an appointment</i>

Instructors

<u>Anatomy Lecturer:</u> 1-Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Ashraf Mohamed Mostafa Mohamed Sadek Assistant Professor 3rd floor, Room 3015 05390333 Ext 5373 ashrafm@hu.edu.jo Sunday 10.00-12.00 Tuesday 11.00-1.00
<u>Pathology Lecturer:</u> Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Dua' Faisal Mohammed Abuquteish Assistant Professor 1 st floor office number 1020 05390333 Ext 5406 dua@hu.edu.jo Sunday and Monday: 10:00 AM -11:00 AM. All students are welcomed at any time.
<u>Pharmacology Lecturer:</u> Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Sherif Ahmed Elsayed Shaltout Assistant Professor 3rd floor, office No. 3045 053903333 ext. sherif@hu.edu.jo every Sunday, Tuesday, Thursday 10 am-12 pm
<u>Biochemistry Lecturer:</u> Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Nebras Melhem Lecturer Ground floor, office 1039 05390333 nebras@hu.edu.jo Sunday, Monday, and Thursday: 10 am-1 pm
<u>Community Lecturer:</u> Name Academic Title: Office Location: Telephone Number: Email Address: Office Hours:	Omnia Mohamed Anwar Mohamed Elmahdy Assistant Professor Ground floor, office No. 1021 +962 (05)3903333 omnia@hu.edu.jo Sunday 10 am-12 pm Thursday 10 am-12 pm

<u>Clinical Sessions:</u> Name Academic Title: Office Location: Telephone Number: Email Address:	Ala'A Almousa Assistant Professor of Neurosurgery alaa.almousa@hu.edu.jo
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REFERENCES AND LEARNING RESOURCES

***Physiology:**

-Guyton and Hall Textbook of Medical Physiology 14th Edition (Elsevier 2020)
[eBook ISBN:9780323640039/ Hardcover ISBN:9780323597128].
-Neuroscience 6th edition, Purves et al. (Oxford University Press 2017)/ ISBN-13: 978-1605353807

***Anatomy:**

Principle of Human Anatomy. By Gerard J. Tortora, Mark Nielsen - 15th Edition (Wiley 2020). ISBN: 978-1-119-66286-0
Snell's Clinical Neuroanatomy. By Ryan Splittgerber – 8th Edition (Wolters Kluwer). ISBN-13: 987-1-4963-4675-9

***Pathology:**

-Robbins Basic pathology 10th Edition (Elsevier 2017)
[Hardcover ISBN: 9780323353175/eBook ISBN: 9780323394130]

***Pharmacology:**

Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series) 7th edition (2018)- ISBN-13: 978-1496384133

***Biochemistry:**

Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. Harper's Illustrated Biochemistry (McGraw-Hill Education / Medical; 31st edition (May 28, 2018). ISBN-13: 978-1259837937, ISBN-10: 1259837939
Thomas M. Devlin. Textbook of Biochemistry with Clinical Correlations (John Wiley & Sons; 7th edition (January 19, 2010). ISBN-10 : 0470281731, ISBN-13 : 978-0470281734

Community Medicine:

- A.L., Benemei, S., Cortese, F., et al. Migraine and cluster headache – the common link. J Headache Pain 19, 89 (2018). <https://doi.org/10.1186/s10194-018-0909-41->
- Jurno, ME , Pereira, BSR , Fonseca FAS , Teixeira,GA , Ludimila Q. Maffia, LQ , Maria R. A. Barros, MRA et.al.,(2018):Epidemiologic study of cluster headache prevalence in a medium-size city in Brazil,Arq Neuropsiquiatr, 76(7):467-472 .<https://doi.org/10.1590/0004-282X20180065>
-Toivola P, AlAhmary k, Bahkali S, AlKhathaami A, Al Ammar S, Altamimi IM (2020): The Epidemiology of Migraine Headache in Arab Countries: A Systematic Review. Scientific World Journal, vol. 2020, Article ID 4790254, 11 pages, 2020. <https://doi.org/10.1155/2020/4790254>

TOPICS DETAILS/ STUDENT LEARNING OUTCOMES MATRIX *

Course Objectives	Course Student Learning Outcomes			Assessment Method
<p>A-Biomedical:</p> <p>1. Describe the Structure of different parts of the CNS, their development, and blood supply.</p> <p>2. Understand the different mechanisms, circuits, and pathways responsible for the normal function of the CNS.</p> <p>3. Identify the abnormalities in CNS structure and function, which occur in diseases and understand the pathogenies and etiology of CNS diseases</p> <p>4-. Understand the use, efficiency, and interactions of different drugs for common CNS diseases.</p> <p>5. Describe the epidemiology and public health issues of common CNS illnesses in the community</p> <p>6. Correlate the basic biomedical knowledge to the clinical skills</p>	<p>TOPIC (SUBJECTS& NUMBER OF LECTURES/ SUBJECT)</p>	<p>SUBJECT</p>	<p>Intended Learning Outcomes</p>	<p>-Exams -“Online’ reading assignments, quizzes.</p>
	<p>T1: Introduction 5 lectures: Anatomy 1 Physiology 1 Biochemistry1 Pharmacology1 Pathology 1</p>	<p>*Anatomy: -An introduction to the nervous system.</p>	<p>-Review the structure of the central, peripheral & autonomic nervous systems.</p>	
		<p>*Physiology: Synaptic transmission and neuronal pools</p>	<p>-Identify Communication within neurons -Review types of synaptic receptors - Review Types of postsynaptic potentials and summations. -Understand the Processing of signals within neuronal pools (divergence, convergence, prolongation, and sharpening of signals).</p>	
		<p>*Biochemistry: - Biochemistry of CNS neurotransmitters</p>	<p>-Define neurotransmitters and classify their chemical nature - illustrate steps of Catecholamines Synthesis and Catabolism - Illustrate Steps of Histamine And Serotonin Synthesis and inactivation - Explain how glutamate is synthesized in the neurons from local precursors - Describe the glutamate-glutamine cycle in the brain - Define excitotoxicity and explain its mechanism - Illustrate steps of GABA (γ-Aminobutyric acid) Synthesis and Catabolism.</p>	
		<p>*Pharmacology: -Drugs and synaptic transmission</p>	<p>-Revise basic concepts of the action potential, synaptic transmission, major neurotransmitters of the CNS, and the neurotransmitter's cycle -Understand the main differences between Excitatory Postsynaptic Potentials (EPSP) and Inhibitory Postsynaptic Potentials (IPSP) -Recall major CNS receptors implicated in the actions of most commonly used drugs -Familiarize with the principal drug targets in the treatment of CNS disorders</p>	
	<p>*Pathology: Introduction</p>	<p>-Describe the patterns of injury & responses (<i>markers</i>) to injury in the nervous system. -Describe the underlying mechanisms, causes, gross features of cerebral edema -Define the subfalcine (cingulate), transtentorial (uncinate), & the tonsillar hernias & describe the effects of each one.</p>		

<p>B-Critical thinking:</p> <p>1-Observe, identify and predict health problems based on previous experience and make decisions based on evidence rather than opinion</p> <p>2- Draw conclusions about the collected data (inference).</p> <p>3- Maintain good communication habits, such as active listening and respect.</p> <p>4-Improve problem-solving skills.</p> <p>5-Demonstrate knowledge of resources and tools available to support lifelong learning.</p>	<p>T2: Spinal cord & somatic sensations</p> <p>11 Lectures:</p> <p>Anatomy 4</p> <p>Physiology 4</p> <p>Pharmacology 2</p> <p>Community 1</p>	<p>*Anatomy:</p> <p>-The spinal cord: Gross features & Internal structure</p> <p>- Ascending tracts of the spinal cord</p> <p>- Descending tracts of the spinal cord</p>	<p>-Describe the gross and internal features of the spinal cord.</p> <p>-Describe the arrangements of nerve fiber tracts in the spinal cord.</p> <p>- Describe the anterolateral ascending tracts.</p> <p>-Describe the dorsal column tracts.</p> <p>- Describe the muscle-joint pathway to the cerebellum</p> <p>- Describe the spinotectal, spinoreticular, spino- Olivary, and visceral sensory tracts.</p> <p>- Identify the different direct and indirect ascending tracts in the spinal cord.</p> <p>- Describe the pyramidal and extra-pyramidal tracts and their functions.</p> <p>- Describe the intersegmental tracts and their significance.</p>	
		<p>*Physiology:</p> <p>- Sensory nervous system & Dorsal column sensations</p> <p>- Spinothalamic sensations & Pain control</p> <p>- Spinal Reflexes</p>	<p>-Understand Sensory receptors (generator potential, specificity, adaptation)</p> <p>-Define Sensory unit and receptive field</p> <p>-describe the coding of sensory information (modality, locality, intensity).</p> <p>-Identify Modalities of sensations transmitted by the dorsal column and Spinothalamic pathways.</p> <p>Differentiate Protopathic and epicritic sensations</p> <p>-Understand Pain classifications, central perception, referred pain, Headache, pain modulation by CNS: Gate theory & descending analgesia system, stress analgesia.</p> <p>-Differentiate Monosynaptic (stretch reflex) and polysynaptic spinal reflexes.</p> <p>-Understand Static and dynamic stretch reflex and apply the knowledge to Muscle tone and Tendon Jerk.</p> <p>-Describe Supraspinal control of stretch reflex and alpha gamma coactivation.</p> <p>-describe Inverse stretch reflex (muscle tension versus muscle length homeostasis)</p>	
		<p>*Pharmacology:</p> <p>- Opioids and opioid antagonists</p>	<p>-Understand the definition of pain, its significance as a component of acute and chronic disorders, and to differentiate between nociceptive and neuropathic pain</p> <p>-Define pain-related terminology, including hyperalgesia, hypoalgesia, allodynia, analgesia, anesthesia, and paraesthesia</p> <p>-Recognize the main principles in the management of pain</p> <p>-Describe the different types of opioid receptors, the primary endogenous opioids that activate them, and their distribution in the CNS.</p> <p>-Understand the main signaling pathways associated with the activation of each opioid receptor and the resulting effects.</p> <p>- Describe the most commonly used opioids based on their nature (natural, synthetic, or semi-synthetic) or pharmacodynamic properties (agonists, partial agonists, or antagonists)</p>	

			<ul style="list-style-type: none"> -Describe the mechanism of action, actions, therapeutic uses, adverse effects, and main contraindications of morphine -Compare the pharmacological characteristics of other opioid agonists with morphine and familiarize with the major differences. -List the main opioid mixed agonist-antagonists and describe their uses as analgesics and for the treatment of opioid use disorder. -Understand the mechanism of action of opioid receptor antagonists and their use for the treatment of opioid overdose and opioid use disorder.
		<p><u>*Community Medicine:</u> Epidemiology of Migraine and Cluster Headache</p>	<ul style="list-style-type: none"> - Identify incidence and prevalence, gender & other demographics -Explain risk and complications attributed to migraines -Summarize lifestyle factors that can reduce migraines and new studies on the effectiveness of TMS -Define causes, clinical picture, diagnosis of migraine -List the types of migraine -Apply new management methods of migraine
	<p>T3: Brain Stem 4 Lecture: Anatomy 3 Physiology 1</p>	<p><u>*Anatomy:</u> -The Brainstem: Medulla oblongata, pons, and Midbrain -Cranial nerves</p>	<ul style="list-style-type: none"> -Describe the structure, functions, and components of the brainstem. - Describe the external and internal features of the upper, middle, and lower levels of the medulla oblongata. -Describe the external & internal features of the pons. - Describe the external & internal features of the Midbrain -Describe the red nucleus & its connections. -Describe the different lemnisci. list the cranial nerves i – xii -List the functional components of cranial nerves -Describe the motor, sensory and parasympathetic nuclei of the cranial nerves i-xii and their connections
		<p><u>*Physiology:</u> The Reticular Formation</p>	<ul style="list-style-type: none"> -Describe the Sensory Part of the reticular formation -Describe the Motor Part of the reticular Formation -Understand the Ascending Reticular Activating System {ARAS} Function, identify factors affecting the activity of ARAS
	<p>T4: Limbic system and Basal Ganglia & Diencephalon 8 Lectures: Anatomy 1</p>	<p><u>*Anatomy:</u> The Limbic system and Basal Ganglia, Thalamus, epithalamus,</p>	<ul style="list-style-type: none"> -Describe the limbic system, the structures forming it, its functions and connections. - Describe the components of basal nuclei, their functions, afferent and efferent connections, and disorders

Physiology 2 Pharmacology3 Pathology 2	subthalamus, hypothalamus	<ul style="list-style-type: none"> -Describe the thalamus, the thalamic nuclei, their functions, and connections. - Describe the epithalamus, its parts, connections, and functions. - Describe the subthalamus. - Describe the hypothalamus, hypothalamic nuclei, and hypothalamic lines of communications, afferent and different connections. -Review the functions of the hypothalamus.
	<u>*Physiology:</u> -Basal Ganglia circuits and Papez circuits, Diencephalon -Memory and learning	<ul style="list-style-type: none"> -Identify the Connections of the basal ganglia (cortical, brain stem, interconnections within the basal ganglia). -Understand the functions of the Basal Ganglia -List the Diseases of the basal ganglia (PD, chorea, athetosis, hemiballismus). -Describe Release Phenomena in CNS, rigidity. -Identify the Connections of the limbic system (between its different parts, Papez circuit), and understand functions of the limbic system. -Define Synaptic Plasticity and recognize its different forms (Potentiation, depression, sensitization) -Describe types of Memory: mechanism, consolidation, encoding. -Compare associative against non-associative learning. -Describe Thalamus functions and apply the knowledge to the manifestations of the thalamic syndrome. -Understand the Hypothalamus functions and define fear and rage.
	<u>*Pharmacology:</u> -CNS stimulants & drugs of abuse -Pharmacology: Antidepressants -Drug therapy for PD and AD -Antipsychotic Drugs	<ul style="list-style-type: none"> -Define terminology related to substance abuse, including addiction, dependence, tolerance, and withdrawal - Understand the importance of the mesolimbic pathway in the development of dependence - Differentiate between psychological and physical dependence - Describe the mechanisms of action of CNS stimulants and their major adverse effects -Understand the pharmacology of nicotinic receptors, nicotine dependence, and nicotine withdrawal -Describe the abuse potential of amphetamines and cocaine. -Identify the mechanisms that propagate the actions of hallucinogens -Understand the types of cannabinoid receptors, their activation, signaling, and <u>major effects associated with marijuana use.</u> -Familiarize with the diagnostic criteria for major depressive disorder and bipolar disorder

			<ul style="list-style-type: none"> -Revise the monoamine theory and norepinephrine and serotonin signaling in the CNS -Recognize the major categories of the currently utilized antidepressants -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of selective serotonin reuptake inhibitors (SSRIs) - Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of serotonin-norepinephrine reuptake inhibitors (SSRIs) - Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of tricyclic antidepressants (TCAs) -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug and food-drug interactions of monoamine oxidase inhibitors (MAOIs) -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of atypical antidepressants - Familiarize with up-to-date therapies of depression, including serotonin dopamine activity modulators and NMDA antagonists - Understand the role of lithium and mood stabilizers in the treatment of bipolar disease <p style="text-align: center;">-----</p> <ul style="list-style-type: none"> -Revise pharmacologically relevant concepts in the pathogenesis of Parkinson’s Disease and Alzheimer’s Disease -Understand the fundamental therapeutic strategies of Parkinson’s Disease -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of Levodopa+carbidopa -Define the concepts of “wearing off” “on-off” phenomena and pharmacological approaches to reduce their occurrence - Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of catechol-O-methyltransferase inhibitors (COMTIs) -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of selective MAOIs -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of dopamine receptor agonists 	
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			<ul style="list-style-type: none"> -Describe the therapeutic advantage of using antimuscarinic agents for the treatment of Parkinson's disease -Describe the basic principles of the pharmacological treatment of Alzheimer's Disease. -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of acetylcholinesterase inhibitors and NMDA antagonists used for the treatment of Alzheimer's Disease -Familiarize with the currently investigated disease-modifying agents in the treatment of Alzheimer's Disease <p style="text-align: center;">-----</p> <ul style="list-style-type: none"> -Familiarize with basic definitions related to psychotic disorders such as delusions and hallucinations, and relate to relevant causes of psychosis -Revise potential mechanisms involved in the pathogenesis of schizophrenia, including the dopamine hypothesis - Understand major differences in signaling and effects of different dopamine receptors - Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of typical and atypical antipsychotics 	
		<p><u>*Pathology:</u> Parkinsonism Alzheimer's disease Huntington Disease AML</p>	<ul style="list-style-type: none"> -Enumerate the major causes of dementia -Describe the incidence, causes, pathogenesis, clinical features, gross & -microscopic features (neuritic plaques & neurofibrillary tangles) of Alzheimer disease -Define frontotemporal dementia -Define parkinsonism & enumerate its causes. -Describe the gross & microscopic features of idiopathic Parkinson's disease. -Describe the pathogenesis, gross & microscopic, & clinical features of Huntington's disease. -Define Friedreich ataxia +++++ -Define the diseases of motor neurons -Describe the gross & microscopic features of amyotrophic lateral sclerosis (motor neuron disease), -Define: (1) bulbospinal atrophy (Kennedy disease), & (2) spinal muscular atrophy 	
	<p>T5: Cerebellum 3 Lectures: Anatomy 1 Physiology2</p>	<p><u>*Anatomy:</u> -The Cerebellum</p>	<ul style="list-style-type: none"> -Describe the cerebellum; its external and internal features, including the intracerebellar nuclei. -Describe the functional areas of the cerebellar cortex and its white matter. 	

			<ul style="list-style-type: none"> - Describe the afferent & efferent connections of the cerebellum. - Review the signs and symptoms of cerebellar diseases related to its anatomy.
		<p>*Physiology: -Cerebellum& Neocerebellar syndrome</p>	<ul style="list-style-type: none"> -Identify Cerebellar neuronal circuits (mossy and climbing fibers) -Describe the Functions of the cerebellum -Apply the basic knowledge to the manifestations of Neocerebellar syndrome -Understand the Nervous control of voluntary movement (planning, execution).
<p>T6: Cerebral Cortex & Electrical activity of the brain 7 Lectures: Anatomy 2 Physiology 2 Pharmacology 3</p>		<p>*Anatomy: cortical areas + functional significance</p>	<ul style="list-style-type: none"> -Describe the different lobes, sulci & gyri of cerebral hemispheres. -Describe the functional localization of the cerebral cortex and their clinical significance.
		<p>*Physiology: -Electrical activity of the brain, EEG & Sleep</p>	<ul style="list-style-type: none"> -Identify the electrical activity of the brain (evoked potentials, spontaneous potentials) -List different EEG waves, frequency, and physiological significance. -Describe the physiological changes during sleep, types of sleep. mechanisms of sleep, sleep disturbances
		<p>*Pharmacology: - Pharmacology of sedative-hypnotics - General anesthetics -Drug used in epilepsy</p>	<ul style="list-style-type: none"> -Revise basic concepts regarding different types of anxiety disorders -Understand transmission at the GABAergic synapse -Differentiate between the GABA-A and GABA-B receptors -Understand the mechanism of action, therapeutic indications, pharmacokinetics, adverse effects, and drug-drug interactions of benzodiazepines -Recognize the role of flumazenil in the treatment of benzodiazepine overdose -Describe the differences between the action of benzodiazepines and barbiturates on GABA receptors <p>-----</p> <ul style="list-style-type: none"> -Understand major effects, phases, benefits, and optimal selection of general anesthesia -Describe the characteristics of the ideal general anesthetic -Understand the mechanisms involved in the induction (and recovery) of general anesthesia using intravenous anesthetics -Differentiate between the main characteristics of intravenous anesthetics -List the currently utilized inhalational anesthetics, their possible mechanisms of action, and their role in the maintenance of anesthesia -Define minimal alveolar concentration (mac) and its affecting factors -Describe the distribution and factors affecting equilibrium/steady state of inhalational anesthetics

			<ul style="list-style-type: none"> -Explain the mechanisms of elimination and recovery from inhalational anesthetics -Differentiate between various inhalational anesthetics and their pharmacological characteristics - Know the role of dantrolene as an antidote against malignant hyperthermia -List drugs used as adjuncts to general anesthesia -Recognize the main local anesthetics, their mechanism of action, and major uses ----- -Define key definitions such as convulsions, seizures, and epilepsy -List the cause of seizures -Understand the clinical classification of seizures -Revise the fundamental concepts behind selecting the optimal antiepileptic drug -Identify the major mechanisms of action of different antiepileptics -Differentiate between the clinical uses, pharmacokinetics, adverse reactions, and drug-drug interactions of the most commonly used antiepileptics -Describe the use of antiepileptics during pregnancy.
<p><u>T7: Traumatic Brain Injury</u> <u>2 lectures</u> Pathology 1 Biochemistry 1</p>	<p><u>*Pathology:</u> - CNS trauma</p>	<ul style="list-style-type: none"> -Describe the sites, gross & microscopic features of recent & old; closed & opened traumatic head injury. -Describe the cause, pathologic features, & effects of diffuse axonal injury. -Describe the causes, sites & effects of traumatic: <ul style="list-style-type: none"> (1) epidural hemorrhages (2) subdural hemorrhages (acute & chronic) 	
	<p><u>-Biochemistry</u></p>	<ul style="list-style-type: none"> -Enumerate blood-based biomarkers used to detect TBI. 	
<p><u>T8: Vascular disorders</u> <u>2 Lectures:</u> Anatomy 1 Pathology 1</p>	<p><u>*Anatomy:</u> Blood supply of the brain and spinal cord</p>	<ul style="list-style-type: none"> -Describe the arterial blood supply of the brain. -Describe the circle of Willis. -Describe the veins of the brain. 	
	<p><u>*Pathology:</u> Cerebrovascular diseases</p>	<ul style="list-style-type: none"> -Define the term cerebrovascular disease (thrombotic & embolic occlusion of vessels & vascular rupture. -Describe the causes, gross & microscopic (early, subacute, & repair) changes, & outcomes of global cerebral ischemia +++++ -Enumerate the sources of emboli & sites of in situ thrombosis in the cerebral circulation. -Describe the sites, types, gross & microscopic changes of early & late cerebral infarction classify the intracranial hemorrhages -Describe the cause (s), sites, effects, gross & microscopic features of recent & old: <ul style="list-style-type: none"> primary brain parenchymal hemorrhage. subarachnoid hemorrhage 	

			<p>-Describe the pathologic features of berry saccular aneurysms & vascular malformations.</p> <p>+++++</p> <p>-Describe the effects of hypertensive cerebrovascular disease, including: massive hypertensive parenchymal hemorrhage (2) lacunar infarcts, (3) slit hemorrhage, & (4) hypertensive encephalopathy.</p>		
	<p>T9: Ventricles of the Brain <u>2 Lectures:</u> Anatomy 1 Pathology1</p>	<p><u>*Anatomy:</u> -Ventricles of the Brain, Dural folds, CSF</p>	<p>-Describe the dura, arachnoid, and pia mater of the brain & spinal cord. - Describe the dural folds. -Describe the dural venous sinuses. -Describe the lateral ventricles, third ventricle, cerebral aqueduct, fourth ventricle -Describe the white matter of the brain, the commissural, association, and projection fibers.</p>		
<p>Clinical sessions (2): Introduction to Physical examination and localization of Central nervous system disorders.</p>		<p><u>*Pathology:</u> Hydrocephalus</p>	<p>-Describe the Causes, Pathogenesis, Types, Effects & Complications of Hydrocephalus in Infants & Adults.</p>		
		Practical Sessions			
	<p>Labs: 5 Anatomy 2 Physiology 1 Pathology 2</p>	<p>Anatomy: Practical I:</p> <p>Practical II:</p>	<p>1 .To identify the different lobes and poles of cerebral hemispheres. .2 To identify the different sulci & gyri of the cerebral hemispheres. .3 To localize the important blood vessels of the brain. 4. To identify the different parts of brain stem & its important landmarks. 1 .To identify the different parts seen in sagittal section of the brain. .2 To localize the different parts seen in the transverse section of the cerebral hemisphere. .3 To identify the different dural folds.</p>		
		<p>Physiology: Practical I: Examination of Somatic Sensations & Sensory lessons.</p>	<p>-Understand steps, and precautions during the examination of the somatic sensations. -Identify common sensory lesions.</p>		

		Pathology Practical I&II	-After reviewing and discussing the colored photographs of the Gross specimens and their Histopathological sections given in the above lectures as PowerPoint presentations during the practical hours -The student should be able to identify, describe and diagnose the common and the important pathological lesions of the various CNS disorders given in the CNS I Module.	
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ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual needs.

Special Needs Section: Student Services and Care Unit
Tel: 053903333 ext. 4132 / 4583 / 5023
Location: Deanship of Students Affairs
Email: stydent@hu.edu.jo

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student’s learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student’s responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student’s responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor’s prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offense and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviors that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

- Use of the work, ideas, images, or words of someone else without his/her permission or reference to them.
- Use of someone else's wording, name, phrase, sentence, paragraph, or essay without using quotation marks.
- Misrepresentation of the sources that were used.

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected.

Late or Missed exams: In all cases of assessment, students who fail to attend an exam on the scheduled date without prior permission and/or are unable to provide an accepted medical note will automatically receive a fail grade for this part of the assessment.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment, and their final grade will be calculated from the forms of assessment listed below, with their grade weighting taken into account.

Assessment	Grade Weighting	Assessment Date
Exam 1	40%	TBD
Exam 2	20%	TBD
Final Exam	40%	TBD

Description of Exams

Test questions will predominately come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of multiple-choice questions for the regular exams and short essay questions for makeup exams (for students with accepted excuses, only documented absences will be considered as per HU guidelines). Grades are not negotiable and are awarded to *the MD program* according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

TBD