

The Hashemite University



الجامعة
الهاشمية



Deanship of Academic Development
and International Outreach

كلية الطب البشري

عمادة التطوير الأكاديمي
والتواصل الدولي

Syllabus: Neurosciences (2) (0111501306)
Third Year-Second Semester
2024/2025

COURSE INFORMATION	
Course Name: Neurosciences II Semester: Second Department: Department of Anatomy, Physiology and Biochemistry Faculty: Faculty of Medicine	Course Code: 0111501306 Section: All Curriculum: MD program
Day(s) and Time(s): Sunday to Thursday Day(s) and Time(s): 9 am to 3:30 pm Classroom: Faculty of Medicine auditorium Theoretical lectures: Faculty of Medicine auditorium Practical sessions: labs of Faculty of Medicine	Credit Hours: 4 Prerequisites: None
COURSE DESCRIPTION	
<p>This is an integrated system-based module which explores anatomy, physiology, pharmacology, microbiology, pathology and Community Medicine of the nervous system. The course provides integrated knowledge covering the peripheral nervous system including peripheral nerves, nerve plexuses and peripheral nerve branches cranial nerves and special senses. The course also highlights structures in the head and neck relevant to cranial nerves.</p> <p>Based on an understanding of normal structure, function relationship, neural connections of peripheral nervous system and special senses. Students will learn pathophysiological basis of various neurological disorders of nervous system. In addition, the course introduces common tumors and degenerative diseases of the nervous system, their pathology and histopathology. Common diseases affecting the nervous system and their epidemiology are also covered.</p> <p>Pharmacology of the autonomic nervous system and pharmacology management of peripheral nervous disorders are also discussed.</p> <p>The overall goal of this course is to provide medical students with foundations for understanding the impairments of sensory and motor functions, diseases, and pharmacological management of these disorders and the application of knowledge and foundation in clinical practice. The objectives of this course are achieved via selected lectures and relevant laboratory sessions.</p>	

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Collaborative learning through small groups acting in an interdisciplinary context.
- Video lectures.

FACULTY INFORMATION

Course Coordinator	
Name:	Dr. Amany Swilam
Academic title:	Assistant Professor.
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Other Faculty staff members

Subject	Members	Email Address	Office location	Office Hours
Anatomy	Dr. Ashraf Sadek	ashrafm@hu.edu.jo	3031	To be determined
	Dr. Mustafa Saad	mustafas@hu.edu.jo	3019	To be determined
Physiology	Dr. Zuheir Hasan	zuhierakh@hu.edu.jo	3017	To be determined
Pathology	Dr. Ola Abu Al Karsaneh	Olaa@hu.edu.jo	1017	To be determined
	Dr. Dua Abuquteish	dua@hu.edu.jo	1020	To be determined
Pharmacology	Dr. Ola Ebbeni	OLAEBBENI@hu.edu.jo	1035	To be determined
Microbiology	Dr. Hala Tabl	hala mo@hu.edu.jo	1041	To be determined
Biochemistry	Dr. Ahmed Salem	asalem@hu.edu.jo	1019	To be determined
Community Medicine	Dr. Omnia Elmahdy	omnia@hu.edu.jo	3030	To be determined
Clinical lectures	Dr. Abd El Halem	newhaleem@gmail.com	-	-

REFERENCES AND LEARNING RESOURCES

ANATOMY:

- Clinical Neuroanatomy. By R. S. Snell.
- Clinical Anatomy for Medical Students. By R. S. Snell.
- Principles of Human Anatomy. By G. J. Tortora.
- Basic Histology. By C. Junqueira.
- Before We Are Born. By K.L. Moore and T.V.N. Persaud.

PHYSIOLOGY:

- Guyton and Hall Textbook of Medical Physiology, 14th Edition
- By John E. Hall, PhD and Michael E. Hall,
- Ganong's Review of Medical Physiology, Twenty-Sixth Edition
- Kim E. Barrett, Susan M. Barman, Heddwen L. Brooks, Jason X.-J. Yuan

BIOCHEMISTRY:

- Harper's Biochemistry. By Robert K. Murray and Co.,
- Supplementary Departmental Handouts.

PATHOLOGY:

- Essential Pathology, by Emanuel Rubin. -
- Basic Pathology, by Kumar, Cotran and Robbin.

MICROBIOLOGY:

- Medical Microbiology. By John C Sherris.

PHARMACOLOGY:

- Lippincott's Illustrated Reviews: Pharmacology 7th edition
- Goodman and Gilman's: The pharmacological basis of therapeutics. 13th edition
- Basic and clinical pharmacology, Bertram and Katzung. 12th edition
- Clinical Pharmacology. D.R. Laurence, P.N. Bennet, and M.J. Brown. 11th edition

COMMUNITY MEDICINE:

- Community Medicine with Recent Advances Third Edition.
- Parks Textbook of Preventive & Social Medicine 23rd Edition
- Monica's Text Book Community Medicine.

CLINICAL LECTURES

- Overview of Peripheral Nervous System Disorders
<https://www.msmanuals.com/professional/neurologic-disorders/peripheral-nervous-system-and-motor-unit-disorders/overview-of-peripheral-nervous-system-disorders>

TOPICS DETAILS/ STUDENT LEARNING OUTCOMES MATRIX *				
Program Learning Outcomes	Course Student Learning Outcomes			Assessment Method
	TOPIC (SUBJECTS& NUMBER OF LECTURES/ SUBJECT)	SUBJECT	Intended Learning Outcomes	
D1 D2 D3 D5 D6 E1 E2	T1 Central nervous system: 7 lectures): Pathology 3 Microbiology 4	Pathology Lecture (1&2) CNS tumors	<ul style="list-style-type: none"> Classify & describe the Unique Characteristics of the CNS tumors. Describe the general, gross & Microscopic Features of Astrocytomas (Pilocytic, diffuse, anaplastic, and Glioblastoma), Oligodendrogliomas, and Ependymomas. Describe the definition and general features of neuronal tumors including Central Neurocytoma, Gangliogliomas, & Dysembryoplastic Neuroepithelial Tumor. Describe the pathogenesis, gross, microscopic features and routes of spread of Medulloblastoma. Define and describe the general features of Primary CNS Lymphoma & Germ-Cell Tumors Describe the Gross & Microscopic Features of Meningiomas Describe the metastatic secondaries in the CNS Mention some paraneoplastic syndromes Define the causes & pathologic features of the Familial Tumor Syndromes associated with CNS tumors (Von Hippel-Lindau Disease, & Tuberous. Sclerosis). 	MCQ exams

		<p><u>Pathology</u> Lecture (3) Primary Diseases of Myelin</p>	<ul style="list-style-type: none"> • Define the Demyelinating & Dysmyelinating Diseases of the CNS. • Describe the causes, pathogenesis, clinical, gross & microscopic features of Multiple Sclerosis (MS) • Define and discuss (1) Acute Disseminated Encephalomyelitis, (2) Acute Necrotizing Hemorrhagic Encephalomyelitis, (3) Central Pontine Myelinolysis, & Leukodystrophies. 	MCQ exams
		<p><u>Microbiology</u> Lecture (1) Meningitis I</p>	<ul style="list-style-type: none"> • Review definition, pathogenesis, clinical presentations & complications of meningitis. • Provide different classifications of meningitis. • List important bacterial pathogens causing septic (purulent) meningitis. • Describe microbiological aspects, virulence factors, pathogenesis, epidemiology and prevention of Neisseria meningitides, Streptococcus pneumonia, Hemophilus influenza type B, Streptococcus agalactiae, Listeria monocytogenes, E. coli and other gram-negative rods. 	MCQ exams
		<p><u>Microbiology</u> Lecture (2) Meningitis II</p>	<ul style="list-style-type: none"> • Define aseptic meningitis and enumerate its important causes. • List viral causes of aseptic meningitis with special stress on Enteroviruses and Herpes simplex virus. • List bacterial causes of aseptic meningitis with special stress on Tuberculous meningitis. • List fungal causes of aseptic meningitis with special stress on Cryptococcal meningitis. 	MCQ exams

D1			<ul style="list-style-type: none"> • List parasitic causes of aseptic meningitis. • Illustrate laboratory diagnosis of meningitis; Specimen Collection, CSF Analysis and findings in different types of meningitis & Microbiological Examination. • Illustrate treatment of different types of meningitis. 	
		<p><u>Microbiology</u> Lecture (3) Encephalitis</p>	<ul style="list-style-type: none"> • Review the definition, pathogenesis, clinical presentations & complications of encephalitis. • List microbial causes of encephalitis. • Describe morphology, epidemiology, clinical aspects, diagnosis and prevention of medically important Arboviruses. • Describe morphology, pathogenesis, clinical findings, diagnosis, treatment and prophylaxis against Rabies virus. • Describe the pathogenesis, routes and microbial causes of brain abscess. 	MCQ exams
		<p><u>Microbiology</u> Lecture (4) Poliomyelitis & Prion disease</p>	<ul style="list-style-type: none"> • Describe morphology, epidemiology, pathogenesis, clinical findings, immunity, diagnosis, treatment and prophylaxis against Polioviruses. • Define and list infection-related causes of encephalopathy. • Define and describe structure, properties and pathogenesis of prions. • List different prion diseases and describe their pathogenesis, clinical findings, diagnosis, treatment and prevention. 	MCQ exams

D3 D5 E2 E3	<u>T2</u> <u>Special senses</u> <u>&Cranial</u> <u>nerves:</u> <u>17 lectures)</u> Anatomy 8 Physiology 8	<u>Anatomy</u> Lecture (1) Central pathways for special senses	<ul style="list-style-type: none"> • Describe olfactory pathway. • Describe taste pathway. • Describe auditory pathway. • Describe vestibular pathway. • Describe visual pathway 	MCQ exams
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	Biochemistry 1	<u>Anatomy</u> Lecture (2) Orbit & eye I	<ul style="list-style-type: none"> • Describe the bony orbit regarding its forming bones, boundaries, and openings. • List the various structures that are found inside the orbit. • Describe the lids and understand their structure and functions. • List the extrinsic muscles of the eye. Know their nerve supply and functions. • Describe the various components of the lacrimal apparatus. • Understand the nerve and vascular supply of the orbit. 	MCQ exams
		<u>Anatomy</u> Lecture (3) Orbit & eye II	<ul style="list-style-type: none"> • Describe the anatomical features of the three layers of the wall of the eyeball: the fibrous layer, the vascular layer, and the retina. • Describe the cavities and chambers of the eyeballs and the structures found in the interior of the eye. • Understand the nerve and vascular supply of the eyeball. 	MCQ exams
		<u>Anatomy</u> Lecture (4) Orbit & eye III	<ul style="list-style-type: none"> • Describe the main histological features of the various parts of the eyeball. • Correlate appearance with function. • Understand the main events in the development of the eye. 	MCQ exams
		<u>Anatomy</u> Lecture (5) Trigeminal nerve & Facial nerve.	<ul style="list-style-type: none"> • Discuss briefly how the face is developed. • Follow up the trigeminal nerve its course from its central connections, exit from the brain and down to its target organs. • Describe nerve supply of the face. • Follow up the course of the facial nerve from its point of central connections, exit and down to its target areas. Make a list of types of nerve fibers it contains. 	MCQ exams

		<u>Anatomy</u> Lecture (6) External, middle ear &	<ul style="list-style-type: none">• Make a list of structures making the external ear. Define each part – use keywords.	MCQ exams
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		cranial nerve VII	<ul style="list-style-type: none"> • Highlight the structural features of the external auditory meatus. • Discuss the features of the tympanic membrane. • Describe the shape, position and various boundaries of the middle ear. • Describe the ossicles and their muscles. • Describe the auditory tube, its openings and structure. • Have an idea about mastoid air cells and their connection to the middle ear. • Follow up the course of the facial nerve in relation to middle ear down to the stylomastoid foramen. • Note the proximity of the internal carotid artery to the middle ear. 	
		<u>Anatomy</u> Lecture (7) Inner ear & cranial nerve VIII.	<ul style="list-style-type: none"> • Make a list of parts making the internal ear. • Define each part. Make sure to use keywords. • Note how structures fit each other. • Describe the bony labyrinth. • Explain how the membranous labyrinth fits the bony one. • Describe the hearing receptors. • Describe the balancing receptors. • Follow the course of the VIII nerve down to its point of entry to the brain. • Follow up the central connections of the VIII nerve. • Define, Otic vesicle. Dorsal utricular part. Ventral saccular part. Auricular hillocks. • Discuss briefly the changes that will occur leading to the formation of different parts of the ear. 	MCQ exams
		<u>Anatomy</u> Lecture (8) Cranial nerves IX, X, XI & XII	<ul style="list-style-type: none"> • Follow up the glossopharyngeal nerve IX, its course from its central connections, exit from the brain and down to its target organs. 	MCQ exams

			<ul style="list-style-type: none"> • Follow up the vagus nerve, its course from its central connections, exit from the brain and down to its target organs. • Make note of plexuses it creates in the mediastinum. • Follow up cranial nerve XI its course from its central connections, exit from the brain and down to its target organs. • Follow up the hypoglossal nerve XII from its central connections, exit point, and its target organs. 	
		<p><u>Physiology</u> Lecture (1&2) Physiology of vision 1. Physiology of the eye 2. Pupil Reflexes and accommodation</p>	<ul style="list-style-type: none"> • Describe the function of the various components of the eye. • Describe the light refraction by the eye and know the refractive indices of the cornea, lens, aqueous humour and vitreous humour. • Explain how light rays in the environment are brought to a focus on the retina. • Describe physiological mechanisms involved in near vision including convergence, accommodation and pupil constriction. • Explain the refractive deficits responsible for hyperopia, myopia, presbyopia, and astigmatism. • Outline the neuronal pathways of accommodation and pupil reflexes and clinical significance of these pathways. 	MCQ exams
		<p><u>Physiology</u> Lecture (3) Neurophysiology of retina</p>	<ul style="list-style-type: none"> • Describe the functional organization of the retina • List the sequence of events involved in phototransduction and the ionic basis of photo transduction • Describe different types of neuronal cells in the retina and their synaptic connections (neural circuit in retina) • Describe the electrical responses produced by bipolar cells, horizontal cells, amacrine cells, and ganglion cells. and the function of these 	MCQ exams

			<p>cells in processing of visual signals</p> <ul style="list-style-type: none"> • Define dark and light adaptation and mechanism of adaptation. • Define visual acuity and function of the fovea. 	
		<p><u>Physiology</u> Lecture (4) Central neurophysiology of vision</p>	<ul style="list-style-type: none"> • Define the visual field and describe monocular and binocular visual fields. • Review the neuronal visual pathway from the retina of the visual cortex. • Identify the major relay stations in the visual pathway and their function. • Describe the function of visual cortex in the processing of visual signals. • Outline the pathway for white and black vision and the pathway for color vision. • Define scotoma in the visual, field and predict the visual field deficits that would occur after lesions within specific part of neural visual pathway. 	MCQ exams
		<p><u>Physiology</u> Lecture (5) Physiology of Hearing: Part I and Part II</p>	<ul style="list-style-type: none"> • Describe the functions of the external, middle, and inner ear. • Explain the roles of the tympanic membrane, the auditory ossicles (malleus, incus, and stapes), and Scala vestibule in sound transmission) • Outline the properties of travelling waves and describe how, via these waves, particular movement of the foot plate of the stapes produce maximal deflection of the basilar membrane at a particular point in the organs of Corti. • Describe the functions of the organs of Corti and describe how deformation of the basilar membrane is converted to impulses in auditory fibers. 	MCQ exams

			<p>(ionic basis of auditory signal transduction)</p> <ul style="list-style-type: none"> • Explain how pitch, loudness, are coded in the auditory pathways. • Review the central auditory pathway from the cochlear hair cells to the cerebral cortex. • Describe the role of auditory cortex in sound perception and sound localization. • Describe the function of major relays of the auditory pathway (for example thalamus, inferior colliculus and superior olive).in the processing of auditory signal • Compare the causes of conductive and sensorineural hearing loss and the tests used to distinguish between them. 	
		<p><u>Physiology</u> Lecture (6) Balance & Equilibrium.</p>	<ul style="list-style-type: none"> • Review the functional anatomy of the vestibular apparatus. • Explain how the sensory receptors in the semicircular canals detect rotational acceleration and how the sensory receptors in the saccule and utricle detect linear acceleration. • Explain the ionic basis of sensory transduction in sensory organs of the vestibular system. • Review the central neuronal pathway and neuronal relays of vestibular nerve and the functional significance of these neuronal pathways. • Review the major neuronal connections of the vestibular system with the brainstem and cerebellum and describe their function. • List the major sensory input that provide the information which is synthesized in the brain into the sense of 	<p>MCQ exams</p>

			Position in space.	
		<p><u>Physiology</u> Lecture (7) Eyes movements</p> <p>Vestibulo- ocular reflexes (VOR)</p>	<ul style="list-style-type: none"> • List& define the major types of eye movements. • Describe the function of each type of eye movement. • Briefly outline the neuronal pathways controlling these eye movements. • Define strabismus and list the major cause of strabismus. • Describe the role of the vestibular system in stabilizing eye movements during acceleration. • Define the VOR. • Outline the neuronal pathway for the VOR. • Describe the function of VOR and how it is initiated by rotational movements. • Describe the neural mechanisms for vestibular Nystagmus and how nystagmus can be used as a diagnostic indicator of the integrity of brain stem 	MCQ exams
		<p><u>Physiology</u> Lecture (8) Chemical senses, taste & smell.</p>	<ul style="list-style-type: none"> • Describe the olfactory receptors and the mechanism of their excitation. • Outline the central neuronal pathway of olfaction. • List the main abnormalities of taste sensations and their pathophysiology • Describe the primary taste of modalities. • Discuss the characteristics of taste buds and distribution in relation to the primary taste modalities. • List major substances that produce sweet, sour, bitter and salty taste and comment on their interaction. • Describe the mechanism of excitation of taste receptors and impulse generation in the primary afferents carrying taste sensation sensations. 	MCQ exams

			<ul style="list-style-type: none"> • Identify the central pathway of gustatory signals and the functions of central nervous system areas in perception of sensations. • List the main abnormalities of taste sensations and their primary cause of these abnormalities. 	
		<u>Biochemistry</u> Lecture (1) Biochemistry of vision	<ul style="list-style-type: none"> • Describe the biochemical principles of normal vision and diseased states and discuss the role of vitamin A in normal vision. 	MCQ exams

<p>D1 D2 D3 D5 D6 E1 E2 E7</p>	<p>T3: <u>Peripheral nervous system</u> (17 lectures) Anatomy 4 Pathology 3 Microbiology 1 Biochemistry 1 Pharmacology 6 Community medicine 2</p>	<p><u>Anatomy</u> Lecture (9) Sympathetic and parasympathetic nervous system.</p>	<ul style="list-style-type: none"> • Review the subdivisions of the nervous system. • Review the general arrangement and compare the sympathetic and parasympathetic parts. • Describe the following plans <ul style="list-style-type: none"> Para vertebral ganglia. Prevertebral ganglia. Parasympathetic ganglia. Splanchnic nerves. Autonomic plexuses. • Map out the various plexuses in head and neck, thorax, abdomen and pelvis. • Make a list of the components of the system. • Review the basic structure of sympathetic trunk. • Describe the source of the sympathetic system in the neck and make a list of target organs. • Describe the Para vertebral sympathetic ganglia in the abdomen, their locations and target organs. • Discuss the relation of this system to the adrenal medulla. • Discuss the sympathetic innervation of blood vessels. • Make a list of cranial nerves having parasympathetic activity. • Describe the parasympathetic ganglia in the head and neck, their locations and target organs. • Describe the sacral 	<p>MCQ exams</p>
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			<ul style="list-style-type: none"> parasympathetic outflow. • Make a list of its target organs. 	
		<p><u>Anatomy</u> Lecture (10) Cervical plexus</p>	<ul style="list-style-type: none"> • Make a list of contributing roots. • Discuss the general arrangement. • Describe the location of this plexus. • Make a list of the outgoing nerves. • Follow the branches to their target organs. • Point out the point where the major cutaneous nerves emerge. • Follow the cutaneous branches to their destinations. 	MCQ exams
		<p><u>Anatomy</u> Lecture (11) Brachial plexus</p>	<ul style="list-style-type: none"> • Make a list of the contributing spinal nerve • Discuss the general arrangement of the plexuses • Locate the plexus in the axilla • Note the important relations to blood vessels. • Make a list of local branches with short notes on its target organs • Discuss the effect of brachial plexus lesion. • Discuss the effect of peripheral nerve injury. 	MCQ exams
		<p><u>Anatomy</u> Lecture (12) Lumbosacral plexus</p>	<ul style="list-style-type: none"> • Make a list of contributing spinal nerves to the lumbar plexus. • Discuss the arrangement of the plexus. • Describe the location of this plexus and its relation to the psoas muscle. • List the terminal branches and follow up each branch to its final destination. • Make a list of contributing spinal nerves to the sacral plexus. • Discuss the arrangement of this plexus. • Describe the location of this. 	MCQ exams

			<p>Plexus.</p> <ul style="list-style-type: none"> • List its terminal branches and follow up each branch to its target organs. • Make a list of nerves of the lower limb including the Gluteal region. • Follow up each nerve down to its target joints (cont) myotomes and dermatomes. • Discuss the effect of lumbosacral and peripheral nerve injuries. 	
		<p><u>Pathology</u> Lecture (4) Peripheral nerves Diseases and tumors</p>	<ul style="list-style-type: none"> • Describe Patterns of Peripheral Nerve Injury, Including Wallerian Degeneration and segmental demyelination. • Describe the disorders Associated with Peripheral Nerve Injury Particularly Causes, Pathologic Features, & Effects of Guillain-Barré Syndrome. • Describe the general, gross & Microscopic Features, & Effects of Schwannoma, Cutaneous & Plexiform neurofibromas, & Malignant Peripheral Nerve Sheath Tumor • Define the Causes & Pathologic features of the Familial Tumor Syndromes Neurofibromatosis. 	MCQ exams
		<p><u>Pathology</u> Lecture (5&6) CNS infections & Prion Diseases</p>	<ul style="list-style-type: none"> • Describe the Pathologic Features, Causes, Routes of infection, and Effects of Prion Diseases, including Sporadic, Familial, Iatrogenic & Variant Forms (vCJD) of Creutzfeldt-Jakob disease. • Describe the causes, routes of infection, pathologic features, CSF Findings, effects, & complications of meningitis. • Describe the most Characteristic Histologic Features of Viral Encephalitis. • Pathologic Features of nervous System Infection by: 	MCQ exams

			<p>Arboviruses; Herpes Simplex Virus Type 1& 2, Varicella-Zoster Virus, & Cytomegalovirus, Poliovirus, Rabies, & Progressive Multifocal Leukoencephalopathy and fungi.</p> <ul style="list-style-type: none"> • Understand peripheral neuropathies including diabetic neuropathy and vitamins involved (especially thiamine and pyridoxine) 	
		<p><u>Microbiology</u> Lecture (5) Infectious diseases of the peripheral nervous system</p>	<ul style="list-style-type: none"> • List infectious diseases of the peripheral nervous system. • List neurotoxin-producing organisms. • Describe microbiological aspect, virulence factors, pathogenesis, clinical aspect, diagnosis, treatment and prevention of Clostridium tetani (Tetanus). • Describe microbiological aspect, virulence factors, pathogenesis, clinical aspects, diagnosis, treatment and prevention of Clostridium botulinum (Botulism). • Describe microbiological aspects, virulence factors, pathogenesis, clinical aspects, diagnosis, treatment and prevention of Mycobacterium leprae (Leprosy). • Define and list infection-related causes of Guillain-Barre syndrome. 	MCQ exams
		<p><u>Biochemistry</u> Lecture (2) Biochemistry of peripheral nerves</p>	<ul style="list-style-type: none"> • Describe the biochemical principles of peripheral neuropathies including diabetic neuropathy and the vitamins involved (especially thiamine and pyridoxine). 	MCQ exams
		<p><u>Pharmacology</u> Lecture (1) Directly acting cholinergic agonists</p>	<ul style="list-style-type: none"> • Review the steps involved in the synthesis, storage, release and termination of action of acetylcholine • Mention examples on inhibitors of acetylcholine synthesis, storage, and 	MCQ exams

			<p>release.</p> <ul style="list-style-type: none"> List the locations and types of acetylcholine receptors in various organ systems. Describe the effects of acetylcholine on major organ systems. List the major clinical indications and adverse effects of cholinomimetic agonists. 	
		<p><u>Pharmacology</u> Lecture (2) Indirectly acting cholinergic agonists</p>	<ul style="list-style-type: none"> Describe the distribution and function of cholinesterase Provide a classification and examples of drugs that inhibit cholinesterase List the major clinical indications and adverse effects of reversible cholinesterase inhibitors. Treatment of myasthenia gravis & differences between myasthenic and cholinergic crises List the major signs and symptoms of organophosphate insecticide poisoning. Describe the treatment modalities of organophosphate poisoning. 	MCQ exams
		<p><u>Pharmacology</u> Lecture (3) Cholinergic antagonists</p>	<ul style="list-style-type: none"> Describe the effects of cholinergic antagonists on various organ systems. List the major clinical indications of muscarinic antagonists List the major adverse effects of anti-muscarinic agents. Describe the signs, symptoms and treatment of atropine poisoning. 	MCQ exams
		<p><u>Pharmacology</u> Lecture (4&5) Adrenergic agonists.</p>	<p>A)</p> <ul style="list-style-type: none"> Review the steps involved in the synthesis, storage, release and termination of action of epinephrine and norepinephrine List examples on the inhibitors of norepinephrine synthesis, storage, release and re-uptake. List the locations, types and 	MCQ exams

			<p>Effects of adrenergic receptors in various organ systems.</p> <ul style="list-style-type: none"> Describe the major systemic effects, clinical applications and major adverse effect of endogenous catecholamines. <p>B)</p> <ul style="list-style-type: none"> List the classification, the major clinical applications and adverse effects of α & β receptor agonists. List the major clinical applications and adverse effects of indirect acting sympathomimetic amine. 	
		<p><u>Pharmacology</u> Lecture (6) Adrenergic antagonists.</p>	<p>A)</p> <ul style="list-style-type: none"> Provide a classification for alpha receptor antagonists List the main indications and the major adverse effects of alpha receptor antagonists. <p>B)</p> <ul style="list-style-type: none"> Compare the pharmacokinetics of various β receptor antagonists Describe the main indications and major adverse effects of β receptor antagonists Medical Treatment of glaucoma. 	MCQ exams
		<p><u>Community Medicine</u> Lecture (1) Epidemiology of common peripheral nervous system disorders</p>	<ul style="list-style-type: none"> Identify prevalence and global burden of common peripheral nervous system disorders like lupus, Guillain-Barre syndrome, and multiple sclerosis Explain risk factors and gender differences of common peripheral nervous system disorders Mention clinical manifestations and complications of common peripheral nervous system disorders Identify Preventive measures of common 	MCQ exams

E1 E2 E6			peripheral nervous system disorders.	
		<u>Community Medicine</u> Lecture (2) Epidemiology of diseases and infections of the peripheral nervous system	<ul style="list-style-type: none"> Identify prevalence, global burden and risk factors of common peripheral nervous system disorders like rheumatoid arthritis, and sciatica. Describe the epidemiological features of common infectious diseases affecting the peripheral nervous system. 	MCQ exams
		<u>Clinical sessions (2)</u>	<ul style="list-style-type: none"> Peripheral neuropathy Peripheral nerve injury: types and management Infections of the PNS Tumors of PNS Clinical approach: history and physical examination of PNS Diagnostic tools: NCS. 	MCQ exams

Program Learning Outcomes	Students learning outcomes of the practical sections		Assessment methods
D1 D2 D3 D5 E2 E3	<u>Anatomy Lab (1)</u> <ul style="list-style-type: none"> Orbit & Eye. Cranial nerves. 	<ul style="list-style-type: none"> Identify bone forming the orbit. Identify communication of the orbit. Recognize individual structures of the eye. Recognize individual structures of the eye ball. Identify the components of the lacrimal apparatus. Study the muscles, blood vessels, and nerves related to orbit & eye ball. Identify and recognize cranial nerves concerning their courses, branches, and distributions. Identify landmarks of the external ear. 	MCQ exams
	<u>Anatomy Lab (2)</u> <ul style="list-style-type: none"> Sympathetic and parasympathetic nervous system. Spinal nerves. 	<ul style="list-style-type: none"> Identify the components of Sympathetic and parasympathetic nervous system. Identify the location of the parasympathetic ganglia in the head. Identify the cervical plexus and its branches Identify brachial plexus and Nerves of the upper limb. Identify Lumbo-sacral plexus and nerves of 	

		<p>The lower limb.</p> <ul style="list-style-type: none"> • Compare & contrast between student's understanding and the real thing seen in the lab. 	
	<p><u>Physiology Lab (1)</u></p> <ul style="list-style-type: none"> • Visual acuity test, Snellen Charts. • Color vision test using Ishihara charts. 	<ul style="list-style-type: none"> • To perform visual acuity test Color vision test, experiments demonstrating and interpret the results 	MCQ exams
	<p><u>Physiology Lab (2)</u></p> <ul style="list-style-type: none"> • Confrontational Perimetry Auditory tests, including Rennin's and Webber's tests. • Audiometry caloric test 	<ul style="list-style-type: none"> • To perform: Auditory tests, including Rennin's, Webber's, and caloric test tests and interpret the results. 	
	<p><u>Pathology Labs (1&2)</u></p> <ul style="list-style-type: none"> • Pathological lesions of the various CNS disorders 	<ul style="list-style-type: none"> • Describe the gross and microscopic features of the pathological lesions of the various CNS and peripheral nervous system disorders (tumors, myelin diseases). 	MCQ exams
	<p><u>Microbioloy Lab (1)</u></p> <ul style="list-style-type: none"> • CSF test 	<ul style="list-style-type: none"> • Identify CNS pathogens using CSF analysis. • Identify the method of specimen collection: indications and contraindications, equipment, process of lumbar puncture, transportation of specimen, storage and complications of LP. • Identify media used for cultures , Identify the pathogenic organisms 	MCQ exams
	<p><u>Biochemistry Lab (1)</u></p> <ul style="list-style-type: none"> • Vitamin B12 	<ul style="list-style-type: none"> • Understand the steps of performing blood vitamin B12 level, interpret results, discuss their clinical significance especially on peripheral nerves and provide an accepted treatment approach for cases of vitamin B12 deficiency. 	MCQ exams

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.

- Submitting a term assignment or class project on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.

- In cases where a student misses an assessment on account of a medical reason or with prior permission, in line with University regulations, an incomplete grade for the specific assessment will be awarded, and an alternative assessment or extension can be arranged.

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 as listed below, with their grade weighting taken into account.

For the modules OR general courses WITH PRACTICAL SESSIONS, please use the following table:

Assessment	Grade Weighting	Deadline Assessment
Exam 1	40%	TBD
Exam 2 (practical)	20%	TBD
Final Exam	40%	TBD

Description of Exams

Test questions will predominately come from the material presented in the lectures. The 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). Details are explained at the end of the file.

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

Will be announced 1 week before starting the course /module

Schedule

Days\ TBD	Group /Room (TBD)	9- 10 AM	10- 11 AM	11:30- 12:30 PM	12:30-1:30 PM	1:30-2:30 PM	2:30- 3:30 PM
1	A	Pathology L (1)	Anatomy L (1)	Biochemistry L (1)	Microbiology L (1)		
	B Online	Anatomy L (1)	Biochemistry L (1)	Microbiology L (1)	Pathology L (1)		
	C	Microbiology L (1)	Pathology L (1)	Anatomy L (1)	Biochemistry L (1)		
2	A Online	Pathology L (2)	Anatomy L (2)	Microbiology L (2)			
	B	Anatomy L (2)	Microbiology L (2)	Pathology L (2)			
	C	Microbiology L (2)	Pathology L (2)	Anatomy L (2)			
3	A	Pathology L (3)	Anatomy L (3)	Physiology L (1)	Lab Biochemistry Group A		
	B	Anatomy L (3)	Physiology L (1)	Pathology L (3)	Lab (1) Pathology Group B	Lab Biochemistry Group B	
	C Online	Physiology L (1)	Pathology L (3)	Anatomy L (3)			
4	A	Microbiology L (3)	Physiology L (2)	Anatomy L (4)	Lab (1) Pathology Group A		
	B Online	Physiology L (2)	Anatomy L (4)	Microbiology L (3)			
	C	Anatomy L (4)	Microbiology L (3)	Physiology L (2)	Lab Biochemistry Group B	Lab (1) Pathology Group C	
5	A	Physiology L (3)	Pharmacology L (1)	Anatomy L (5)			
	B	Pharmacology L (1)	Anatomy L (5)	Physiology L (3)	Lab 1 Physiology B1&2	Lab 1 Physiology B3&4	
	C Online	Anatomy L (5)	Physiology L (3)	Pharmacology L (1)			

6	A Online	Physiology L (4)	Anatomy L (6)	Community L (1)			
	B	Anatomy L (6)	Community L (1)	Physiology L (4)	Lab (1) Anatomy B1&B2	Lab (1) Anatomy B3&B4	
	C	Community L (1)	Physiology L (4)	Anatomy L (6)	Lab 1 Physiology C3&4	Lab 1 Physiology C1&2	
7	A	Microbiology L (4)	Anatomy L (7)	Pharmacology L (2)		Lab Microbiology Group A	
	B	Anatomy L (7)	Pharmacology L (2)	Microbiology L (4)	Lab Microbiology Group B		
	C Online	Pharmacology L (2)	Microbiology L (4)	Anatomy L (7)			
8	A	Physiology L (5)	Anatomy L (8)	Pathology L (4)	Lab 1 Physiology A3&4	Lab 1 Physiology A1&2	
	B Online	Anatomy L (8)	Pathology L (4)	Physiology L (5)			
	C	Pathology L (4)	Physiology L (5)	Anatomy L (8)	Lab2 Physiology C1&2	Lab 2 Physiology C3&4	
9	A Online	Physiology L (6)	Anatomy L (9)	Pharmacology L (3)			
	B	Anatomy L (9)	Pharmacology L (3)	Physiology L (6)	Lab 2 Physiology B3&4	Lab 2 Physiology B1&2	
	C	Pharmacology L (3)	Physiology L (6)	Anatomy L (9)	Lab (1) Anatomy C1&C2	Lab (1) Anatomy C3&C4	
10	A	Pharmacology L (4)	Anatomy L (10)	Physiology L (7)	Lab (1) Anatomy A1&2	Lab (1) Anatomy A3&4	
	B	Anatomy L (10)	Physiology L (7)	Pharmacology L (4)	C.S. B1&2	C.S. B3&4	
	C Online	Physiology L (7)	Pharmacology L (4)	Anatomy L (10)			

11	A Online	Microbiology L (5)	Anatomy L (11)	Pharmacology L (5)			
	B	Anatomy L (11)	Pharmacology L (5)	Microbiology L (5)			
	C	Pharmacology L (5)	Microbiology L (5)	Anatomy L (11)	Lab (2) Anatomy C 3&4	Lab (2) Anatomy C 1&2	
12	A	Pathology L (5)	Anatomy L (12)	Physiology L (8)	Lab 2 Physiology A1&2	Lab 2 Physiology A3&4	
	B Online	Anatomy L (12)	Physiology L (8)	Pathology L (5)			
	C	Physiology L (8)	Pathology L (5)	Anatomy L (12)	Lab Microbiology Group C		
13	A	Pathology L (6)	Pharmacology L (6)	Community L (2)	Lab (2) Anatomy A3&4	Lab (2) Anatomy A1&2	
	B	Pharmacology L (6)	Community L (2)	Pathology L (6)	Lab (2) Anatomy B3&4	Lab (2) Anatomy B1&2	
	C Online	Community L (2)	Pathology L (6)	Pharmacology L (6)			
14	All groups	Biochemistry L (2)	Clinical lecture (1)	Clinical lecture (2)	Lab (2) Pathology All groups		

Distribution of questions& marks of PNS exams

Subject	Midterm Exam Questions		Practical Exam Questions	
	Lectures	Number Of Qs	Labs	Number Of Qs
Anatomy	1-8	16	2	5
Physiology	1-5	10	2	5
Pathology	1-4	8	2	5
Microbiology	1-3	6	1	3
Pharmacology	1-4	8	-	-
Biochemistry	1	2	1	2
Community	-	-	-	-
Clinical- neurosurgery	-	-	-	-
	25 lectures (58% of lectures)	Total: 50	Total: 8 Labs	Total: 20 Qs

Final Exam Questions (Inclusive)

Subject	Lectures	Number Of Qs		
		On Final material	On Mid material	Total Qs
Anatomy	9- 12	9	2	11
Physiology	6 - 8	7	1	8
Pathology	5 & 6	5	1	6
Microbiology	4 & 5	5	1	6
Pharmacology	5 & 6	5	1	6
Biochemistry	L (2)	2	1	3
Community	1&2	5	-	5
Clinical- neurosurgery	1&2	5	-	5
	18 lectures	Total: 43	Total:7	Total: 50

Makeup Exams

Makeup –Mid-exam - Essay Qs (any number of Qs) according to these marks

Subject	Lectures	Marks
Anatomy	1-8	13
Physiology	1-5	8
Pathology	1-4	6
Microbiology	1-3	5
Pharmacology	1-4	6
Biochemistry	L (1)	2
Community	-	-
Clinical-neurosurgery	-	-
	25 lectures (58% of lectures)	Total: 40 marks

Practical for makeup exam (essay Qs)

Subject	Labs	Number Of Qs
Anatomy	2	5
Physiology	2	5
Pathology	2	5
Microbiology	1	3
Pharmacology	-	-
Biochemistry	1	2
Community	-	-
Clinical-neurosurgery	-	-
	Total: 8 Labs	Total: 20 marks

Makeup for Final exam - Essay Qs (any number of Qs) according to these marks

Subject	Lectures	Marks		
		On Final material	On Mid material	Total marks
Anatomy	9 - 12	7	2	9
Physiology	6 - 8	6	1	7
Pathology	5 & 6	4	1	5
Microbiology	4 & 5	4	1	5
Pharmacology	5 & 6	4	1	5
Biochemistry	L (2)	2	-	2
Community	1&2	3	-	3
Clinical-neurosurgery	1&2	4	-	4
	18 lectures	Total: 34	Total: 6	Total: 40

Resit exam

Subject	Lectures	No. of MCQs on theoretical part	Labs	No. of Qs of practical exam
Anatomy	1-12	18	2	4
Physiology	1-8	12	2	4
Pathology	1-6	9	2	4
Microbiology	1-5	7	1	2
Pharmacology	1-6	9	-	-
Biochemistry	1&2	3	1	2
Community	1&2	3	-	-
Clinical-neurosurgery	1&2	3	-	-
	43 lectures	Total: 64 Qs (80 Marks)	8 labs	Total: 16 Qs (20 Marks)