



خطة المساق الدراسي
COURSE PLAN

FIRST: COURSE IDENTIFICATION						أولاً: تعريف المساق
College & Department						الكلية والقسم
College	Medicine	الطب		الكلية		
Department	Basic Medical Sciences	العلوم الطبية الأساسية		القسم		
Academic Year	3 rd	الثالثة		السنة الدراسية		
Academic Semester	2 nd	الثاني		الفصل الدراسي		
Course details						تفاصيل المساق
Course Title	Nervous System and Special Senses		الجهاز العصبي والحواس		اسم المساق	
Course Code	BMS 332	ع ط أ 332		رمز المساق		
Course Type	Theory and Practical		نظري و عملي		نوع المساق	
Credit Hours	7	7		الساعات المعتمدة		
Pre-requisite	NA		لا يوجد		المتطلب السابق	
آلية تدريس المساق						<input type="checkbox"/> مدمج <input type="checkbox"/> الكتروني كامل <input checked="" type="checkbox"/> وجاهي
Teaching Method						<input type="checkbox"/> Face-to-Face <input type="checkbox"/> Online <input type="checkbox"/> Blended
Instructor Contact Information						المدرس
Name	Multi-disciplinary staff members; Dr. Ezidin Kaddumi (course Coordinator)		تدريس مشترك د. عز الدين قديمي (منسق المساق)		اسم المدرس	
Office No.	OG 15		الطابق الأرضي مكتب رقم 15		رقم المكتب	
Tel (Ext)					الرقم الداخلي	
E-mail	kaddumi@bau.edu.jo		kaddumi@bau.edu.jo		البريد الإلكتروني	
Office Hours	12-13 Sun-Thur		1-12 من الأحد إلى الخميس		الساعات المكتبية	
وقت المحاضرة Class Times	وقت البدء Start Time	وقت النهاية End Time	اليوم Day	المبنى Building	رقم القاعة Room No.	
8:00-12:00	8:00	12:00	S M T W T	Faculty of Medicine	Auditorium 301 & 302	
Course Materials						مصادر المساق
Textbook						الكتاب المقرر
Course References, Readings and Learning Resources						المراجع والقراءات ومصادر تعلم المساق:



Anatomy:

1. - Clinical Neuroanatomy for Medical Students By R.S Snell. Latest Edition.
2. - Clinical Anatomy for Medical Students. By R. S. Snell, Latest Edition.
3. - Textbook of Head & Neck Anatomy. By J. L. Hiatt and L. P. Gartner. Latest Edition.
4. - Any Atlas of neuroanatomy, Latest Edition.
5. - Basic Histology. By L. Carlos Junqueira, Latest Edition.
6. - Before we are born. By K. L. Morre and T. V. N. Persaud, Latest Edition.

Physiology:

7. - Textbook of Medical Physiology. By Guyton and Hall, Latest Edition.
8. - Concise Text of Neuroscience, by R. E. Kingsley, Latest Edition.

Biochemistry:

9. - Harper's Biochemistry. By Robert K. Murray and Co. Latest Edition.

Pharmacology:

10. - Lippincott's Illustrated Reviews Pharmacology, Latest edition.
11. - Basic and Clinical Pharmacology. By Katzung, Latest Edition.
12. - Goodman and Gilman's: The pharmacological basis of therapeutics, Latest edition
13. - Clinical Pharmacology. D.R. Laurence, P.N. Bennet, and M.J. Brown. Churchill Livingstone, Latest edition.

Pathology:

14. - Basic Pathology. By Kumar, Cotran and Robbins, Latest Edition.
15. - Essential of Pathology Rubin, Latest Edition.

Microbiology:

16. - Medical Microbiology. An Introduction to Infectious Diseases. By Sherris, Latest Edition



Clinical Lectures:

17. - To be assigned by the lecturer

SECOND: COURSE OVERVIEW/DESCRIPTION

ثانياً: معلومات المساق

Course description وصف المساق

This course covers nervous system and special senses from the standpoints of anatomy, histology and organization of the central and peripheral nervous system including the brain, spinal cord, and nerves including their motor and sensory functions in addition to the study of vision, hearing and chemical sense, cerebral cortex and intellectual functions, neurotransmission including its chemistry, receptors and neurotransmitters, and chemistry of vision. It also covers diseases of the central nervous system and organs of special senses including bacterial, viral, fungal and parasitic infections, brain edema, hydrocephalus, vascular disturbances, trauma, congenital malformations, tumors, degenerative and immune-mediated disorders and the drugs used for the treatment of these diseases. The course is concluded by covering the clinical aspects of the disease that affect the central and peripheral nervous system as well as special senses.

Course Objectives أهداف المساق

By the end of this course, students should be able to مع نهاية هذا المساق يجب أن يكون الطالب قادراً على

CO1.	Describe the anatomical and histological structures of different parts of the nervous system and understand their functions.	الهدف 1:
CO2.	Explain the biochemical basis of different disorders affecting nervous system.	الهدف 2:
CO3.	Distinguish the pathological conditions affecting the nervous system.	الهدف 3:
CO4.	Select the appropriate diagnostic tests and treatments for certain NS disorders.	الهدف 4:

Program Intended Learning Outcomes (PILO): مخرجات التعلم المستهدفة للبرنامج

Knowledge & understanding	PILO1	م ب 1:	المعرفة والفهم
Professional Skills	PILO1	Show understanding of various human body systems in terms of structure, function, and regulation, and normal anatomical, biochemical, cellular, genetic, and molecular mechanisms in human body and their disruptions during disease status	م ب 1:
	PILO2	Collect history and perform physical examination and apply clinical knowledge and skills in disease diagnosis and management through rational planning in requesting necessary, updated, and accurate diagnostic procedures	م ب 2:
	PILO3	Demonstrate and apply sufficient knowledge of drugs and pharmacotherapy concepts for rational drug use in clinical: therapeutic and preventive settings	م ب 3:
	PILO4	Understand and apply the concepts and application of community and preventive medicine	م ب 4:
	PILO5	Build an efficient and healthy doctor-patient and doctor-community relationship	م ب 5:



Competences	PILO6	Recognise and apply the basic concepts and principles in scientific research, emphasizing research ethics and the practice of evidence-based medicine	م ب 6:	الكفايات
	PILO7	Appreciate and apply the principles of medical and sustainable professional development	م ب 7:	
	PILO8	Respect and adhere to ethical principles in all aspects of education, training, and work	م ب 8:	
Course Intended Learning Outcomes (CILO) مخرجات التعلم المستهدفة للمساق				
Successful completion of the course should lead to the following outcomes: في نهاية المساق بنجاح يجب أن يكتسب الطالب المخرجات التالية:				
Knowledge & understanding	CILO1	Describe the gross features of the human central nervous system (brain and spinal cord), including brain coverings, cerebrospinal fluid (CSF), and blood supply of the central nervous system	م م 1:	المعرفة والفهم
	CILO2	Analyze the structures conveying information to and from the central nervous system, and define the structural basis, physiological, and pharmacological properties transmit sensory and motor information in the CNS	م م 2:	
	CILO3	Describe the anatomical and physiological basis for higher-order cortical functions in the central nervous system	م م 3:	
	CILO4	Describe pathogens that infect the nervous system and the pathological changes related to the infection process	م م 4:	
	CILO5	Describe the principles that guide our understanding of human behavior and the biochemical basis of various behavioral disorders	م م 5:	
Professional Skills	CILO6	Correlate lesion sites at specific levels of the central nervous system with neurological and pathological findings of various neurological disorders	م م 6:	المهارات
	CILO7	Describe the pharmacology of drugs employed in the management of various mental and neurological disorders	م م 7:	
Competences	CILO 8	Be able to explain symptoms, signs, investigations, and forms of treatments of nervous system's anomalies	م م 8:	الكفاءات

Mapping Course Learning Outcomes CILOs to Program Learning Outcomes PILOs				موائمة مخرجات التعلم للمستاق CILOs مع مخرجات التعلم للبرنامج PILOs			
	PILO1	PILO2	PILO3	PILO4	PILO5	PILO6	PILO8
CILO1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



CILO2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO7	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CILO8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Topic Outline/Schedule (Syllabus)

مخطط المساق (الموضوعات)

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CLO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
1	Orientation Session	-	-		Online	-	-
1	Introduction and organization of NS (Anatomy 1)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Characteristic features of CNS pathology (Pathology 1)	14 & 15	4, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Cerebral cortex (Anatomy 2)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Gross morphology of spinal cord (Anatomy 3)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Bacterial meningitis (Microbiology 1)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Brain meninges, ventricles and CSF (Anatomy 4)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.



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1	Vascular diseases of the CNS (Pathology 2)	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Blood supply of the CNS (Anatomy 5)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Physiology of the brain circulation and CSF Formation (Physiology 1)	7 & 8	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Language and memory (I) (Physiology 2)	7 & 8	3	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Language and memory (II) (Physiology 3)	7 & 8	3	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Metabolism of neurotransmitters (Biochemistry 1)	9	5	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
1	Neuroanatomy I (Anatomy Lab 1)	4	1	1	Small groups Models Demonstration Handout	2	2-3 hours



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1	Neurophysiology (Physiology Lab 1)	7 & 8	2	1	Power point &/or Videos &/or Handout	2	2-3 hours
2	Brainstem & Diencephalon (Anatomy 6)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Brainstem & Diencephalon II (Anatomy 7)	1	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	The Limbic System and the Hypothalamus (Physiology 4)	7 & 8	5	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	The Limbic System and the Hypothalamus II (Physiology 5)	7 & 8	5	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Electroencephalogram (EEG) & Sleep (Physiology 6)	7 & 8	3, 8	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Antidepressants (Pharmacology 1)	10-13	7, 8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.



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2	Drugs used in schizophrenia and psychotic disorders (Pharmacology 2)	10-13	7, 8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Motor pathways I (Anatomy 8)	1	2, 3, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Motor pathways II (Anatomy 9)	1	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Higher motor control & the basal ganglia (Physiology 7)	7 & 8	2, 3, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	The basal ganglia & cerebellum (I) (Physiology 8)	7 & 8	2, 3, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
2	Neuroanatomy II (Anatomy Lab 2)	4	1	1	Small groups Models Demonstration Handout	2	2-3 hours
3	The cerebellum (II) (Physiology 9)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.



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3	Antiparkinsonism drugs (Pharmacology 3)	10-13	7	3	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Histology of the CNS (Anatomy 10)	5	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Viral and fungal meningitis (Microbiology 2)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Development of CNS I (Anatomy 11)	6	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Development of CNS II (Anatomy 12)	6	1	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Vascular disease and trauma of the CNS (Pathology 3)	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Mycobacterium Leprae. Clostridium tetani & Clostridium Botulism (Microbiology 3)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.



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3	Drugs for neurodegenerative diseases (Pharmacology 4)	10-13	7, 8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Prions and Ticks (Microbiology 4)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Infections of CNS I (Pathology 4)	14 & 15	4	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Infections of CNS II (Pathology 5)	14 & 15	4	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	The biochemical basis of selective neurological disorders (Biochemistry 2)	9	5	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
3	Neuroanatomy III (Anatomy Lab 3)	4	1	1	Small groups Models Demonstration Handout	2	2-3 hours
5	General sensory pathways of the trunk and limbs (Anatomy 13)	1	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.



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5	General sensory pathways of the face area, Taste pathways and Hearing pathways (Anatomy 14)	1	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Sensory system (Physiology 10)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Epilepsy (Physiology 11)	7 & 8	5	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	The orbit, orbital contents and cranial nerves III, IV and VI (Anatomy 15)	1 -3	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Drugs used in epilepsy (Pharmacology 5)	10-13	7	3	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	The Eye and optic nerve (Anatomy 16)	1 -3	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Sedative-hypnotics (Pharmacology 6)	10-13	7, 8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.



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5	Trigeminal nerve (Anatomy 17)	1 & 3	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Vision (I) (Physiology 12)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	Vision (II) (Physiology 13)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
5	The external and middle ear & carinal nerve VII (Anatomy 18)	1 -3	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Inner ear & cranial nerve VIII (Anatomy 19)	1 -3	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Drugs used in treatment of glaucoma (Pharmacology 7)	10-13	7	3	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Cranial nerves IX, X, XI, XII (Anatomy 20)	1 & 3	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.



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6	Hearing & equilibrium (I) (Physiology 14)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Hearing & equilibrium (II) (Physiology 15)	7 & 8	2, 6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Face and scalp, cervical plexus & nerves of the head and neck (Anatomy 21)	2 & 3	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	The neck (Anatomy 22)	2 & 3	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Rabies and arboviruses (Microbiology 5)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	General anesthetics (Pharmacology 8)	10-13	7, 8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Local anesthetics (Pharmacology 9)	10-13	2, 4	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.



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6	Tumors of the Nervous system (Pathology 6)	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Demyelinating diseases (Pathology 7)	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
6	Orbit, Eye and Ear (Anatomy Lab 4)	2 & 3	2	1	Small groups Models Demonstration Handout	2	2-3 hours
6	Pathology Lab 1	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	2	2-3 hours
7	Chemical senses; taste & smell (Physiology 16)	7 & 8	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Enteroviruses (Microbiology 6)	16	4, 8	1, 2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Sympathetic nervous system (Anatomy 23)	1	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.



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7	Parasympathetic nervous system (Anatomy 24)	1	2	1	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Opioids and opioid antagonists (Pharmacology 10)	10-13	2, 7	1, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	CNS stimulants and drugs of abuse (Pharmacology 11)	10-13	2, 7	1, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Neurodegenerative diseases (Pathology 8)	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Face, Scalp & Neck (Anatomy Lab 5)	2 & 3	2	1	Small groups Models Demonstration Handout	2	2-3 hours
7	Microbiology Lab	16	4, 8	1, 2,3	Power point &/or Videos &/or Handout	2	2-3 hours
7	Physiology Lab 2	7 & 8	2	1	Power point &/or Videos &/or Handout	2	2-3 hours



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7	Pathology Lab 2	14 & 15	6	1, 2	Power point &/or Videos &/or Handout	2	2-3 hours
7	Clinical Lecture I	17	8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Clinical Lecture II	17	8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Clinical Lecture III	17	8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
7	Clinical Lecture IV	17	8	2, 3	Power point &/or Videos &/or Handout	0.5-1	50 min.
	<ul style="list-style-type: none"> التقييم التجميعي Final exam (Summative Assessment) 				الامتحان النهائي (التقييم التجميعي) Summative Assessment		Week 8

Week	May use the Week number more than once	من الممكن استخدام رقم الأسبوع أكثر من مرة	الأسبوع
Course Topics/Events	The topic that is the focus of this part of the class in subjects' format	المحتوى التعليمي المعطى في المحاضرة على شكل مواضيع الفعاليات	مواضيع المساق / الفعاليات
CILO	The learning objective of this specific topic; what	الهدف التعليمي لهذا الموضوع المحدد؛ ما الذي تريد أن يحققه الطلاب.	مخرجات التعلم للمحاضرة



	you want the students to achieve.		
Teaching & Learning Activity	Power point material, Videos, White board, overhead projector, handout, pc projector, written assignment, flip chart, objects used to illustrate something etc.	وسائل التعليم المستخدمة، مادة عرض مصورة، مقاطع مصورة، مجسمات السبورة البيضاء، جهاز عرض علوي، نشرة، جهاز عرض كمبيوتر، مهمة كتابية، لوح ورقي، أشياء مستخدمة لتوضيح شيء ما وما إلى ذلك.	أنشطة التدريس والتعلم
Time	Duration of this part of the class.	مدة هذا الجزء النشاط من المحاضرة.	الوقت
Mark	Mark weight for each topic as a part of total (100)	علامة كل مخرج وهي جزء من العلامة الكلية (100)	العلامة

#	LECTURE TITLE	LECTURE OBJECTIVES
	Orientation Online (Coordinator)	<ol style="list-style-type: none"> 1. Understand the general outline of the Neuroscience module. 2. Be familiar with the modalities of teaching throughout the course. 3. Acknowledge the important relation between normal and abnormal structure and function. 4. Appreciate the importance of basic neurosciences in clinical application and neurology.
1	Introduction and organization of NS (Anatomy 1)	<ol style="list-style-type: none"> 1. Describe the organization of the NS. 2. Overview of the main parts of the CNS. 3. Explain the concept of nuclei, fasciculi, lemnisci, tracts, laminae, white and gray matter inputs (afferent) and outputs (efferent). 4. Demarcate the major lobes, gyri and sulci of the cerebral hemisphere. 5. Describe the types of fibers in the white matter of the cerebral hemisphere: projection (internal capsule), commissural and association fibers.
2	Characteristic features of CNS pathology (Pathology 1)	<ol style="list-style-type: none"> 1. To know the selectivity of disease and vulnerability of certain areas to specific disease processes. 2. To know the types and functions of the various elements in the CNS & their response to injury. 3. To know the types of cerebral herniations, their anatomical locations & complications. 4. To know the pathology of cerebral edema. 5. To know the types, causes & effects of hydrocephalus. 6. List the malformations and developmental diseases including neural tube defects with or without hydrocephalus.
3	Cerebral cortex	<ol style="list-style-type: none"> 1. Describe the organization of the cerebral cortex. 2. Locate the motor, sensory and other cortical areas.



	(Anatomy 2)	<ol style="list-style-type: none"> Describe the cortical areas related to the written and spoken language. Identify the components of the medial temporal lobe and the hippocampal formation. Identify the structures in coronal, sagittal and horizontal sections of brain.
4	Gross morphology of spinal cord (Anatomy 3)	<ol style="list-style-type: none"> Describe the gross anatomical features of the spinal cord. Describe the level of the different spinal segments compared to the level of their respective vertebrae. Identify important gross features of spinal cord, nerve roots, and spinal ganglia. Describe the internal features of spinal cord (gray matter and white matter) in the different regions. Describe the blood supply of the spinal cord.
5	Bacterial meningitis (Microbiology 1)	<ol style="list-style-type: none"> Describe the morphology, cultural characteristics, pathogenesis, laboratory diagnosis, prevention of meningitis caused by <i>Neisseria meningitidis</i>, group B Streptococci, <i>S. Pneumoniae</i>, <i>Haemophilus influenzae</i>, other Gram negative bacilli and <i>Listeria monocytogenesis</i>.
6	Brain meninges, ventricles and CSF (Anatomy 4)	<ol style="list-style-type: none"> Describe the arrangement of the meninges and their relationship to brain and spinal cord. Explain the occurrence of epidural, subdural and subarachnoid spaces. Locate the principal subarachnoid cisterns, and arachnoid granulations. Describe the ventricles of brain and importance of their choroid plexuses. Summarize the pathway of cerebrospinal fluid (CSF) circulation. Locate the safe sites for the lumbar puncture. Identify brain ventricles in CT scan, MRI and ventriculograms.
7	Vascular diseases of the CNS (Pathology 2)	<ol style="list-style-type: none"> Define stroke, transient ischemic attack, and the areas & cells in the brain, which are most susceptible to ischemia & hypoxia. Describe global/ ischemic encephalopathy, laminar necrosis, Border-Zone (Watershed) infarcts. Understand regional infarction and describe their pathology. Know the types of intracranial hemorrhage & their pathological features. Know the effects of hypertension on the brain.
8	Blood supply of the CNS (Anatomy 5)	<ol style="list-style-type: none"> Describe the four arteries supplying the CNS. Follow up each artery to its destination. Describe the circle of Willis and its branches. Describe venous drainage and circulation of the brain.
9	Physiology of the brain circulation	<ol style="list-style-type: none"> Explain types of Blood-brain barrier Discuss functions of the blood-brain barrier



	and CSF Formation (Physiology 1)	<ol style="list-style-type: none"> 3. Discuss regulation cerebral blood flow: 4. Explain three systems of nerves innervate the cerebral blood vessels. 5. Discuss cerebral microcirculation: 6. Explain brain Metabolism: 7. Explain function of cerebro-spinal fluid (CSF): 8. Discuss composition of CSF comparing to plasma 9. Explain Blood flow in various parts of the brain 10. Discuss Oxygen consumption & Energy sources in various parts of the brain
10	Language and memory (I) (Physiology 2)	<ol style="list-style-type: none"> 1. Functions of specific cortical areas: 2. Explain associated areas: A. Parieto-occipito-temporal association area: (1) Analysis of the Spatial Coordinates of the Body (2) Wernicke's Area (3) Angular gyrus area (4) Area for Naming Objects. B. Prefrontal association area (1) Broca's area. C. Limbic association area (1) Area for recognition of faces 3. Discuss Brain Lateralization & Complementary specialization of the hemispheres versus "cerebral dominance" 4. Discuss Language: A. Speech in response to hearing B. Speech in response to reading 5. Explain aphasia: Patient with Broca's aphasia, and Wernicke's aphasia 6. Discuss Learning and memory 7. Explain Multi-store model memory 8. Explain multi-store model memory: (1) Sensory memory (2) Short-term memory 9. Explain Working memory (Baddeley & Hitch model): 1. The central executive, 2. Visuo-Spatial Sketchpad, 3. Phonological Loop, 4. episodic buffer
11	Language and memory (II) (Physiology 3)	<ol style="list-style-type: none"> 1. Discuss Intermediate long-term memories: Kandel experiment: ①Siphon-gill withdrawal reflexes, ②Habituation in Aplysia californica, ③Dishabituation in Aplysia californica , ④Sensitization in Aplysia californica , ⑤ classical conditioning 2. Discuss Molecular Mechanism of Intermediate Memory 3. Discuss Long-term memory: ①characterizes by: A. Encoding B. Storage C. retrieval ②types: A. Explicit or declarative memory, B. Implicit or non-declarative memory 4. Explain consolidation of memory and Long-term potentiation 5. Explain Production of Long-term potentiation in Schaffer collaterals in the hippocampus 6. Explain Biochemical and Neuronal plasticity explanation of Long-term potentiation 7. Explain Neurogenesis synaptic plasticity
12	Metabolism of neurotransmitters	<ol style="list-style-type: none"> 1. Discuss the synthesis and degradation of gamma-amino-butyric acid (GABA). 2. Discuss the synthesis and degradation of dopamine, epinephrine and nor-epinephrine. 3. Discuss the formation and catabolism of serotonin.



	(Biochemistry 1)	<ol style="list-style-type: none"> 4. Discuss the glutamate metabolism. 5. Understand the brain peptides as neurotransmitters.
13	Brainstem & Diencephalon I (Anatomy 6)	<ol style="list-style-type: none"> 1. Identify the gross features of the brainstem. 2. Briefly describe the internal structure of the brainstem (ascending and descending pathways, sensory and motor cranial nuclei, substantia nigra, red nucleus, olivary nucleus and reticular formation). 3. Review the blood supply of the brainstem. 4. Describe lesions in the brainstem such as medial medullary syndrome and lateral medullary syndrome.
14	Brainstem & Diencephalon II (Anatomy 7)	<ol style="list-style-type: none"> 5. Describe the main connections of Reticular Formation and correlate these connections with its main functions. 6. Describe the anatomical features of the diencephalon; components, location and relations.
15	The Limbic System and the Hypothalamus I (Physiology 4)	<ol style="list-style-type: none"> 1. Explain Pathophysiology of depression 2. Discuss Pathophysiology of schizophrenia 3. Discuss Pathophysiology of anxiety 4. Explain Circuitry of the Hypothalamus: Neural Connections, Limbic Circuits, Sensory and Autonomic Circuits. 5. Discuss hypothalamic functions <ol style="list-style-type: none"> I. Control of pituitary gland (anterior and posterior lobe), II. Control of autonomic functions (First: Hypothalamic Structures, Second: Extra-hypothalamic Structures), Circuitry for Hypothalamic Control of the Autonomic Nervous System. III. Relation to cyclic phenomena & sleep, IV. Relation to hunger: Mechanisms of Satiety; The neural inputs, Neurochemistry. V. Relation to Thirst (Neural Mechanisms of Thirst)
16	The Limbic System and the Hypothalamus II (Physiology 5)	<ol style="list-style-type: none"> IV. Relation to thermal regulation (Hypothalamic role in controlling body temperature), Fever (hyperthermia), Hypothermia 6. Discuss limbic system 7. Discuss main components of the limbic system: 8. Hippocampus: <ol style="list-style-type: none"> I. Functions of Hippocampus II. Discuss Disorders related to Hippocampus: 1. Aging, 2. Stress, 3. Epilepsy, 4. Schizophrenia, 5. Transient global amnesia 9. Amygdala <ol style="list-style-type: none"> I. Discuss Functions of amygdala Discuss Amygdala II. dysfunction: Urbach-Wiethe disease, The Klüver-Bucy Syndrome



		10. Discuss reward and punishment function of limbic system: a. Reward center or pleasure center, b. Punishment Centers
17	Electroencephalogram (EEG) & Sleep (Physiology 6)	<ol style="list-style-type: none"> 1. Explain electroencephalogram Alpha wave, Beta wave, Gamma wave, Theta wave, Delta wave 2. Sleep 3. Explain sleep patterns: <ol style="list-style-type: none"> a) Rapid eye movement (REM) sleep (Paradoxical or Desynchronized sleep), b) non-rapid eye movement (NREM) or slow-wave sleep 4. Explain physiological function of sleep 5. Explain basic theories of sleep 6. Explain sleep stages
18	Antidepressants (Pharmacology 1)	<ol style="list-style-type: none"> 1. Describe the monoamine theory of depression. 2. Describe the classification of antidepressants. 3. Describe the probable mechanisms and the major pharmacodynamic properties of tricyclic antidepressants. 4. List the toxic effects that occur during chronic therapy and after an overdose of tricyclic antidepressants. 5. Describe the therapeutic use and toxic effects of MAO inhibitors. 6. Identify the second and third generation antidepressants and their distinctive properties. 7. Identify the prototype selective serotonin reuptake inhibitor and list its major characteristics. 8. Identify the major drug interactions associated with the use of antidepressant drugs.
19	Drugs used in schizophrenia and psychotic disorders (Pharmacology 2)	<ol style="list-style-type: none"> 1. Describe the dopamine hypothesis of schizophrenia. 2. List the major receptors blocked by antipsychotic drugs. 3. Describe the classifications of antipsychotic drugs. 4. Describe the pharmacodynamics of antipsychotic drugs and correlate these pharmacodynamic to their clinical uses. 5. List the adverse effects and the behavior effects of the major antipsychotic drugs. 6. Describe the pharmacokinetics and pharmacodynamic of lithium.
20	Motor pathways I (Anatomy 8)	<ol style="list-style-type: none"> 1. Define the terms upper and lower motor neurons with examples. 2. Describe the corticospinal (pyramidal) tract and the direct motor pathways from the cortex to the trunk and limbs. 3. Briefly describe the indirect motor pathways from the cortex to the trunk and limbs through extrapyramidal tracts such as rubrospinal and reticulospinal tracts. 4. Describe motor pathways to the face muscles. 5. Compare the signs and symptoms of the upper and lower motor neuron lesions.



21	Motor pathways II (Anatomy 9)	<ol style="list-style-type: none"> Identify the centers that make the basal ganglia. Identify the different parts, regions and nuclei of the cerebellum. Summarize the motor system circuitry.
22	Higher motor control & the basal ganglia (Physiology 7)	<ol style="list-style-type: none"> Discuss primary motor cortex (M I: Brodmann's area 4): Function, characteristics of vertical columns Discuss supplementary motor area (M-II) Discuss pre-motor cortex (M III) Discuss specialized area of motor control found in human motor cortex: A. Broca's area "word formation" area 44, 45, B. Voluntary eye movement field, C. Head rotation, D. Area for hand skills, E. Posterior parietal cortex. Explain simplified linear sequence of events of Voluntary movements Explain transmission of signals from the motor cortex to the muscle: The basal ganglia Explain the functions of the basal ganglia Explain neuronal circuitry of the Basal Ganglia: Motor loop First: executive loop: <ol style="list-style-type: none"> The putamen circuit (a. Direct Pathway, b. Indirect Pathway, c. hyper-direct pathway), Abnormal Function in the Putamen Circuit. The nigrostriatal pathway. Disorders of the Basal Ganglia: Parkinson's disease Second: cognitive loop
23	The basal ganglia & cerebellum (I) (Physiology 8)	<ol style="list-style-type: none"> Explain Non-motor Loop: A. Limbic loop: B. prefrontal loop Explain Functional Anatomical Areas of cerebellum & Topographical Representation Discuss cerebellum Afferent Pathways from Other Parts of the Brain Discuss cerebellum Anatomical Efferent Pathways from the Cerebellum & Efferent Pathways according to functional division of cerebellum Discuss Cerebellar Functions
24	The cerebellum (II) (Physiology 9)	<ol style="list-style-type: none"> Explain Functional Unit of the Cerebellar Cortex Explain Excitatory input to cerebellum: A. The climbing fibers, B. The mossy fiber Explain neuronal circuit through cerebellar cortex Discuss Neuronal output from the functional unit to Purkinje cell Explain Neuronal output from the deep nuclear cell Discuss Functional parts of cerebellum ①Vestibulocerebellum ②Spino-cerebellum ③Cerebro-Cerebellum Discuss Signs of cerebellar lesions include: 1. Dysdiadochokinesis, 2. Dysmetria, 3. Cerebellar Ataxia, 4. Cerebellar nystagmus, 5. Tremor (action tremor or intention tremor), 6. Dysarthria, 7. Hypotonia



25	Antiparkinsonism drugs (Pharmacology 3)	<ol style="list-style-type: none"> 1. Describe the neurochemical imbalance underlying the symptoms of Parkinson's disease. 2. Identify the mechanisms by which drugs can alleviate parkinsonism. 3. Describe the therapeutic and toxic effects of the major antiparkinsonism drugs. 4. Identify the compounds that inhibit DOPA decarboxylase and COMT and describe their use in parkinsonism. 5. Identify the chemical agents and drugs that cause Parkinson symptom.
26	Histology of the CNS (Anatomy 10)	<ol style="list-style-type: none"> 1. Describe the histology of the cerebral cortex layers. 2. Describe the histological features of the cerebellum, layers and cells of cerebellar cortex. 3. Describe the elements of the blood-brain barrier and the blood-CSF barrier. 4. Describe the structure of the choroid plexus and the meninges.
27	Viral and fungal meningitis (Microbiology 2)	<ol style="list-style-type: none"> 1. Describe the morphology, physical properties, pathogenesis, and laboratory diagnosis of Enteroviruses: Polio viruses, basic structural, morphological and physical properties, epidemiology, pathogenesis, clinical presentation, laboratory diagnosis, and prevention. 2. Describe Cryptococcus neoformans, its morphology, cultural characteristics, pathogenesis, laboratory diagnosis, its importance.
28	Development of CNS I (Anatomy 11)	<ol style="list-style-type: none"> 1. Describe the formation of neural tube and neural crest. 2. Describe the development of brain and spinal cord. 3. Describe the positional changes of spinal cord. 4. Describe the development of the spinal nerves and their spinal ganglia. 5. Describe the development of meninges.
29	Development of CNS II (Anatomy 12)	<ol style="list-style-type: none"> 6. Describe the formation of neural tube and neural crest. 7. Describe the development of brain and spinal cord. 8. Describe the positional changes of spinal cord. 9. Describe the development of the spinal nerves and their spinal ganglia. 10. Describe the development of meninges. 11. Describe the development of brain vesicles from the neural tube. 12. Describe the development of the different parts of brain. 13. Describe the development of brain ventricles and choroid plexuses. 14. Describe the development of the cranial nerves and their ganglia. 15. Describe the congenital anomalies of brain and spinal cord.
30	Vascular disease and trauma of the CNS	<ol style="list-style-type: none"> 1. List the types of aneurysms in the brain, their pathology, and outcome of their rupture. 2. Define berry aneurysms in the circle of Willis and describe their clinical and pathological manifestations.



	(Pathology 3)	<ol style="list-style-type: none"> Describe the types, morphology, pathology and complications of open and closed injury to the brain. Describe the pathology of diffuse axonal injury. List the complications of trauma to the brain and spinal cord. List the types of perinatal brain injury.
31	Mycobacterium Leprae. Clostridium tetani & Clostridium Botulism (Microbiology 3)	<ol style="list-style-type: none"> Understand the characteristics, laboratory diagnosis and management of <i>Listeria monocytogenes</i>, <i>Clostridium tetani</i> and <i>Clostridium botulinum</i>. Understand the bacteriological aspects, laboratory diagnosis, management and prevention of <i>Listeria monocytogenes</i>, <i>Mycobacterium Leprae</i>, <i>Clostridium tetani</i> and Botulism.
32	Drugs for neurodegenerative diseases <i>(Pharmacology 4)</i>	<ol style="list-style-type: none"> Drugs used in Alzheimer's disease: <ol style="list-style-type: none"> Discuss acetylcholinesterase inhibitors. Discuss NMDA receptor antagonist. Drugs used in multiple sclerosis: <ol style="list-style-type: none"> List the disease-modifying therapies. Describe the disease-modifying therapies mechanisms of action. Describe the Symptomatic treatment of multiple sclerosis. Discuss drugs used in amyotrophic lateral sclerosis.
33	Prions and Ticks (Microbiology 4)	<ol style="list-style-type: none"> Indicate the historical background of prions and discuss its basic structure, classification of diseases involved. Discuss the epidemiology, pathogenesis and pathology, laboratory diagnosis, and prevention of prion diseases. Study the following tick borne diseases: <ol style="list-style-type: none"> Lyme disease (understand the epidemiology of Lyme disease, Microbiology, Clinical manifestations, Immunopathogenesis, Diagnosis, and prevention). Rocky Mountain Spotted Fever. Study the methods for transmission, vectors, clinical manifestation, laboratory diagnosis, prevention and control.
34 & 35	Infections of CNS (Pathology 4 & 5)	<ol style="list-style-type: none"> Compare & contrast the clinical and pathological findings in bacterial and viral meningitis. Know the pathology of tuberculous meningitis and tuberculoma. List the types of syphilitic & fungal diseases in the brain. Describe viral encephalitis and the main morphological features in the commoner types. Know about prion diseases in the CNS.
36	The biochemical basis of selective neurological disorders	<ol style="list-style-type: none"> Discuss the sphingolipids metabolism and their disorders (sphingolipidoses). Understand the biochemical bases of Huntington disease. Understand the biochemical bases of Alzheimer disease. Understand the role of biochemical mechanisms in brain damage due to stroke.



(Biochemistry 2)		
Midterm Exam		
37	General sensory pathways of the trunk and limbs (Anatomy 13)	<ol style="list-style-type: none"> 1. Describe gracile and cuneate tracts and pathways for conscious proprioception, touch, pressure and vibration from the limbs and trunk. 2. Describe dorsal and ventral spinocerebellar tracts and pathways for unconscious proprioception from the limbs and trunk. 3. Describe lateral spinothalamic tract and pathways for pain and temperature from the limbs and trunk. 4. Describe ventral spinothalamic tract and pathways for simple touch from the limbs and trunk.
38	General sensory pathways of the face area, Taste pathways and Hearing pathways (Anatomy 14)	<ol style="list-style-type: none"> 1. Describe pathways for general sensations (pain, temperature, touch and proprioception) from the face area. 2. Describe taste pathways. 3. Describe hearing pathways.
39	Sensory system (Physiology 10)	<ol style="list-style-type: none"> 1. Discuss Classification of pain according to duration 2. Explain Sensory pathway for transmitting somatic signals: (A) The dorsal column–medial lemniscal system B) The spinothalamic tract 3. Explain Body Reactions to Pain: 1) Somatic reactions, 2) Autonomic reactions3) Emotional or psychogenic reactions: 4. Explain Referred Pain 5. Discuss pain modulation: First: Based on the gate control theory, Second: The perception of pain, Third: Surgical procedures, Fourth: The endogenous opiate system 6. Discuss structure of cerebral cortex 7. Discuss somatosensory cortex vertical columns 8. Explain somatosensory Areas I and its functions 9. Explain somatosensory associated area 10. Explain segmental fields of sensation (dermatomes) 11. Explain Function of the thalamus in somatic sensation
40	Epilepsy (Physiology 11)	<ol style="list-style-type: none"> 1. Discuss Etiology 2. Discuss pathophysiology of Epilepsy 3. Discuss Neuronal Mechanisms of Epilepsy 4. Discuss The International Classification of Epileptic Seizures <ol style="list-style-type: none"> a. Partial Seizures



		<ul style="list-style-type: none"> i. Simple (formally called focal): <ul style="list-style-type: none"> 1. Partial (focal) motor seizure 2. Partial (focal) somatosensory seizure ii. Complex Partial (Temporal Lobe, Psychomotor) Seizures iii. Autonomic Seizures b. Generalized Seizures <ul style="list-style-type: none"> i. Generalized Tonic-Clonic (Grand Mal) Seizures (What Initiates a Generalized Tonic-Clonic Seizure? ii. What Stops the Generalized Tonic-Clonic Attack?)B. Absence Seizures (formerly called Petit Mal Seizures) C. Myoclonic (infantile spasm) D. Atonic seizures
41	The orbit, orbital contents and cranial nerves III, IV and VI (Anatomy 15)	<ul style="list-style-type: none"> 1. Describe the location of the orbit. 2. Make a list of structures making the orbit starting from orbital margin. 3. Define each component. 4. Describe openings into orbital cavity. 5. Define the orbital fascia. 6. Describe muscles of the orbit, their cone arrangement, origin, insertion, nerve supply and their function. 7. Describe the nerves of the orbit, their courses, important relations and their targets 8. Describe blood supply and lymph drainage of the orbit.
42	Drugs used in epilepsy (Pharmacology 5)	<ul style="list-style-type: none"> 1. Describe the major drugs for partial seizures, generalized tonic-clonic, absence, myoclonic seizures, and status epilepticus. 2. List the mechanism of action, adverse effects and drug-drug interaction of each drug. 3. Understand the importance of Therapeutic drug monitoring in the follow -up of patients taking antiepileptic drugs. 4. Describe the pharmacokinetic factors that must be considered in designing a dosage regimen for antiepileptic drugs. 5. List the new antiepileptic drugs and describe their advantages, major indications and adverse effects.
43	The Eye and optic nerve (Anatomy 16)	<ul style="list-style-type: none"> 1. Make a list of structures making the eyeball. 2. Describe the contents and layers of the eyeball. 3. Describe the sensory, sympathetic and parasympathetic nerve supply. 4. Define the optic nerve. 5. Follow the optic nerve from the eyeball to its point of entry to the brain and its central connections. 6. Explain the effect of optic nerve fibers' injuries on the visual field. 7. List the related structures to the eye; eyelids and lacrimal system.



44	Sedative-hypnotics (Pharmacology 6)	<ol style="list-style-type: none"> 1. Identify the major chemical classes of sedative-hypnotics. 2. Describe the sequence of CNS effects of a typical sedative-hypnotic over the entire dose range. 3. Describe the pharmacodynamics of benzodiazepines, including interactions with neuronal membrane receptors. 4. Compare the pharmacokinetics of commonly used benzodiazepines and barbiturates and discuss how differences among them affect clinical use. 5. Describe the clinical uses of sedative-hypnotics. 6. Describe the common adverse effects and drug interaction of sedative-hypnotics. 7. Understand tolerance and dependence induced by sedative-hypnotics. 8. Understand the therapeutic indications and adverse effects of benzodiazepines antagonists.
45	Trigeminal nerve (Anatomy 17)	<ol style="list-style-type: none"> 1. Discuss briefly how the face is developed. 2. Follow up the course of trigeminal nerve from its point of central connections, exit and down to its target areas. 3. Describe briefly important cranial reflexes involving the face and trigeminal nerve.
46	Vision (I) (Physiology 12)	<ol style="list-style-type: none"> 1. Discuss Principles of optics 2. Discuss Retinal Image 3. Discuss the near response: 1. Accommodation, 2. Miosis (or pupillary constriction), 3. Convergence: 4. Discuss Common defects of the image- forming mechanism (Errors of refraction): 1. Myopia (nearsightedness), 2. Hyperopia (farsightedness), 3. Astigmatism 5. Explain Color vision and color blindness 6. Explain Optic nerve neural pathway and abnormalities in the field of vision: 7. Explain Morphology of the retina, Pigment epithelium, Photoreceptors: main differences between rods and cones 8. Discuss rhodopsin-retinal visual cycle and excitation of the rod 9. Discuss rod receptor potential is hyperpolarizing, not depolarizing
47	Vision (II) (Physiology 13)	<ol style="list-style-type: none"> 1. Discuss dark and light adaptation 2. Discuss retinal electrophysiology 3. Discuss On-center, Off-center retinal ganglion cell: 4. Explain electrophysiology explanation of on-center off-center retinal ganglion cell action potential 5. What is the benefit of on-center off-center? 6. Discuss Central Neurophysiology of Vision: Lateral geniculate body functions, organization and function of visual cortex, the layers of primary visual cortex 7. Discuss columnar architecture of primary visual cortex 8. Discuss Vertical neuronal columns in the visual cortex: a. Ocular dominance columns, b. Orientation columns



		<ol style="list-style-type: none"> 9. Discuss cortical Modules 10. Discuss feature Detection Model of Form Perception: Simple cells, Complex cells, Hyper-complex cell (end-stopped cell) 11. Discuss other cortical areas concerned with vision 12. Discuss fixation movements of eyes: Saccadic Movement of the Eyes, Pursuit Movement 13. Discuss mechanism of involuntary locking fixation (role of the superior colliculi in turning the eyes and head toward a visual disturbance) 14. Explain neural mechanism of stereopsis for judging distances of visual objects
48	The external and middle ear & carinal nerve VII (Anatomy 18)	<ol style="list-style-type: none"> 1. Make a list of structures making the external and middle ear. 2. Discuss the features of the external auditory meatus and tympanic membrane. 3. Describe the shape, position, boundaries and content of the middle ear. 4. Describe the auditory tube, its openings and structure. 5. Describe the mastoid air cells and their connection to the middle ear. 6. Follow up the course of facial nerve from its point of central connections, exit and down to its target areas. 7. Follow up the central connections of the facial nerve. 8. Discuss the various modalities of its fibers. Review your knowledge of its target organs.
49	Inner ear & cranial nerve VIII (Anatomy 19)	<ol style="list-style-type: none"> 1. Make a list of parts making the internal ear. 2. Note how structures fit each other. 3. Describe the bony labyrinth. 4. Explain how the membranous labyrinth fits the bony one. 5. Describe the hearing and balance receptors. 6. Follow the course of the VIII nerve down to its point of entry to the brain. 7. Follow up the central connections of the VIII nerve.
50	Drugs used in treatment of glaucoma (Pharmacology 7)	<ol style="list-style-type: none"> 1. Classification of drugs used in treatment of glaucoma 2. Describe the pharmacodynamics of these drugs 3. Describe major pharmacokinetic parameters of these drugs 4. Describe major unwanted side effects of these drugs 5. Describe clinical uses and contraindications
51	Cranial nerves IX, X, XI, XII (Anatomy 20)	<ol style="list-style-type: none"> 1. Follow up the course of glossopharyngeal, vagus, accessory, and hypoglossal nerves from its central connections, exit from the brain and down to its target organs. 2. Make a list of types of nerve modalities conveyed by these nerves. 3. Review your knowledge of its target organs. Make note of plexuses X nerve creates in the thorax and abdomen.



52	Hearing & equilibrium (I) (Physiology 14)	<ol style="list-style-type: none"> 1. Explain sound wave 2. Explain characteristics of sound waves 3. Explain sound transmission 4. Explain Middle ear (ossicular system) 5. Discuss tympanic reflex (attenuation reflex) and its functions 6. Discuss structure of inner ear 7. Discuss structure of Cochlea 8. Discuss the characteristics of basilar membrane 9. Explain transmission of sound waves in the cochlea (the traveling wave)
53	Hearing & equilibrium (II) (Physiology 15)	<ol style="list-style-type: none"> 1. Discuss structure of Organ of Corti 2. Explain the functions of inner hair cells 3. Explain the depolarization of hair cell 4. Explain the function of cerebral cortex in hearing 5. Discuss sound frequency perception in the primary auditory cortex. 6. Discuss discrimination of sound “Patterns” by the auditory cortex 7. Discuss determination of the direction from which sound come 8. Equilibrium 9. Explain sensory organ of utricle and saccule 10. Explain spatial orientation 11. Explain rotational movement & Semicircular canal 12. Explain responses to rotational acceleration
54	Face and scalp, cervical plexus & nerves of the head and neck (Anatomy 21)	<ol style="list-style-type: none"> 1. Review the general anatomical features of the face and scalp. 2. Describe blood supply, innervation, and lymphatic drainage of the face and scalp. 3. Make a list of contributing roots to cervical plexus. 4. Discuss the general arrangement. 5. Describe the location of this plexus. 6. Make a list of the outcoming nerves. 7. Follow the branches to their target organs. 8. Make a list of the cutaneous nerves. 9. Follow the cutaneous branches to their destinations.
55	The neck	<ol style="list-style-type: none"> 1. Define the boundaries of the neck. 2. Describe the fasciae of the neck. 3. Summarize the main arteries, veins, nerves and lymph nodes of the neck. 4. List the muscles of the neck. 5. Describe the neck triangles.



	(Anatomy 22)	<ol style="list-style-type: none"> Describe the key muscles creating the triangles, mainly, sternomastoid, omohyoid and digastric. Study the boundaries and content of each triangle.
56	Rabies and arboviruses (Microbiology 5)	Discuss Rabies and Arboviruses: classification, basic structural, morphological and physical properties, epidemiology, pathogenesis, clinical presentation, laboratory diagnosis, and prevention.
57	General anesthetics (Pharmacology 8)	<ol style="list-style-type: none"> Describe stages of anesthesia. Describe drugs used as pre-anesthetics and the rationale of their use. Identify the main inhalation anesthetic agents and describe their pharmacodynamic and pharmacokinetics properties. Understand the mechanism and toxicities of inhalation anesthetics. Describe the relationship between the blood: gas partition coefficient of an inhalation anesthetic and the induction and recovery of anesthesia. Describe how changes in pulmonary ventilation and blood flow can influence the induction and the recovery of inhalation anesthesia. Describe the pharmacodynamic and pharmacokinetics properties of the commonly used intravenous anesthetics. Describe the toxicity of the intravenous anesthetics.
58	Local anesthetics (Pharmacology 9)	<ol style="list-style-type: none"> Describe the classification of the local anesthetic. Indicate the pharmacological characteristics of their chemical structures. Describe the mechanism of blockade of the impulse by local anesthetics. Discuss the relation between pH, pK_a, and the speed of onset of local anesthesia. List the factors that determine the susceptibility of nerve fibers to blockade by local anesthetics. List the major toxic effects of the local anesthetics. Explain use-of dependent blockade by local anesthetics.
59	Tumors of the Nervous system (Pathology 6)	<ol style="list-style-type: none"> Classify tumors and describe the general features of primary brain tumors in comparison to other tumors in the body. Know the pathology and prognosis of the various types of brain tumors. Describe tumors of the peripheral nerves. Know the common types of metastatic tumors and their pathologic characteristics.
60	Demyelinating diseases (Pathology 7)	<ol style="list-style-type: none"> Know the various causes and types of peripheral neuropathies. Know about various axonal degeneration and injures. Know the general features of demyelinating diseases, with special emphasis on Multiple Sclerosis and Guillain-Barré syndrome. <p>Know the general features of Neuromuscular Junction Disorders (myasthenia gravis and Lambert-</p>



		Eaton syndrome).
61	Chemical senses; taste & smell (Physiology 16)	<p>Smell</p> <ol style="list-style-type: none"> 1. Explain olfactory epithelium 2. Explain olfactory bulbs 3. Explain olfactory cortex 4. Explain signal transduction in an odorant receptor 5. Discuss sniffing 6. Discuss role of pain fibers in the nose: 7. Discuss abnormalities in Odor Detection <p>Taste</p> <ol style="list-style-type: none"> 1. Explain taste buds' structure 2. Explain types of taste buds 3. Explain taste pathway 4. Discuss taste receptors and transduction
62	Enteroviruses (Microbiology 6)	<ol style="list-style-type: none"> 1. Discuss Coxsackie viruses, Echo viruses: basic structural, morphological and physical properties, epidemiology, pathogenesis, clinical presentation, laboratory diagnosis, and prevention.
63	Sympathetic nervous system (Anatomy 23)	<ol style="list-style-type: none"> 1. Review the subdivisions of the nervous system. 2. Review the general arrangement and compare the sympathetic and parasympathetic parts. 3. Describe the following plans: <ul style="list-style-type: none"> - Para vertebral ganglia. - Prevertebral ganglia. - Parasympathetic ganglia. - Splanchnic nerves. - Autonomic plexuses. 4. Map out the various plexuses in head and neck, thorax, abdomen and pelvis. 5. Make a list of the components of the system. 6. Review the basic structure of sympathetic trunk. 7. Describe the source of sympathetic system in the neck and make a list of target organs. 8. Describe the Para vertebral sympathetic ganglia in the abdomen; their locations and target organs. 9. Discuss the relation of this system to the adrenal medulla. 10. Discuss the sympathetic innervation of blood vessels.



64	Parasympathetic nervous system (Anatomy 24)	<ol style="list-style-type: none"> 1. Make a list of the components of the system. 2. Make a list of cranial nerves having parasympathetic activity. 3. Describe the parasympathetic ganglia in the head and neck, their locations and target organs. 4. Describe the sacral parasympathetic outflow. 5. Make a list of its target organs.
65	Opioids and opioid antagonists (Pharmacology 10)	<ol style="list-style-type: none"> 1. List the receptors affected by opioid analgesics and the endogenous opioid peptides. 2. List of major opioid agonists and rank them in analgesic efficacy. 4. Describe the main pharmacodynamic and pharmacokinetic properties of agonist opioid analgesics and list their clinical uses. 5. List the main adverse effects of acute and chronic use of opioid analgesics. Identify opioid receptor antagonists and mixed agonist-antagonist.
66	CNS stimulants and drugs of abuse (Pharmacology 11)	<ol style="list-style-type: none"> 1. Describe the clinical uses of the opioid receptor antagonists. 2. Describe methods of treatment of opioids dependency. 3. Describe the pharmacological types of drug dependence. 4. Describe the major pharmacological actions of drugs that are commonly abused. 5. Describe the major signs and symptoms of withdrawal of drugs that are commonly abused. 6. Identify the most likely causes of fatalities from commonly abused agents. 7. Describe methods of treatment of drugs abuse.
67	Neurodegenerative diseases (Pathology 8)	<ol style="list-style-type: none"> 1. Know the general features of degenerative diseases & dementias, with special emphasis on Alzheimer's disease, its clinical & morphological findings. 2. Know briefly about Parkinson's Disease, Huntington's disease and amyotrophic lateral sclerosis.
68	Clinical Lecture I	Will be Provided by the instructor
69	Clinical Lecture II	Will be Provided by the instructor
70	Clinical Lecture III	Will be Provided by the instructor
71	Clinical Lecture IV	Will be Provided by the instructor
Feedback session		
Revision sessions		
Week 8		
Practical & Final Exams		



#	PRACTICAL TITLE	OBJECTIVES
1	Neuroanatomy I (Anatomy 1)	- Gross morphology of brain. 1. Identify major components of brain. 2. Know major lobes, major gyri and sulci. 3. Identify major components of brain stem, important landmarks and the main arteries of the brain including the circle of Willis.
2	Neuroanatomy II (Anatomy 2)	1. Study and identify the major components of brain in coronal, transverse and sagittal sections including: Thalamus, hypothalamus, Basal ganglia, ventricular system, cerebellum, and brainstem. 2. Brain ventricular system included capsule, basal ganglia etc. 3. Use dissected brains, CT scan & MRI.
3	Neuroanatomy III (Anatomy 3)	1. Study major parts of the brainstem, origin of the cranial nerves. 2. Identify the main nuclei (including the cranial nuclei) and the main ascending and descending pathways in the brainstem. 3. Identify the gross morphology of the spinal cord. 4. Identify the main nuclei, laminae, and tracts in the spinal cord.
4	Pathology 1	- Study Images of medical CNS lesions
5	Pathology 2	- Study images of tumors of CNS, peripheral nerves and eye.
6	Neurophysiology (Physiology 1)	1. <i>Cutaneous sensations</i> - Determine tactile sensibility by determining two-point discrimination. 2. Reflexes: - Demonstrate deep tendon reflexes and explain their clinical significance. The following reflexes will be studied: knee jerk, ankle jerk, biceps, and triceps reflex. - Demonstrate and elicit the following superficial reflexes and explain their physiological significance. The following reflexes will be studied: corneal reflex, palatal reflex, abdominal reflex, and Babinski's sign. 3. Muscle tone. 4. Body temperature examination
7	Microbiology	1. Describe the method of specimen collection including the process of lumbar puncture, transportation of specimen, and storage.



		<ol style="list-style-type: none"> 2. Describe the laboratory method used for the specimen processing, including media used, incubation environment, colonial morphology and bacterial identification. 3. Prepare a sample culturing resembling CSF specimen and Identify the organisms involved. 4. Write the laboratory findings in the hospital laboratory format.
8	Orbit, Eye and Ear (Anatomy 4)	<ol style="list-style-type: none"> 1. Recognize individual structures related to orbit, eye & ear. 2. Observe the organization and relations of these structures. 3. Compare between your understanding, your atlas and the specimens you see in the lab.
9	Face, Scalp & Neck (Anatomy 5)	<ol style="list-style-type: none"> 1. Recognize individual structures related to face, scalp & neck. 2. Observe the organization and relations of these structures. 3. Compare between your understanding, your atlas and the specimens you see in the lab.
10	Physiology 2	<ol style="list-style-type: none"> 1. Students are expected to do experiments demonstrating the following tests: <ul style="list-style-type: none"> - Visual acuity test, Snellen, Charts. - Color vision test using Ishihara charts. - Confrontational perimetry and mapping of blind spot. - Use of ophthalmoscope and examination of the retina. 2. Students are expected to perform auditory tests, including Rinne's and Webber's tests. Demonstrating physiology of balance and equilibrium using Barny chair.



ASSESSMENT TOOLS		أساليب التقييم		
Write assessment tools that will be used to test students' ability to understand the course material and gain the skills and competencies stated in learning outcomes		اكتب أساليب التقييم التي سيتم استخدامها لتقييم قدرة الطلبة على استيعاب مواد المساق واكتساب المهارات والكفايات المنصوص عليها في مخرجات التعلم		
وسيلة التقييم ASSESSMENT TOOLS	النوع (تكويني أو تجميعي) Type (Informative and Summative)	رمز مخرجات المساق المستهدفة CILO	العلامة Grade	النسبة % Percentage
<input type="checkbox"/> المشاركة (Participation)				
<input type="checkbox"/> تقرير (Report)				
<input type="checkbox"/> المقالات المختصرة (Essays)				
<input type="checkbox"/> واجبات (assignments)				
<input type="checkbox"/> الاختبارات الشفوية (Oral exams)				
<input type="checkbox"/> دراسة الحالة (Case study exams)				
<input type="checkbox"/> امتحانات قصيرة (Quizzes)				
<input type="checkbox"/> التجارب العملية (Experiments)				
<input type="checkbox"/> مشاريع (Project)				
<input type="checkbox"/> زيارات ميدانية (Field Trip)				
<input type="checkbox"/> الامتحان العملي (Practical Exam)	Summative	1-4, 6	20	20
<input type="checkbox"/> امتحان منتصف الفصل (Mid Exam)	Summative	1-8	30	30
<input type="checkbox"/> الامتحان النهائي (Final Exam)	Summative	1-8	50	50
المجموع (TOTAL MARKS)			100	100

Informative	A set of formal and informal assessment procedures that teachers conduct during the learning process in order to modify teaching and learning activities to improve student achievement.	مجموعة من إجراءات التقييم الرسمية وغير الرسمية التي يجريها المعلمون أثناء عملية التعلم من أجل تعديل أنشطة التعليم والتعلم لتحسين تحصيل الطلاب.	التكويني
Summative	A set of formal assessment procedures that teachers conduct after the learning process in order to measure student achievement.	مجموعة من إجراءات التقييم الرسمية التي يجريها المعلمون بعد عملية التعلم من أجل قياس تحصيل الطلاب.	التجميعي
Assessment Tools	Technique or method of evaluating information to determine how much a Student knows and whether this knowledge aligns with the intended learning outcomes of a theory or framework.	تقنية أو طريقة لتقييم المعلومات لتحديد مدى معرفة الطالب وما إذا كانت هذه المعرفة تتوافق مع نتائج التعلم لنظرية أو إطار عمل.	وسيلة التقييم



THIRD: COURSE POLICIES AND INSTRUCTIONS

ثالثاً: التعليمات والإرشادات

Attendance

الحضور والمواظبة rules

Attendance and participation are critical, and the regular university norms will apply. A student is not permitted to be absent for more than 15% of the total number of credit hours given to any course. Each class's attendance will be tracked. A 10% absence will result in a first written notice. If a student misses 15% of the class, the course is dropped, and the student is not entitled to sit for the final exam. If a student has any special circumstances (medical or personal), he or she is advised to discuss this with the instructor, and documented evidence will be requested to be recorded as absence with special circumstances.

يعتبر حضور الطلبة للمحاضرات ومشاركتهم بها في غاية الأهمية، وسيتم تطبيق القواعد المعمول بها في الجامعة بهذا الخصوص. يتم تسجيل حضور الطلبة في كل محاضرة. وصول نسبة غياب الطالب إلى 10% ستنتسبب في تلقيه إنذاراً أولياً خطياً. في حال وصول نسبة الغيابات إلى 15%، يتم حرمان الطالب من المساق ولن يسمح للطالب بالتقدم للامتحان النهائي في المساق. في حال تعرض الطالب إلى أي ظروف قاهرة (مرض أو ظروف شخصية)، يجدر بالطالب التواصل مع المدرس ومناقشة هذا الظرف وإظهار دليل خطي يبرر الظرف ليتم تسجيل الغياب كغياب بعذر.

GRADING SYSTEM

نظام التقديرات

التقدير Grade	النقاط Points	المدى Range
A	أ	
A-	أ-	
B+	ب+	
B	ب	
B-	ب-	
C+	ج+	
C	ج	
C-	ج-	
D+	د+	
D	د	
D-	د-	
F	ف	



Policies and instructions

السياسات والإرشادات

<ul style="list-style-type: none"> • Students must read and follow the internal bylaws of BAU in relation to student conduct bylaws. • Students with special needs are highly recommended to register their cases with a valid doctor's report in the student affairs department. • Students with special needs shall be subject to special care in coordination with the head of department as per internationally recognized and benchmarked considerations and services. • The student must seek permission before making any interventions on the subject of the lecture. • The student must listen to and respect the opinions of others. • The student should not obstruct the course of the lecture. • Students should not hesitate to ask questions to the instructor. • Students should not use their mobile phones during the lecture. • Students are strongly encouraged to contact their instructor if they have course-related questions during office hours. • Students are recommended to contact their instructor using the LMS. • Cheating and Plagiarism are prohibited. 	<ul style="list-style-type: none"> • يجب على الطالب أن يقوم بقراءة واتباع اللوائح الداخلية الخاصة بجامعة البلقاء التطبيقية المتعلقة بلوائح سلوك الطلبة. • ينصح الطلبة من ذوي الاحتياجات الخاصة أن يقوموا بتسجيل حالاتهم لدى شؤون الطلبة من خلال تقرير طبي حسب الأصول وساري المفعول. • يخضع الطلبة من ذوي الاحتياجات الخاصة إلى رعاية خاصة وذلك بالتنسيق مع رئيس القسم وفقاً للمعايير الخاصة بذلك والمعترف بها دولياً. • على الطالب الاستئذان قبل القيام بأي مداخلات على موضوع المحاضرة. • على الطالب الاستماع واحترام الرأي الآخر. • على الطالب عدم إعاقة سير المحاضرة. • على الطلاب عدم التردد في طرح الأسئلة على مدرس المادة والتواصل مع المدرس خلال الساعات المكتبية او من خلال نظام التعليم الإلكتروني. • على الطلاب عدم استخدام الهاتف النقال أثناء المحاضرة. • على الطلاب عدم التردد في التواصل مع المدرس خلال الساعات المكتبية او من خلال نظام التعليم الإلكتروني. • غير مسموح الغش والانتحال على الاطلاق.
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COURSE COORDINATOR

منسق المساق

منسق المساق Course Coordinator:	Dr. Ezidin Kaddumi	رئيس القسم Department Head:	Dr. Mohammad Shaban
رقم قرار القسم Department Decision		تاريخ القرار: Date of Decision:	
التوقيع Signature:		التوقيع Signature:	
التاريخ Date:		التاريخ Date::	