

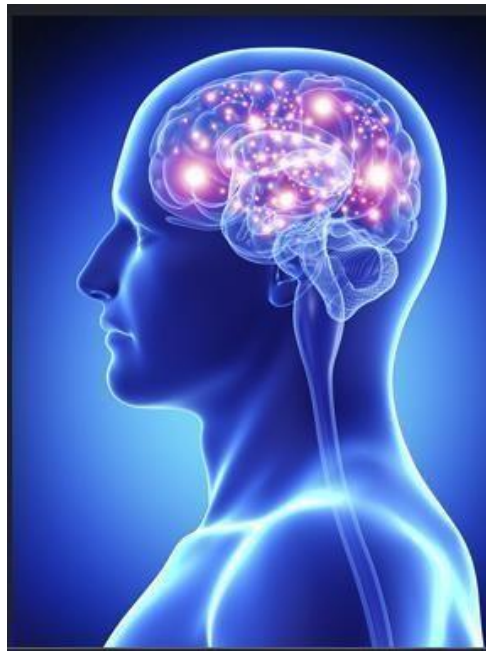


Faculty of Medicine



Sohag University

NEUROSCIENCE SYSTEM



Phase III- M.B.B. Ch
Block NEU213
2022 – 2023

Prepared by

**Physiology, Biochemistry
Anatomy, Histology
Microbiology, Parasitology
Pathology & Pharmacology
Departments**

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Basic Information about the Block

Block Specification

A. Basic Information:

Program on which the course is given: Bachelor of medicine and surgery (M.B., B.Ch.).

Elements (Major or Minor) of the program: Undergraduate.

Departments offering the course: all academic departments.

Academic year/level: 3rd year, 1st semester.

Date of specification approval: 2022 / 2023.

Title: Neuroscience.

Code: NEU213.

Credit points: 12.5.

Lecture: 84 hours.

Practical: 56 hours.

Student learning activities: 35 hours (Cases) and 7 hours (formative assessment).

Total: 175 hours.

Block Credit Points

Block	Points	Weeks	Learning activities		
			Contact hours/points	Formative assessment/ Feedback	Assignments
Neuroscience	12.5	8 weeks	175 hours/ 6.5 points	0.5 point	5.5 points

NARS Competencies Covered by the Block

- 1.6 Select the appropriate investigations and interpret their results taking into consideration cost/ effectiveness factors.
- 1.8 Apply knowledge of the clinical and biomedical sciences relevant to the clinical problem at hand.
- 1.9 Retrieve, analyse, and evaluate relevant and current data from literature, using information technologies and library resources, in order to help solve a clinical problem based on evidence (EBM).
- 1.10 Integrate the results of history, physical and laboratory test findings into a meaningful diagnostic formulation.
- 1.11 Perform diagnostic and intervention procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances.
- 1.16 Apply the appropriate pharmacological and non-pharmacological approaches to alleviate pain and provide palliative care for seriously ill people, aiming to relieve their suffering and improve their quality of life.
- 2.4 Identify the major health risks in his/her community, including demographic, occupational and environmental risks; endemic diseases, and prevalent chronic diseases.
- 2.5 Describe the principles of disease prevention, and empower communities, specific groups or individuals by raising their awareness and building their capacity.
- 2.6 Recognize the epidemiology of common diseases within his/her community, and apply the systematic approaches useful in reducing the incidence and prevalence of those diseases.
- 3.1 Exhibit appropriate professional behaviors and relationships in all aspects of practice, demonstrating honesty, integrity, commitment, compassion, and respect.
- 3.8 Refer patients to appropriate health facility at the appropriate stage.
- 3.9 Identify and report any unprofessional and unethical behaviors or physical or mental conditions related to himself, colleagues or any other person that might jeopardize patients' safety.
- 4.1 Describe the normal structure of the body and its major organ systems and explain their functions.
- 4.2 Explain the molecular, biochemical, and cellular mechanisms that are important in maintaining the body's homeostasis.
- 4.3 Recognize and describe main developmental changes in humans and the effect of growth, development and aging on the individuals and family.

- 4.4** Explain normal human behavior and apply theoretical frameworks of psychology to interpret the varied responses of individuals, groups and societies to disease.
- 4.5** Identify various causes (genetic, developmental, metabolic, toxic, microbiologic, autoimmune, neoplastic, degenerative, and traumatic) of illness/disease and explain the ways in which they operate on the body (pathogenesis).
- 4.6** Describe altered structure and function of the body and its major organ systems that are observed in various diseases and conditions
- 4.7** Describe drug actions–therapeutics and pharmacokinetics; side effects and interactions, including; multiple treatments, long term conditions and nonprescribed medication; and effects on the population.
- 4.8** Demonstrate basic sciences specific practical skills and procedures relevant to future practice, recognizing their scientific basis, and interpret common diagnostic modalities including: imaging, electrocardiograms, laboratory assays, pathologic studies and functional assessment tests.
- 5.2** Respect colleagues and other health care professionals and work cooperatively with them, negotiating overlapping and shared responsibilities and engaging in shared decision making for effective patient management.
- 5.3** Implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports collaborative work.
- 5.4** Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system.
- 5.6** Evaluate his/her work and that of others using constructive feedback.
- 5.7** Recognize own personal and professional limits and seek help from colleagues and supervisors when necessary.

Neuroscience Block Map							
Block	Department Involved	Code	Points	days/week	learning activities		
					contact hours/ points	formative assessment /feed back	assignments and other home and self-learning (portfolio based evidence)
Neuroscience	All departments of basic sciences **	NEU213	12.5	8 weeks	6.5 points	0.5 point	5.5 Points

عدد ساعات كل ورقة * عدد ساعات التحريري	إجمالي الدرجات	أيام الأسبوع	النقاط	الكود	الوحدات المشاركون	Block الوحدة التعليمية
Mid exam 2 hours Final exam 3 hours	187.5	8 weeks	12.5	NEU213	All departments of basic sciences **	Neuroscience

Structure of the Block

Items	Lectures	Practical	Cases	Formative assessment	Total
Contact Hours	84	56	35	7	182
Credit points	3.12	2.08	1.30	0.5	7

Participation of Different Departments in Neuroscience Module

Department	Lectures	Practical	Cases	Total
Medical Physiology	28	10	9	47
Anatomy	22	24	9	55
Pharmacology	8	6	4	18
Histology	7	6	1	14
Pathology	6	4	6	16
Microbiology	5	4	2	11
Parasitology	5	2	2	9
Biochemistry	3	-	2	5
TOTAL	84	56	35	175

Professional Information

Block Aims

I. Overall Aims

This system based course integrates the basic sciences into a study of neuroscience and behavior in both health and disease states. The overall goal of the Neuroscience course is to provide basic knowledge and understanding of the structure, function of the nervous system, biochemical basis of human behavior, as well as the pathological basis of neurological and mental disorders. Fundamental principles of anatomy, physiology, pharmacology, biochemistry, pathology, microbiology, parasitology and human behavior will be applied to pathological situations to distinguish the clinical basis for central nervous system disorders. This goal will be achieved via selected lectures, relevant laboratory sessions, cases, and self-directed learning methods. The goal of this module is to provide all future physicians, regardless of specialization, the skills to recognize neurological and psychiatric problems, and understand treatment strategies; and to facilitate the professional development of students to become doctor responsive to such needs.

II. Intended Learning Outcomes of the Block:

A. Knowledge and Understanding

Upon completion of the course, students should be able to:

1. List muscles, blood supply and lymph nodes groups of the head and neck.
2. Clarify the structure of the scalp.
3. Recognize the cranial nerves and cervical plexus and the main signs of their injury.
4. Describe the boundaries and contents of the orbit.
5. Clarify the formation, course and distribution of cerebral blood vessels.
6. Know the formation, differentiation and development of the head and neck structures.
7. Describe the anatomy of meninges.
8. Discuss the ventricular system and cerebrospinal fluid (CSF) formation, composition and functions.
9. Describe the structure and functions of the ear and sound transmission and characteristics.
10. Describe the metabolism of the brain and nervous tissue.
11. Describe neurotransmitters and neuropeptides, characters, synthesis, function and destruction.
12. Describe the anatomy of the brain stem, spinal cord, cranial nerves and main ascending and descending tracts.
13. Draw the development of the spinal nerves.
14. Explain how information is processed in the nervous system through sensory receptors and transduction.
15. List the different types of receptors and their functions.
16. Mention different types of somatic sensations.
17. Summarize the mechanism of pain and its control.
18. Describe the pharmacodynamics and pharmacokinetic properties of opioid analgesics and list their clinical uses.
19. List and describe the pharmacology of general anaesthetic agents.

20. Summarize different parts of the cerebrum and location, characteristics, and functions of sensory and motor areas of the brain.
21. List different thalamic nuclei and their functions.
22. Describe components of reflex arc, functions of the afferents, interneurons and efferent neurons.
23. Describe the structure, types, and characteristics of the synapses.
24. Summarize stretch reflex: definition, receptors, types, properties, functions and supraspinal control.
25. List cerebellum structure, connections and functions.
26. Describe basal ganglia structure, connections and functions.
27. List structure, connections and functions of the vestibular apparatus. Explain the importance of the ear in the equilibrium process.
28. Summarize nuclei, connections and functions of hypothalamus.
29. Mention higher intellectual functions of the brain as sleep, speech, memory and learning and their mechanisms of action.
30. Define and describe the origin and development of different parts of the central nervous system.
31. List the different parts of the reticular formation and the limbic system and their functions.
32. List the major Hypnotics/ Anxiolytics. Explain their pharmacodynamics, pharmacokinetic, therapeutic uses and side effects.
33. Summarize the most common causative organisms causing infectious diseases of the nervous system, organs of special sense and related pathological changes.
34. Mention the structure and functions of different parts of the eye.
35. List different refractory media of the eye and principles of optics.
36. Describe the mechanism of genesis of action potential on photoreceptors, components of the visual pathway, location and functions of visual cortex.
37. Explain the mechanisms of scotopic, photopic and colour vision.
38. Mention visual field, visual acuity and binocular vision.
39. Recognize the components of chemical sense and their functions.
40. Discuss the different nervous system neoplasms, their cell origin and classification.
41. Classify degenerative and demyelinating diseases of the CNS.
42. List the main bacterial, fungal, viral and parasitological pathogens that may affect the CNS and special sense.

B. Intellectual Skills

1. Explore mechanism(s) of receptor adaptation and headache.
2. Differentiate primary and secondary hyperalgesia and fast and slow pain-
3. Interpret some clinical findings in relation to developmental basis.
4. Explain the manifestations of cranial nerves injury on the basis of anatomical facts.
5. Differentiate between the functions of pyramidal and extrapyramidal tracts.
6. Explore different symptoms and signs of thalamic syndrome.
7. Explore the effect of lesion of different somatosensory and motor areas.
8. Describe factors that contribute to the high somatic sensory acuity of the hands and face.
9. Differentiate between electrical and chemical synapses.
10. Differentiate between synaptic potential and action potential.
11. Differentiate between reflex and motor tetanus.
12. Explore how synaptic plasticity is important for learning and memory.
13. Compare muscle tone and tendon jerk and stretch and inversed stretch reflexes.
14. Explain how spinocerebellum and neocerebellum control voluntary movements and how neocerebellum is important in planning and programming voluntary movement.
15. Understand the mechanism of detection of angular and linear acceleration of the head by the semicircular canals, utricle and sacculae.
16. Understand the functions and the balance between different neurotransmitters in basal ganglia.
17. Differentiate between main clinical syndromes produced by damage in basal ganglia.
18. Explore hypothalamic connections with different endocrine glands, reproduction and metabolism.
19. Distinguish between different central nervous system malformations.
20. Know different types of sleep disorders.
21. Differentiate between various types of aphasia.
22. Explore disorders of cranial nerves injury.
23. Correlate the knowledge gained from the multisystem discussed regarding normal and abnormal functions of the nervous system and special senses.
24. Explain the effect of injury and its clinical manifestations at various levels of the sensory and motor pathways on anatomical basis.
25. Compare normal and abnormal structure of nervous tissues.
26. Interpret the different results of clinical, laboratory and radiological examinations.
27. Explain the pathology of the CNS and understand the pharmacology of the drugs used in the treatment of these underlying diseases.
28. Understand the pathogenesis and explore the mode of transmission of the main bacterial, fungal, viral and parasitological infections of the CNS.

C. Practical/ Professional Skills

1. Regularly **attend** the classes as possible.
2. **Organize** and **distribute** tasks.
3. Work in a team to conduct a specific project.
4. Work independently to conduct a specific project.
5. **Recognize** anatomical features of the skull, mandible and cervical vertebrae.
6. **Display** muscles, main blood vessels and nerves of the head and neck specimens.
7. **Identify** the gross morphology of the cerebrum, cerebellum, brain stem in fresh specimens
8. **Identify** the arrangement of various parts of the brain in palatinate sections.
9. **Perform** an examination of different types of sensation.
10. **Acquire** skills to examine cranial nerves, sensory, motor, vestibular system and cerebellum.
11. **Acquire** skills to examine visual fields, visual acuity and color vision.
12. **Acquire** skills to do hearing tests by tuning fork and audiometer.
13. **Acquire** skills to examine normal and abnormal brain tissues.
14. **Acquire** skills to interpret CSF findings.
15. **Identify** tests for diagnosis of some bacterial, fungal, viral and parasitological infections of the CNS and special senses.

D. General and Transferable Skills

The skills of a general nature, which can be applied in any subject area, including: written and oral communication, the use of new technological tools, group working, problem solving, management ... etc.

1. Use of information by all means, including electronics.
2. Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.
3. Organize time and resources effectively and set priorities-
4. Discuss their own work and that's of others, using constructive feedback.
5. Communicate effectively, both orally and in writing, with colleagues, patients and family (if possible) and others with whom physicians must exchange information in carrying out their responsibilities.
6. Retrieve (from electronic databases and other resources), manage, and utilize biomedical information for solving problems and making decisions that are relevant to the care of individuals and populations.
7. Analyze and evaluate the source and validity of new basic science information that apply to human biology and the practice of medicine.
8. Translate current clinical and basic information into lay language for patients.
9. Assess online medical information and assist patients and their families with these tools.
10. Gather information not only about the disease but also about the patient's reliefs, concerns and expectations about the illness, while considering the influence of various factors such as the patient's age, gender, ethnic, cultural and socioeconomic background, and spiritual values on that illness.

Learning Methods

1. Lectures for knowledge and intellectual skill outcomes.
2. Practical sessions to gain practical skills aided with the practical book.
3. Cases related to the topics studied in lectures; including libraries, E learning (practical photographs and questions of different topics available online for student's assessments) and consulting professors for gathering information.

Methods for Student Assessment

1. Formative:

This is used to monitor student's learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. It's given once weekly and the answers are presented and discussed immediately with you after the assessment.

2. Summative

It is used to evaluate student's achievements at the end of an instructional unit. The grades tell whether the student achieved the learning goal or not.

The student's performance will be assessed according to the following:

Assessment task	Type of assessment	Proportion of total assessment	
		%	Marks
End block exam	50% MCQ (best answer)	20%	37marks
Portfolio		10%	18.5 marks
Final exam	50% MCQ (best answer)	40%	75 marks
Paractical	Static and dynamic stations	30%	57 marks
Total		100%	187.5 marks

Formative Assessment

No.	Quiz	Weeks	Hours
1.	Anatomy+ Histology (topics of the 1 st week).	1 st	1 hr.
2.	Anatomy+ Physiology + Biochemistry + Histology + Pharmacology + Pathology (topics of the 2 nd week).	2 nd	1hr
3.	Anatomy+ Physiology + Pharmacology (topics of the 3 rd week).	3 rd	1hr
4.	Histology + Physiology + Pathology + Microbiology+ Parasitology (topics of the 4 th week).	4 th	1hr
5.	Pharmacology + Physiology + Microbiology+ Parasitology + Anatomy (topics of the 5 th week).	5 th	1hr
6.	Pharmacology + Physiology + Pathology + Biochemistry + Anatomy + Histology + (topics of the 6 th week).	6 th	1hr
7.	Physiology + Microbiology+ Parasitology + Anatomy + Histology (topics of the 7 th week).	7 th	1hr
	Total		7 hrs.

Block Evaluation

1. Students' results.
2. Students' feedback.
3. Tutors' feedback.

Block Contents

Lecture Topics (12 hours/ week)

Lecture number	Week	Lecture title	Departments
1	1 st week	Scalp, face and Muscles of the head.	Anatomy
2	1 st week	Muscles of the neck.	Anatomy
3	1 st week	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy
4	1 st week	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy
5	1 st week	Blood supply and lymphatic of the head and neck.	Anatomy
6	1 st week	Contents of orbit.	Anatomy
7	1 st week	Blood supply of the brain.	Anatomy
8	1 st week	Development of the head and neck.	Anatomy
9	1 st week	Meninges and ventricular system.	Anatomy
10	1 st week	Meninges and ventricular system.	Anatomy
11	1 st week	Histological structure of the neurons, synapses and neuroglial cells.	Histology
12	1 st week	Histological structure of the meninges (pia and arachnoid and dura matters), choroids plexus and different types of brain barriers.	Histology
1	2 nd week	Structure of the ear.	Anatomy
2	2 nd week	Cerebral circulation and Physiology of cerebrospinal fluid.	Physiology
3	2 nd week	Basic functions of the synapses and neurotransmitters.	Physiology
4	2 nd week	Basic functions of the synapses and neurotransmitters	Physiology
5	2 nd week	Basic functions of the synapses and neurotransmitters.	Physiology
6	2 nd week	Neurotransmitters.	Biochemistry
7	2 nd week	Neurotransmitters.	Biochemistry
8	2 nd week	Somatosensory function.	Physiology
9	2 nd week	Histological structure of the spinal cord (nuclei and lamination). Differentiate between different levels	Histology

		of the spinal cord.	
10	2 nd week	Antidepressants.	Pharmacology
11	2 nd week	Basic Pathology of CNS.	Pathology
12	2 nd week	Cerebrovascular Diseases.	Pathology
1	3 rd week	Spinal cord.	Anatomy
2	3 rd week	Spinal cord.	Anatomy
3	3 rd week	Peripheral nervous system.	Anatomy
4	3 rd week	Brain stem.	Anatomy
5	3 rd week	Physiology of pain (I).	Physiology
6	3 rd week	Physiology of pain (II).	Physiology
7	3 rd week	Local anesthetics.	Pharmacology
8	3 rd week	General anesthetics.	Pharmacology
9	3 rd week	Opioids.	Pharmacology
10	3 rd week	Stretch reflex (I)	Physiology
11	3 rd week	Stretch reflex (II)	Physiology
12	3 rd week	Cerebrum (I).	Anatomy
1	4 th week	Cerebrum (II).	Anatomy
2	4 th week	Myelination in PNS and CNS and Types of nerve fibers and nerve endings.	Histology
3	4 th week	Histological structure of the cerebral and cerebellar cortex.	Histology
4	4 th week	Sensory and motor areas of the cerebral cortex (I).	Physiology
5	4 th week	Sensory and motor areas of the cerebral cortex (II).	Physiology
6	4 th week	Intellectual Functions of the Brain, Physiology of speech.	Physiology
7	4 th week	Infection of CNS. Meningitis. Encephalitis.	Pathology
8	4 th week	Protozoa causing CNS diseases (I).	Parasitology
9	4 th week	Protozoa causing CNS diseases (II).	Parasitology
10	4 th week	<u>Meningitis (I)</u>	Microbiology

11	4 th week	<u>Encephalitis (II)</u>	Microbiology
12	4 th week	<u>Brain abscess, Poliomyelitis, Rabies.</u>	Microbiology
1	5 th week	Helminths causing CNS diseases (I).	Parasitology
2	5 th week	Helminths causing CNS diseases (II)	Parasitology
3	5 th week	<u>Tetanus, Botulism, Prion disease.</u>	Microbiology
4	5 th week	Cerebellum.	Anatomy
5	5 th week	Cerebellum (functions).	Physiology
6	5 th week	Functions of vestibular apparatus.	Physiology
7	5 th week	Development of the nervous system.	Anatomy
8	5 th week	Physiology of basal ganglia.	Physiology
9	5 th week	Antiparkinsonian.	Pharmacology
10	5 th week	Limbic system.	Physiology
11	5 th week	Learning and Memory.	Physiology
12	5 th week	Hypothalamus.	Physiology
1	6 th week	Reticular activating system and Wakefulness.	Physiology
2	6 th week	Anticonvulsants.	Pharmacology
3	6 th week	Physiology of sleep.	Physiology
4	6 th week	Hypnotics / Anxiolytic.	Pharmacology
5	6 th week	Degenerative and demyelinated diseases.	Pathology
6	6 th week	Brain tumors (I).	Pathology
7	6 th week	Brain tumors (II).	Pathology
8	6 th week	Metabolism of brain.	Biochemistry
9	6 th week	Antipsychotics.	Pharmacology
10	6 th week	Visual pathway.	Anatomy
11	6 th week	Histological structure of the eye and its accessory structures.	Histology
12	6 th week	Functions of different parts of the eye.	Physiology
1	7 th week	The optical system of the eye.	Physiology

2	7 th week	The visual process.	Physiology
3	7 th week	Light- dark adaptation cycle and color vision.	Physiology
4	7 th week	Parasitic infections of the eye.	Parasitology
5	7 th week	<u>Infections of the eye and the ear.</u>	Microbiology
6	7 th week	Auditory and vestibular pathways.	Anatomy
7	7 th week	Gustatory and olfactory pathways.	Anatomy
8	7 th week	Histological structure of sensory organs of hearing, balance, taste and smell.	Histology
9	7 th week	Hearing mechanisms (I).	Physiology
10	7 th week	Hearing mechanisms (II).	Physiology
11	7 th week	Chemosensory functions (I).	Physiology
12	7 th week	Chemosensory functions (II).	Physiology
Total	84		

B. Practical Sessions (8 hours / week, 4 sections)

Experiment number	Week	Laboratory name	Departments
1	1 st week	Skull.	Anatomy
2	1 st week	Skull and cervical vertebrae.	Anatomy
3	1 st week	Muscles of the head.	Anatomy
4	1 st week	Neck. Blood supply of the head and neck.	Anatomy
1	2 nd week	Orbit and ear.	Anatomy
2	2 nd week	Meninges and brain ventricles.	Anatomy
3	2 nd week	Blood supply of the brain	Anatomy
4	2 nd week	Slide demonstration and examination of: Nerve trunk (Hx&E Osmic acid), Spinal ganglion (Hx&E). Cervical spinal cord.	Histology
1	3 rd week	Brain stem, attachments of cranial nerves and spinal cord.	Anatomy
2	3 rd week	Somatosensory function.	Physiology
3	3 rd week	Local and general Anesthetics.	Pharmacology
4	3 rd week	Drug dependence	Pharmacology
1	4 th week	Cerebral hemisphere	Anatomy
2	4 th week	Spinal reflexes	Physiology
3	4 th week	Transverse sections of the brain	Anatomy
4	4 th week	Coronal sections of the brain	Anatomy
1	5 th week	Slide demonstration and examination of: Cerebral cortex. Brain stems (midbrain, pons, and medulla oblongata). Cerebellum.	Histology
2	5 th week	Cerebellum.	Anatomy
3	5 th week	Cerebellum and vestibular apparatus examinations.	Physiology
4	5 th week	Lumbar puncture & Lab diagnosis of microbial infections of the CNS.	Microbiology
1	6 th week	Lab diagnosis of microbial infections of the CNS.	Microbiology

2	6 th week	Slide demonstration of: - Schwannoma. - Meningioma.	Pathology
3	6 th week	Gross demonstration of specimens of intracranial hemorrhage and examples of brain tumors.	Pathology
4	6 th week	Antiepileptics, antidepressant, antipsychotics and antiparkinsonian drugs (samples, prescriptions).	Pharmacology
1	7 th week	Slide demonstration and examination of: Eye: Cornea, iris, retina, eye lid & lacrimal gland. Organ of Corti. Taste buds.	Histology
2	7 th week	Visual system examination.	Physiology
3	7 th week	Hearing tests.	Physiology
4	7 th week	Parasitic infections of the brain and eye.	Parasitology

C. Case- based Group Discussion (5 hours/ week)

Cases	Week	Section name	Departments
1	1 st week	Fracture of the skull base. Cephalohematoma. Epidural hematoma.	Anatomy (60 min)
2	1 st week	Trigeminal nerve injury (trigeminal neuralgia).	Anatomy (60 min)
3	1 st week	Injury of facial nerve	Anatomy (60 min)
4	1 st week	Hypoglossal nerve and oculomotor nerve Injuries	Anatomy (60 min)
5	1 st week	Branchial arches development (Cleft lip)-Torticollis.	Anatomy (60 min)
1	2 nd week	Schizophrenia (glutamate hypothesis of schizophrenia)	Biochemistry (60 min)
2	2 nd week	Depression.	Biochemistry (60 min)
3	2 nd week	Depression.	Pharmacology (60 min)
4	2 nd week	Stroke & Hydrocephalus.	Pathology(60 min)
5	2 nd week	Cerebral arteries-stroke	Anatomy (60 min)
1	3 rd week	Headache.	Physiology (30 min)
		Migraine.	Pharmacology (30 min)
2	3 rd week	Thalamic syndrome.	Physiology (30 min)

		Upper and lower motor neuron lesions.	Physiology (30 min)
3	3 rd week	Chronic pain.	Physiology (60 min)
4	3 rd week	Drug dependence.	Pharmacology (60 min)
5	3 rd week	Lesions of different motor and sensory of areas of the cerebral cortex.	Physiology (60 min)
1	4 th week	Meningitis.	Pathology (30 min)
		Cerebral abscess.	Pathology (30 min)
2	4 th week	Transection of the spinal cord (complete, hemi-, quadrant transections).	Physiology (60 min)
3	4 th week	Syringomyelia	Anatomy (60 min)
4	4 th week	Parasitic infections cause space occupying lesions of the brain/ Parasitic infections of the eye.	Parasitology (60 min)
5	4 th week	Parasitic infections cause brain diseases (Encephalitis, Meningoencephalitis, Cerebrovascular diseases).	Parasitology (60 min)
1	5 th week	Neural tube defect. - Cerebellum Development	Anatomy (60 min)
2	5 th week	Aphasia and dysarthria	Physiology (30 min)
		Demyelinated diseases.	Physiology (30 min)
3	5 th week	Ataxia.	Physiology (30 min)
		Vertigo.	Physiology (30 min)
4	5 th week	Parkinsonism, athetosis, hemiballismus, chorea.	Physiology (60 min)
5	5 th week	Tetanus, botulism, Rabies, Poliomyelitis and prion diseases.	Microbiology (60 min)
1	6 th week	Alzheimer disease & Parkinson diseases.	Pathology (60 min)
2	6 th week	Multiple Sclerosis.	Pathology (60 min)
3	6 th week	Epilepsy	Pharmacology (30 min)
		Alzheimer disease.	Pharmacology (30 min)
4	6 th week	CNS tumors.	Pathology (60 min)
5	6 th week	CNS tumors.	Pathology (60 min)
1	7 th week	Corneal abrasion, clinical cases about abnormalities in neurons, glial cells and synapses.	Histology (60 min)

2	7 th week	Visual field defects.	Anatomy (60 min)
3	7 th week	Meningoencephalitis	Microbiology (30 min)
		Otitis media and conjunctivitis	Microbiology (30 min)
4	7 th week	Errors of refraction, and Night blindness.	Physiology (30 min)
		Color blindness and glaucoma	Physiology (30 min)
5	7 th week	Deafness.	Physiology (60 min)

Study Resources

1. Lecture Notes

2. Books:

☒ Physiology department:

1. Textbook of Medical Physiology, Hall, John E. (2011). Guyton and Hall Textbook of Medical Physiology with Student Consult Online Access (12th ed.). Philadelphia: Elsevier Saunders. ISBN 978-1-4160-4574-8. see Table of Contents link Archived 2011-07-01 at the Wayback Machine
2. Human Physiology from Cells to Systems. By Lauralee Sherwood
3. Ganong's Review of Medical Physiology, Twenty Sixth Edition 26th Edition Neuroscience Physiology. by Kim Barrett (Author), Susan Barman (Author), Jason Yuan (Author), Heddwen Brooks
4. Neuroscience Physiology
5. Case files Physiology.

☒ Anatomy department:

1. Oxford handbook of medical sciences.
Wilkins, R., Cross, S., Megson, I., and Meredith, D. (2011). *Oxford handbook of medical sciences*. Oxford: Oxford University Press.
2. Integrated anatomy and embryology (scalp).
Bogart, B. I., & Ort, V. H. (2007). *Elsevier's integrated anatomy and embryology*. Philadelphia: Mosby/Elsevier.
3. First aid for the basic sciences (organ systems).
Le, T., Hwang, W. L., Muralidhar, V., White, J. A., & Moore, M. S. (2017). *First aid for the basic sciences*. organ systems. 3rd Ed. New York: McGrawHill Education,
4. First Aid USMLE.
Le, T., Bhushan, V., Sochat, M., Kallianos, K., Chavda, Y., Kalani, M., Abrams, J. and Vaidyanathan, V. (2019). *First aid for the USMLE step 1 2019*. New York: McGrawHill Education.
5. Kaplan Medical USMLE Step 1 Lecture Notes 2008.
6. Case Files Anatomy Toy, E. C. (2008). *Case files Anatomy*. New York: McGrawHill Medical.
7. Lecture note & department book.
8. First Aid Q&A USMLE step 1.
- 9-Le, T., Bechis, S. K., & Adler, K. A. (2009). *First aid Q&A for the USMLE Step 1*. New York [etc.: McGraw Hill Medical.

☒ Pharmacology department:

1. FIRST AID for the Basic Science, Organ Systems Third Edition.
2. Basic and clinical pharmacology; B.G.Katzung 10th edition, McGraw Hill.
3. Lippincott Illustrated Reviews: Pharmacology, Sixth Edition.
4. Department book.

☒ Histology department:

1. Integrated systems.
2. The nervous system.

☒ Pathology department:

1. Elsevier's integrated pathology.
2. Escourolle & Poirier Manual of Basic Neuropathology.
3. Tao Le et al. (2017).
4. Robbins Basic Pathology 10th edition (2018).
5. Case File pathology, 2nd edition.
6. First AID Cases for the USMLE Step 1 3rd edition.

7. Robbins & Cotran Review of Pathology 4th edition.

☒ Microbiology department:

1. YALE-G First Aid: CRUSH USMLE, Step2CK and Step 3.
2. Elsevier's Integrated Review Immunology and Microbiology.
3. Pretest Microbiology
4. Lecture note and department book.

4. First Aid Q&A.

☒ Parasitology department:

1. department book
2. First aid for USMLE step 1. student to student guide 2019.
3. Oxford handbook of Medical Sciences 2011.
4. Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

☒ Biochemistry department:

1. First aid for USMLE step 1 (2019).
2. Lippincott illustrated reviews integrated systems.
3. The nervous system, basic science and clinical conditions, second edition.
4. Textbook of medical biochemistry 8th edition.

Details Block Timetable/ week

A. Lecture topics and their intended learning outcomes

Lecture (1): Scalp, face and Muscles of the head (Anatomy)

By the end of the lecture the student will be able to:

A.4 Recognize the layers of the scalp.

A.4 List the muscles of the facial expressions and their nerve supply.

A.4 List the muscles of mastication, tongue, soft palate, pharynx and larynx and define their nerve supply.

A.4 Describe the articulation of temporomandibular joint (type, bones, ligaments and movements).

B.4 Elucidate the clinical presentation of scalp injuries (lacerations and hemorrhage based on the anatomical facts).

B.4 Explain the manifestation of facial nerve injury on the basis of anatomical facts.

NARS: 4.1, 4.5

Reference books:

Oxford handbook of medical sciences, pp. 696.

Integrated anatomy and embryology (scalp), pp209.

Department book pp4

Lectures (2): Muscles of the neck (Anatomy)

By the end of the lecture the student will be able to:

A.3 List the muscles of the neck and describe the sternocleidomastoid muscle as an important landmark.

A.3 Describe the boundaries and enumerates contents of the anterior and posterior triangles of the neck.

A.3 Identify structures in the midline of the neck.

B.3 Correlate anatomical facts with the manifestations of some congenital anomalies of the head and neck (torticollis, branchial fistula), complete injury of brachial plexus and spinal accessory nerve injury in the neck.

NARS: (4.1, 4.5)

Reference book:

Oxford handbook of medical sciences, pp. 696. Department book pp20

Lecture (3): Nerves of head and neck (cranial nerves & cervical plexus) (Anatomy)

By the end of the lecture the student will be able to:

A.5 List the cranial nerves and identify briefly; component fibers, peripheral distribution, function of each nerve. The main signs of injury.

B.5 Explain the signs of cranial nerves injury based on anatomical facts.

NARS: (4.1, 4.5)

Reference book:

Oxford handbook of medical sciences, pp. 702-705. Department book p25

Lecture (4): Nerves of head and neck (cranial nerves & cervical plexus) (Anatomy)

By the end of the lecture the student will be able to:

A.5 List the cranial nerves and identify briefly; component fibers, peripheral distribution, function of each nerve. The main signs of injury.

A.5 Describe the formation and branches of the cervical plexus.

B.5 Explain the signs of cranial nerves injury based on anatomical facts.

B.5 Distinguish the difference in clinical manifestations between upper and lower lesion of the facial nerve.

NARS: (4.1, 4.5)

Reference book:

Oxford handbook of medical sciences, pp. 702-705. Department book30

Lectures (5): Blood supply and lymphatic of the head and neck (Anatomy)

By the end of the lecture the student will be able to:

A.8 List and describe briefly the course of the main arteries, veins, and major lymph nodes in the head and neck.

A.8 Describe the Dural venous sinuses and know the anatomy of the cavernous sinus.

B.8 Correlate and Interpret the knowledge of the distribution of the veins in understanding the signs of cavernous sinus thrombosis.

B.8 Demonstrate the dangerous area of the face.

NARS: (4.1, 4.5)

Reference books:

Oxford handbook of medical sciences, pp. 694-695.

First aid for the basic sciences (organ systems): chapter 6 (dural venous sinuses), pp. 424-425. Department book 49

Lectures (6): Contents of orbit (Anatomy)

By the end of the lecture the student will be able to:

A.6 List the contents of the orbit.

A.6 List the muscles of the eye (intraocular and extraocular muscles).

A.6 Discern the gross structure and layers of the eye in coronal section and define its nerve and blood supply.

A.6 Describe on a diagram the anatomy of the eyelids and lacrimal apparatus.

B.6 Correlate anatomical facts with the manifestations of various nerve injuries of the orbit.

B.6 Interpret anatomical facts with its major clinical applications: e.g., ocular manifestations of increased intracranial pressure.

NARS: (4.1, 4.5)

Reference book:

Oxford handbook of medical sciences, pp. 699 & 706. Department book 65

Lectures (7): Blood supply of the brain (Anatomy)

By the end of the lecture the student will be able to:

A.9 Identify the blood supply of the brain.

A.9 Describe the circle of Willis.

A.9 List the main arterial supply for different parts of the brain (cerebral cortex, internal capsule, basal ganglia, diencephalon).

B.9 Correlate and Interpret knowledge of the distribution of the arterial supply of the brain for understanding stroke, cerebral aneurysms and intracranial hemorrhages.

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences (organ systems): chapter 6, pp. 422-423. Department book p123

Lectures (8): Development of the head and neck (Anatomy)

By the end of the lecture the student will be able to:

A.1 Describe in a table form the development of the pharyngeal arches (derivatives, nerve supply and related syndromes).

A.1 Enumerate the derivatives of pharyngeal clefts.

A.1 Enumerate the derivatives of pharyngeal pouches.

A.1 Enumerate the congenital anomalies of face and neck.

A.1 Define the embryological origin of the skull, cervical vertebrae and head and neck.

B.1 Interpret some clinical findings in relation to developmental basis (ex. cervical sinus and cleft lip).

B.1 Correlates knowledge of the fates of pharyngeal arches with manifestations of related syndromes (e.g. Treacher Collins syndrome).

NARS: (4.1, 4.3)

Reference book:

First Aid USMLE pp. 605-607. department book 177

Lectures (9): Meninges and ventricular system (Anatomy)

By the end of the lecture the student will be able to:

A.2 Describe the normal anatomy of meninges.

A.2 List various dural folds.

A.2 List and describe the structures involved in the production, circulation, and reabsorption of cerebrospinal fluid.

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences, organ systems: chapter 6, pp. 419-421.

Oxford handbook of medical sciences, pp. 690-691. Department book 83-128

Lectures (10): Meninges and ventricular system (Anatomy)

By the end of the lecture the student will be able to:

A.2 List and describe the structures involved in the production, circulation, and reabsorption of cerebrospinal fluid.

A.2 Describe brain ventricles.

A.2 Describe briefly the circulation of CSF.

B.2 Understand some clinical situations such as hydrocephalus and increased intracranial pressure in tumors of the ventricles.

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences, organ systems: chapter 6, pp. 419-421.

Oxford handbook of medical sciences, pp. 690-691. Department book 83-128

Lecture (11): Histological structure of the neurons, synapses and neuroglial cells (Histology)

By the end of the lecture the student will be able to:

A.1 Mention the different types of neurons and nerve fibers in the body.

A.1 Describe the structure of neurons and nerves.

B.1 Identify -different types, structure and function of neuroglia-

NARS: (4.1, 4.2).

Reference books:

Integrated systems (pp. 55 &56), The nervous system (pp. 32-36), Basic Histology (pp. 161-170).

Lecture (12): Histological structure of meninges (pia arachnoid and dura matters) choroids plexus and different types of brain barriers (Histology)

By the end of the lecture the student will be able to:

A.3. **Define** the meninges

A.3 **Mention** the different types of meninges and their structure.

B.3 **Explain** the structure and importance of choroid plexus.

B.3 **Describe** the different brain barriers.

NARS: (4.1, 4.2).

Reference books: Integrated systems (pp.51), The nervous system (pp.24) & Basic Histology (pp. 176-183)

Lecture (13): Structure of the ear (Anatomy)

By the end of the lecture the student will be able to:

A.7 **Describe** the anatomy of the external auditory meatus and tympanic membrane.

A.7 **Identify** the boundaries and contents of the middle ear-

A.7 **Know** the parts of the inner ear.

B.7 **Correlates** anatomical facts concerning the relation of the middle ear to the middle cranial fossa in cases of fracture of base of the skull and infections of middle ear.

B.7 **Explain** the relation between chorda tympani nerve and tympanic membrane.

NARS: (4.1, 4.5).

Reference book:

Oxford handbook of medical sciences, pp. 708-709. Department book pp.76

Lectures (14): Cerebral circulation and physiology of cerebrospinal fluid (Physiology)

By the end of the lecture the student will be able to:

B.1 **Recognize** mechanism of regulation and auto regulation of cerebral blood flow.

B.1 **Explain** the effect of brain activity on cerebral blood flow.

A.1 **Identify** formation, flow and absorption of cerebral fluid.

A.1 **List** functions of CSF.

B.1 **Recognize** the blood brain barrier.

B.1 **Describe** mechanism of transport of substances across blood brain barrier.

B.1 **Recognize** factors influencing the intracranial pressure.

B.1 **Explain** mechanisms of brain edema.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.9-13

Gyton. Pp.743-749

Lecture (15): Basic functions of the synapses and neurotransmitters (Physiology)

By the end of the lecture the student will be able to:

A.3 **Identify** the basic functional unit of the CNS.

A.3 **Recognized** functions of afferent, interneuron and efferent neurons.

A.3 **Compare** chemical and electrical synapses and **Summarize** the mechanism of their actions.

A.3 Explore steps of chemical synaptic transmission.

NARS: (4.1; 4.2; 4.4; 4.5; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.15-27

Gyton. Pp.543-557

Lectures (16): Basic functions of the synapses and neurotransmitters (Physiology)

By the end of the lecture the student will be able to:

A.3 Recognize different types of pre- and post-synaptic potentials.

B.3 Explain the mechanisms of pre- and post-synaptic potentials.

A.3 Differentiate between synaptic potential and action potential.

B.3 Design the mechanism and types of synaptic inhibitions.

A.3 Recognize the types of summation of postsynaptic potentials.

A.3 Know factors affecting synaptic transmissions.

A.3 Summarize functions of commonest neurotransmitters in the CNS.

NARS: (4.1; 4.2; 4.4; 4.5; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.15-27

Gyton. Pp.543-557

Lecture (17): Basic functions of the synapses and neurotransmitters (Physiology)

By the end of the lecture the student will be able to:

B.3 List different properties of chemical synaptic transmission.

B.3 Recognize the differences between motor and reflex tetanus.

B.3 Paraphrase the mechanism by which synaptic plasticity occurs.

NARS: (4.1; 4.2; 4.4; 4.5; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.15-27

Gyton. Pp.543-557.

Lecture (18): Neurotransmitters (Biochemistry)

By the end of the lecture the student will be able to:

A.1 Define neurotransmitters.

A.1 Describe classification of neurotransmitters.

A.1 Describe properties of neurotransmitters

A.1 List types of neurotransmitter receptors.

NARS: (4.2; 4.6; 4.8)

Reference books:

The nervous system, basic science and clinical conditions, second edition, pp. 4146.

Lecture (19): Neurotransmitters (Biochemistry)

By the end of the lecture the student will be able to:

A.1 List types of neurotransmitter receptors.

A.1 Describe acetylcholine synthesis, release, binding to the postsynaptic receptors, and removal from synaptic cleft.

A.1 Describe catecholamine (dopamine, epinephrine, norepinephrine) synthesis and degradation.

A.1 Describe serotonin synthesis and breakdown.

NARS: (4.2; 4.6; 4.8)

Reference books:

The nervous system, basic science and clinical conditions, second edition, pp. 4146.

Lecture (20): Somatosensory functions (Physiology)

By the end of the lecture the student will be able to:

A.4 Identify the basic principles of sensory physiology (receptors, transduction of sensory stimuli into nerve impulses and receptor potential).

A.4 Describe briefly submodalities of tactile sensation and associated receptors.

A.4 Define adequate stimulus, sensory threshold, receptive field and adaptation of receptors.

A.4. Identify the inverse relationship between sensitivity and threshold.

B.4 Explain transduction mechanisms for mechanical and thermal stimuli.

B.4 Distinguish mechanisms of adaptation and classifications of the receptors according to adaptation (dynamic and static).

B.4 Compare crude and fine tactile sensation.

B.2 Explain information encoding by the CNS; stimulus strength, duration and location.

B.4 Differentiate topographic representation vs population encoding.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp 30- 43

Gyton. Pp.571-581

Lecture (21): Histological structure of the spinal cord (nuclei and lamination). Differentiate between different levels of the spinal cord (Histology)

By the end of the lecture the student will be able to:

A.4 Define some structural terms used in CNS in general.

A.4 Describe the spinal cord gray and white matters structure.

A.4 Recognize the dorsal, ventral and lateral horns of the spinal cord.

B.4 Compare between different levels of the spinal cord.

NARS: (4.1, 4.2).

Reference books: Integrated systems (pp.51& 52), Integrated medical sciences (pp. 187), Textbook of Clinical Neuroanatomy, 2 ed. (250-255), Ross & Pawlina Histology (pp.384) and Basic Histology (pp.174& 175)

Lecture (22): Antidepressants (Pharmacology)

By the end of the lecture the student will be able to:

A.6 Identify classification of antidepressants.

A.6 List the uses and adverse effects of antidepressants.

B.6 Explain the mechanism of action of antidepressants.

B.6 Predict drug interaction of antidepressants.

NARS: (4.7, 4.8).

Ref. books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 531-535.

Basic and clinical pharmacology; B.G.Katzung 10th edition McGraw Hill, pp. 475-487.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 135-143.

Department book p 47

Lecture (23): Basic pathology of CNS (Pathology)

By the end of the lecture the student will be able to:

A.1 Summarize basic cellular lesions of the CNS.

A.1 Mention definition, causes, types & effects of hydrocephalus.

A.1 Outline types & causes of cerebral edema.

B.1 Summarize causes, effects & complications of ↑ICP (brain herniation).

NARS: (4.3, 4.5, 4.6, 5.3).

Reference books:

Tao Le et al. (2017) (pp. 488, 469-473, 503).

Elsevier's integrated pathology (2007) (pp. 337-338, 340).

Escourolle & Poirier Manual of Basic Neuropathology (2004) (pp. 120).

Lecture (24): Cerebrovascular Diseases (Pathology)

By the end of the lecture the student will be able to:

A.2 Classify intracranial hemorrhage & mention the causes.

B.2 Compare between epidural & subdural Hemorrhage.

A.2 List types of cerebral aneurysms. **Describe** cause, shape & site of each type.

B.2 Identify complications of cerebral aneurysms.

A.2 Enumerate causes and effects of cerebral ischemia.

A.2 Know the causes of infarction.

A.2 Summarize gross & microscopic features of cerebral infarction.

NARS: (4.3, 4.5, 4.6, 5.3).

Reference books:

Tao Le et al. (2017) (pp. 473-478).

Robbins Basic Pathology 10th edition (2018). (pp. 852-856).

Elsevier's integrated pathology (2007) (pp.340-341).

Lecture (25): Spinal cord (Anatomy)

By the end of the lecture the student will be able to:

A.10 Describe the anatomy of the spinal cord.

B.10 Interpret anatomical facts with the clinical manifestations of some vascular lesions (anterior spinal artery infarction and cauda equina and conus medullaris syndromes).

B.10 Correlate the anatomy of the spinal cord with the lumbar puncture procedure (level and structures that the needles pass through).

B.10 Correlate anatomical facts with the injury of spinal cord and vertebral column.

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences (organ systems): Chapter 6, pp. 446 - 447.

Nervous System Basic science and clinical condition pp. 60-62.

Department book pp.146

Lecture (26): Spinal cord (Anatomy)

By the end of the lecture the student will be able to:

A.10 Describe the normal anatomy of the main ascending (sensory) and descending (motor) tracts.

B.10 Interpret anatomical facts with the clinical manifestations of some vascular lesions (anterior spinal artery infarction and cauda equina and conus medullaris syndromes).

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences (organ systems): Chapter 6, pp. 446-447.

Nervous System Basic science and clinical condition pp. 60-62.

Department book pp.146

Lecture (27): Peripheral nervous system (Anatomy)

By the end of the lecture the student will be able to:

A.15 Describe the anatomy of the spinal nerves.

A.15 List the body plexuses and their formation.

B.1 Organizes the landmark dermatomes on a diagram of the human body.

NARS: (4.1, 4.5).

Reference book:

First Aid USMLE pp. 495 & 498.

Lecture (28): Brain stem (Anatomy)

By the end of the lecture the student will be able to:

A.11 Describe the structure of the mesencephalon.

A.11 Describe the structure of the rhombencephalon.

B.11 Recognize the cranial nerve nuclei in the brain stem.

NARS: (4.1, 4.5).

Reference book:

First aid for the basic sciences (organ systems): chapter 6, pp. 441-442&444-445.

Oxford handbook of medical sciences, pp. 412.

Department book pp.112

Lecture (29): Physiology of pain (I) (Physiology)

By the end of the lecture the student will be able to:

A.5 Define pain.

A.5 Identify nociceptors (location, categorization and adequate stimulus).

B.5 Explain mechanisms of pain sensory transduction.

A.5 Define hyperalgesia and **List** the differences between primary and secondary hyperalgesia.

B.5 Compare fast and slow pain.

B.5 Know classification of pain.

B.5 Differentiate allodynia from hyperalgesia.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.44-58

Gyton. Pp.583- 592

Lecture (30): Physiology of pain (II) (Physiology)

By the end of the lecture the student will be able to:

B.5 Distinguish mechanism of referred pain.

B.5 Explain mechanisms of peripheral and central pain inhibition.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.44-58

Gyton. Pp.583- 592

Lecture (31): Local anesthetics (Pharmacology)

By the end of the lecture the student will be able to:

A.1 Define local anesthetics.

A.1 Recognize techniques of local anesthesia.

A.1 Classify local anesthetics.

A.1 Recognize adverse effects of local anesthetics.

B.1 Explain the mechanism of action of local anesthetics.

NARS: (1.8; 4.8).

References books:

Lippincott's Illustrated Reviews: Pharmacology, 4th Edition. pp. 139-140.
Department book p15

Lecture (32): General anesthetics (Pharmacology)

By the end of the lecture the student will be able to:

A.2 Define general anesthetics.

A.2 Classify general anesthetics.

A.2 Recognize adverse effects of general anesthetics.

A.2 Enumerate preanesthetic medications and anesthetic adjuvants.

B.2 Explain the mechanism of action of general anesthetics.

NARS: (1.8; 4.8).

References books:

First Aid for the Basic Sciences: Organ Systems, Tao Le et al., 3rd edition pp. 545-547.
Lippincott's Illustrated Reviews: Pharmacology, 4th Edition. Chapter 11. pp. 127-140.
Department book p 3

Lecture (33): Opioids (Pharmacology)

By the end of the lecture the student will be able to:

A.3 Identify opioid receptors.

A.3 Recognize the uses, adverse effects and contraindications of morphine.

A.3 Describe the manifestation and the management of morphine toxicity.

A.3 Know classification of opioids.

B.3 Distinguish the mechanism of action of opioids.

NARS: (4.7, 4.8)

References books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 530-531.
Basic and clinical pharmacology; B.G.Katzung 10th edition McGraw Hill, pp. 489-507.
Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 191-202.
Department book p 82

Lecture (34): Stretch reflex (I) (Physiology)

By the end of the lecture the student will be able to:

A.6 Describe the muscle spindle and its innervation; **Understand** mechanism of its stimulation.

A.6 List the functions and types of stretch reflex.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.62-72
Gyton. Pp.655-665

Lecture (35): Stretch reflex (II) (Physiology)

A.6 Enumerate supraspinal control of stretch reflex.

A.6 Explain the functions and importance of Golgi tendon organs.

B.6 Differentiate between muscle tone and tendon jerk.

B.6 Explore role of gamma efferent discharge.

B.6 Compare stretch and inverted stretch reflex.

B.6 Construct causes of abnormal muscle tone.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.62-72
Gyton. Pp.655-665

Lecture (36): Cerebrum (I) (Anatomy)

By the end of the lecture the student will be able to:

A.12 List the sulci and gyri of the lobes of the cerebrum.

A.12 Define the lobes of the cerebral hemisphere.

A.12 List the main cortical areas on the cerebral cortex.

A.12 Describe the components of the cerebrum,

B.12 Interpret anatomical facts with its major clinical applications (vascular injuries of the cerebral cortex).

NARS : (4.1, 4.5).

Reference book: department book pp.91

First aid for the basic sciences (organ systems): chapter 6, pp.:425-463.

Lecture (37): Cerebrum (II) (Anatomy)

By the end of the lecture the student will be able to:

A.12 Name the parts of the diencephalon.

A.12 Describe the anatomy of the thalamus and hypothalamus.

A.12 Enumerate the components of the basal ganglia.

A.12 Enumerate the components of the limbic system.

A.12 List types of white matter fibers, including the internal capsule and corpus callosum (parts and its blood supply).

B.12 Interpret anatomical facts with its major clinical applications (vascular injuries of basal ganglia and internal capsule).

NARS: (4.1, 4.5).

Reference book: department book pp.91

First aid for the basic sciences (organ systems): chapter 6, pp.:425-463.

Lecture (38): Myelination in PNS and CNS and Types of nerve fibers and nerve ending (Histology)

By the end of the lecture the student will be able to:

A.2 Identify the mechanisms of myelination in peripheral and CNS.

A.2 Compare between myelination in peripheral and CNS.

A.2 Mention the characters of different types of sensory and motor nerve endings.

NARS: (4.1, 4.2)

Reference books:

Integrated systems (p.5255), The nervous system (pp. 22, 23, 34 &35) & Basic Histology (pp.174-185).

Lecture (39): Histological structure of the cerebral and cerebellar cortex (Histology)

By the end of the lecture the student will be able to:

A.5 Describe the cytoarchitecture of the cerebellum.

B.5 Explain the cytoarchitecture of the cerebral cortex.

NARS: (4.1, 4.2).

Reference books:

Integrated systems (pp.55-90) Basic histology (pp. 174-179).

Lectures (40): Sensory and motor areas of the cerebral cortex (I) (Physiology)

By the end of the lecture the student will be able to:

A.7 Describe briefly functional areas of cerebral cortex (motor, sensory) concerning location, connection, body representation and functions.

B.7 Explain neurological manifestation and correlate them to the defective areas of the cerebral cortex.

NARS: (4.1; 4.6; 4.8)

References books:

Neuroscience Physiology, pp.76-94

Gyton. Pp.667-678

Lectures (41): Sensory and motor areas of the cerebral cortex (II) (Physiology)

By the end of the lecture the student will be able to:

A.7 Describe briefly high order association cortical areas concerning location, connection, body representation and functions.

B.7 Explain neurological manifestation and correlate them to the defective areas of the cerebral cortex.

B.7 Identified functions of different ascending and descending tracts.

NARS: (4.1; 4.6; 4.8)

References books:

Neuroscience Physiology, pp.76-94

Gyton. Pp.667-678

Lecture (42): Intellectual Functions of the Brain; Physiology of speech (Physiology)

By the end of the lecture the student will be able to:

A.12 Define speech.

A.12 List types of speech (spoken and written).

B .12 Describe mechanism of speech.

B.12 Mention types and mechanisms of speech disorders (aphasia & dysarthria).

NARS: (1.8; 1.10).

References books:

Neuroscience Physiology, pp.96-98

Gyton. Pp.703

Lecture (43): Infections of CNS (meningitis and encephalitis) (Pathology)

By the end of the lecture the student will be able to:

A.3 Define meningitis & encephalitis.

A.3 List routes of CNS infection.

A.3 Outline different types of meningitis.

A.3 Identify morphological changes of suppurative meningitis.

B.3 Explore complication of meningitis.

B.3 Compare between pyogenic & Aseptic meningitis.

A.3 Describe types, morphology & complications of brain abscess.

NARS: (4.3, 4.5, 4.6, 5.3).

Reference books:

Robbins Basic Pathology 10th edition (2018). (pp. 862-865).

Elsevier's integrated pathology (2007) (pp.343-344).

Lecture (44): Protozoa causing CNS diseases (I) (Parasitology)

By the end of the lecture the student will be able to:

A.1 List the most common protozoa causing CNS diseases.

A.1 Recall and differentiate the infective and diagnostic stages of each parasite.

A.1 Identify mode of infection of each parasite.

B.1 Demonstrate the pathological lesions in the brain caused by each parasite.

B.1 Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).

B.1 Describe laboratory diagnosis, imaging and pathological studies of lesions caused by these parasites and **Recall** treatment and prevention of them.

NARS: (1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

Lecture notes.

First aid for USMLE step 1. Student to student guide 2019. Pages: 79, 156, 157, 177, 180, 182, 198, 200, 309, 414, 416, 417, 679, 683, 684.

Oxford handbook of Medical Sciences 2011. Pages: 138, 818, 819, 820, 863, 922. Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

Lecture (45): Protozoa causing CNS diseases (II) (Parasitology)

By the end of the lecture the student will be able to:

A.1 List the most common protozoa causing CNS diseases.

A.1 Recall and differentiate the infective and diagnostic stages of each parasite.

A.1 Identify mode of infection of each parasite.

B.1 Demonstrate the pathological lesions in the brain caused by each parasite.

B.1 Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).

B.1 Describe laboratory diagnosis, imaging and pathological studies of lesions caused by these parasites and **Recall** treatment and prevention of them.

NARS: (1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

Lecture notes.

First aid for USMLE step 1. Student to student guide 2019. Pages: 79, 156, 157, 177, 180, 182, 198, 200, 309, 414, 416, 417, 679, 683, 684.

Oxford handbook of Medical Sciences 2011. Pages: 138, 818, 819, 820, 863, 922. Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

Lecture (46): Meningitis (I) (Microbiology)

By the end of the lecture the student will be able to:

A.1 Define meningitis.

A.1 List infectious causes of meningitis.

A.1 Differentiate the morphological characteristics and **Identify** the mode of infection of some pathogens.

B.1 Demonstrate host-parasite relationships (pathogenesis) and **Explain** the main clinical presentations of these pathogens.

B.1 Describe prevention of these pathogens.

NARS: (1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

YALE-G First Aid: Crush USMLE, Step2CK and Step 3 (page 52, 53).

Elsevier's Integrated Review Immunology and Microbiology (page 107,108,110, 114,117,118,132,133,134,145). Lecture note and department book pages(4-13)

Lecture (47): Encephalitis (Microbiology)

By the end of the lecture the student will be able to:

B.1 Describe laboratory diagnosis of a case of meningitis

A.1 Define encephalitis.

A.1 List infectious causes of encephalitis.

A.1 Differentiate the morphological characteristics and **Identify** the mode of infection of some pathogens.

B.1 Demonstrate host-parasite relationships (pathogenesis) and **Explain** the main clinical presentations of these pathogens.

B.1 Describe laboratory diagnosis and prevention of these pathogens.

NARS: (1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

YALE-G First Aid: Crush USMLE, Step2CK and Step 3 (page 52, 54).

Elsevier's Integrated Review Immunology and Microbiology (page 120,131,132,134,135).

Lecture note and department book pages (14-19)

Lecture (48): Brain abscess, Poliomyelitis, Rabies (Microbiology)

By the end of the lecture the student will be able to:

A.2 Define each disease.

A.2 Memorize the causative agent of each disease and its morphological characteristics.

A.2 Identify the mode of infection for each pathogen.

B.2 Demonstrate host parasite relationships (pathogenesis) of each disease.

B.2 Explain the main clinical presentations of each disease.

B.2 Describe laboratory diagnosis and prevention of each disease.

NARS: (1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

YALE-G First Aid: Crush USMLE, Step 2CK and Step 3 (page 55,98).

Elsevier's Integrated Review Immunology and Microbiology (page 105,106,107, 132,134,145).

Lecture note and department book pages (20-27)

Lecture (49): Helminths causing CNS diseases (I) (Parasitology)

By the end of the lecture the student will be able to:

A.2 List the most common helminths causing CNS diseases.

A.2 Recall and differentiate the infective and diagnostic stages of each parasite.

A.2 Identify mode of infection of each parasite.

B.2 Demonstrate the pathological lesions in the brain caused by each parasite.

B.2 Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).

B.2 Describe laboratory diagnosis, imaging and pathological studies of lesions caused by these parasites and **Recall** treatment and prevention of them

NARS:)1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

Lecture notes

First aid for USMLE step 1. Student to student guide 2019. Pages: 158, 159, 160, 161, 226, 383, 588, 665

Oxford handbook of Medical Sciences 2011. Pages: 810, 819

Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

Lecture (50): Helminths causing CNS diseases (II) (Parasitology)

By the end of the lecture the student will be able to:

A.2 List the most common helminths causing CNS diseases.

A.2 Recall and differentiate the infective and diagnostic stages of each parasite.

A.2 Identify mode of infection of each parasite.

B.2 Demonstrate the pathological lesions in the brain caused by each parasite.

B.2 Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).

B.2 Describe laboratory diagnosis, imaging and pathological studies of lesions caused by these parasites and **Recall** treatment and prevention of them

NARS:)1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

Lecture notes

First aid for USMLE step 1. Student to student guide 2019. Pages: 158, 159, 160, 161, 226, 383, 588, 665

Oxford handbook of Medical Sciences 2011. Pages: 810, 819

Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

Lecture (51): Tetanus, Botulism, Prion disease (Microbiology)

By the end of the lecture the student will be able to:

A.3 Define each disease.

A.3 Memorize the causative agent of each disease and its morphological characteristics.

A.3 Identify the mode of infection for each pathogen.

B.3 Demonstrate host parasite relationships (pathogenesis) of each disease.

B.3 Explain the main clinical presentations of each disease.

B.3 Describe laboratory diagnosis and prevention of each disease.

NARS: (1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

YALE-G First Aid: Crush USMLE, Step 2CK and Step 3 (page 93,557).

Elsevier's Integrated Review Immunology and Microbiology (page 111,117,136).

Lecture note and department book pages(28- 37)

Lecture (52): Cerebellum (Anatomy)

By the end of the lecture the student will be able to:

A.13 Describe the anatomy of the cerebellum (position, parts, nuclei, blood supply)

B.13 Interpret anatomical facts with its major clinical applications (cerebellar vascular lesions and ataxia).

NARS: (4.1,4.5).

Reference book: department book pp.140

First aid for the basic sciences (organ systems): Chapter # 6, pp. 437-438.

Lecture (53): Cerebellum (functions) (Physiology)

By the end of the lecture the student will be able to:

A.8 List the motor functions of different parts of the cerebellum.

A.8 Identify the functional importance of cerebellum neural circuit.

A.8 Explain the mechanism of action of different parts of cerebellum.

A.8 Describe the relation between cerebellum and stretch reflex (alpha gamma coactivation) and control of equilibrium.

B.8 Summarize role of cerebellum in voluntary movement control.

B.8 Define tremor; **distinguish** its types

B.8 Define nystagmus; **distinguish** its causes, types and mechanism.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.99-106

Gyton. Pp.681-688

Lecture (54): Functions of vestibular apparatus (Physiology)

By the end of the lecture the student will be able to:

A.9 Identify the functional components and neural connections of the vestibular apparatus.

A.9 Describe the receptors in vestibular system (name, location, adequate stimulation, adaptation).

B.9 Explain the effects of stimulation of macula and crista.

B.9 Explore the mechanism of detection of angular and linear acceleration.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.107-113

Gyton. Pp.674-678

Lecture (55): Development of the nervous system (Anatomy)

By the end of the lecture the student will be able to:

A.14 Enumerate the congenital anomalies of face and neck.

A.14 Define and know the origin and development of the parts of the central nervous system.

B.14 Distinguish between different central nervous system malformations (spina bifida, meningocele, meningomyelocele, myelocele, , encephalocele, hydrocephalus, anencephaly).

NARS: (4.1,4.3,4.5).

Reference book: department book pp.185

First aid for the basic sciences(organ systems):chapter 6, pp.:412-418.

Lecture (56): Physiology of basal ganglia (Physiology)

By the end of the lecture the student will be able to:

A.10 Describe direct and indirect circuitry of basal ganglia that control of motor function.

A.10 List neurotransmitters secreted by nuclei of BG.

A. 26 List functions of BG.

B.10 Explain the changes in muscle tone, involuntary movement, and motor dysfunction associated with lesions of different nuclei of BG.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.114-119

Lecture (57): Antiparkinsonism (Pharmacology)

By the end of the lecture the student will be able to:

A.7 Describe uses and adverse effects of drugs used in treatment of Parkinsonism.

B.7 Explore the mechanism of action of drugs used in treatment of Parkinsonism.

NARS: (4.7; 4.8).

Ref. books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 543545.

Basic and clinical pharmacology; B.G.Katzung 10th edition McGraw Hill, pp. 442-451.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 109-115.

Department book p 68

Lecture (58): Limbic system (Physiology)

By the end of the lecture the student will be able to:

A.11. Identify functional components of limbic system mainly hippocampus, amygdala and thalamus.

A.11 Describe functions of hippocampus, amygdala and thalamus.

B.11 Diagram James Papez circuit and its functions.

B.11 Distinguish thalamic syndrome.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.120-121

Gyton. Pp.711-718

Lecture (59): Learning and Memory (Physiology)

By the end of the lecture the student will be able to:

B.11 Differentiate between different types of memory and **Explain** their mechanism.

B.11 Explain encoding and consolidation of memory.

B.11 List types of amnesia.

B.11 Identify the main ways of learning.

B.11 List main types of learning.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.122-130

Gyton. Pp.705-710

Lecture (60): Hypothalamus (Physiology)

By the end of the lecture the student will be able to:

A.11. Identify functional components of hypothalamus.

A.11 Describe functions of hypothalamus.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.131-139

Gyton. Pp.715-718

Lecture (61): Reticular activating system and Wakefulness (Physiology)

By the end of the lecture the student will be able to:

A.11. Describe functions of reticular activating system.

A.11. Describe pathophysiology of coma.

A.11 Describe electroencephalography.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.140-147

Gyton. Pp.721-728

Lecture (62): Anticonvulsant (Pharmacology)

By the end of the lecture the student will be able to:

A.8 Classify Anticonvulsants.

A.8 Describe the uses, adverse effect and contraindication of anticonvulsants.

B.8 Explain the mechanism of actions of anticonvulsants.

B.8 Predict drug interaction of antiepileptics.

NARS: (4.7; 4.8).

Ref. books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 537-541
 Basic and clinical pharmacology; B.G. Katzung 10th edition McGraw Hill, pp. 374-393.
 Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 157-167.
 Department book p 56

Lecture (63): Physiology of sleep (Physiology)

By the end of the lecture the student will be able to:

- A.13 **Define** sleep and **know** its importance.
- A.13 **Identified** physiological changes during sleep.
- A.13 **List and compare** different types of sleep.
- B.13 **Describe** distribution of sleep stages (sleep cycles).
- B.13 **Explain** the sleep/wakefulness cycle.
- B.13 **List** the mechanisms (theories) of sleep.
- B.13 **Describe** EEG changes during sleep and wakefulness.
- B.13 **Explain** the different reasons for common sleep disturbances.

NARS: (1.8; 1.10).

References books:

Neuroscience Physiology, pp.140-147
 Gyton. Pp.721-728

Lecture (64): Hypnotics/ Anxiolytics (Pharmacology)

By the end of the lecture the student will be able to:

- A.4 **Define** Hypnotics and Anxiolytics.
- A.4 **Enumerate** the pharmacological action, uses and adverse effects of benzodiazepines.
- A.4 **Know** Classification of hypnotics and anxiolytics.
- B.4 **Explain** the mechanism of action of benzodiazepines.
- B.4 **Distinguish** between hypnotics and anxiolytics.

NARS: (4.7, 4.8).

Ref. books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 528-530.
 Basic and clinical pharmacology; B.G.Katzung 10th edition McGraw Hill, pp. 347-360.
 Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 121-133.
 Department book p 23

Lecture (65): Neurodegenerative and demyelinating diseases (Pathology)

By the end of the lecture the student will be able to:

- A.4 **Mention** common Pathologic features & classification of neurodegenerative Ds.
- A.4 **Summarize** pathogenesis of Alzheimer Ds.
- A.4 **Describe** macroscopic & microscopic features of Alzheimer Ds.
- A.4 **Summarize** pathogenesis of Parkinson Ds
- A.4 **Mention** morphologic changes of Parkinson Ds.
- A.4 **Define & Classify** demyelinating diseases.
- A.4 **Identify** pathogenesis & morphology of multiple sclerosis.

NARS: (4.3, 4.5, 4.6, 5.3).

Reference books:

Robbins Basic Pathology 10th edition (2018). (pp. 870-879).
 Tao Le et al. (2017) (ppt. 480-487).
 Elsevier's integrated pathology (2007) (pp.345 348, 344).

Lecture (66): Tumors of Nervous System (I) (Pathology)

By the end of the lecture the student will be able to:

A.5 Classify intracranial and spinal cord tumor.

B.5 Describe brain metastases.

B.5 Describe WHO grading of brain tumors.

A.5 Know pathology of gliomas.

NARS: (4.3, 4.5, 4.6,5.3).

Reference books:

Tao Le et al. (2017) (ppt. 490).

Robbins Basic Pathology 10th edition (2018). (pp.881-886).

Elsevier's integrated pathology (2007) (pp.349-353).

Escourolle & Poirier - Manual of Basic Neuropathology (2004) (21-28/42-45).

Lecture (67): Tumors of Nervous System (II) (Pathology)

By the end of the lecture the student will be able to:

A.5 Know pathology of gliomas and medulloblastoma (definition, sites & age).

A.5 Identify origin, sites, gross and microscopic features of meningioma.

B.5 Compare between schwannoma & neurofibroma.

NARS: (4.3, 4.5, 4.6,5.3).

Reference books:

Tao Le et al. (2017) (ppt. 490).

Robbins Basic Pathology 10th edition (2018). (pp.881-886).

Elsevier's integrated pathology (2007) (pp.349-353).

Escourolle & Poirier - Manual of Basic Neuropathology (2004) (21-28/42-45).

Lecture (68): Metabolism of the brain (Biochemistry)

By the end of the lecture the student will be able to:

A.2 Identify substrates used for energy production in the brain.

A.2 Describe briefly how carbohydrate is metabolized in cerebral tissue.

A.2 Describe the significance of oxygen supply to brain energy metabolism.

A.2 Know the amino acid content in cerebral tissue.

A.2 Know the role of lipids in the brain.

B.2 Explain why brain needs energy.

B.2 Explain the effect of hypoxia on the brain metabolism.

NARS: (4.1; 4.2; 4.5; 4.6).

Reference books:

First aid for USMLE step 1 (2019) p.72-79; 90 – 91.

Lippincott illustrated reviews integrated systems p 44; 4647.

Textbook of medical biochemistry 8th edition, pp322-430.

Lecture (69): Antipsychotics (Pharmacology)

By the end of the lecture the student will be able to:

A.5 Describe the uses and adverse effects of antipsychotics.

B.5 Explain mechanism of action of antipsychotic drugs.

B.5 Explore the classification of antipsychotics.

NARS: (4.7, 4.8).

Ref. books:

FIRST AID for the Basic Science, Organ Systems Third Edition, pp. 535-537.

Basic and clinical pharmacology; B.G.Katzung 10th edition McGraw Hill, pp. 457-473.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 147-153.

Department book p 40

Lecture (70): Visual pathway (Anatomy)

By the end of the lecture the student will be able to:

A.16 Recognize the components of the visual pathway.

B.16 Explain the effect of injury and the clinical manifestations of it at various levels of the visual pathway on anatomical basis.

NARS: (4.1, 4.5).

Reference book: department book pp166

First aid for the basic sciences (organ systems): chapter 6, pp. 459.

Lecture (71): Histological structure of the eye and its accessory structures (Histology)

By the end of the lecture the student will be able to:

A.6 Explain the histological structure of the eyeball.

A.6 Describe the ultrastructure of the retinal photoreceptors rods, cones and pigmented epithelium.

B.6 Describe the histological structure of accessory organs of the eye.

NARS: (4.1, 4.2)

Reference books:

Integrated systems (pp. 83 & 84), Basic Histology (pp.479-495) and Ross Pawlina Histology (pp. 988).

Lecture (72): Functions of different parts of the eye (Physiology)

By the end of the lecture the student will be able to:

A.14 Describe functions of different components of the eye (cornea, conjunctiva, ciliary body, etc).

A.14 Explain the physiological significance of the papillary reflexes (corneal, light and near).

B.14 Distinguish synthesis, flow and drainage, functions of aqueous humor and, factors affecting intraocular pressure (IOP).

NARS: (4.1; 4.6; 4.8).

Reference books: Neuroscience Physiology, pp.147-153

Gyton. Pp.597-606

Lecture (73): The optical system of the eye (Physiology)

By the end of the lecture the student will be able to:

A.14 Recall basic principles of optics and learn how these principles apply to the eye.

A.14 Know the role of cornea and lens as a refractive medium.

B.14 Explain mechanisms of accommodation.

B.14 Distinguish the types of refractive errors that can occur in the eye and its corrections

NARS: (4.1; 4.6; 4.8).

Reference books: Neuroscience Physiology, pp.154-158

Gyton. Pp.609-611

Lecture (74): The visual process (Physiology)

By the end of the lecture the student will be able to:

A.14 Identify functional organization of the retina.

A.14 Identify functions of different retinal cells.

B. 14 Explain scotopic and photopic vision and **Describe** neural basis of visual process.

B.14 Explain the phototransduction process.

NARS: (4.1; 4.6; 4.8).

Reference books: Neuroscience Physiology, pp.158-163

Gyton. Pp.616-622

Lecture (75): Light – Dark adaptation cycle and color vision (Physiology)

By the end of the lecture the student will be able to:

B.14 Describe light –dark adaptation cycle.

B.14 Describe mechanism of colour vision, **Identify** causes and classification of colour blindness.

B.14 Explain mechanism of binocular vision, **Identify** visual acuity and visual field.

NARS: (4.1; 4.6; 4.8).

Reference books: Neuroscience Physiology, pp.164-173

Gyton. Pp.623-632

Lecture (76): Parasitic infections of the eye (Parasitology)

By the end of the lecture the student will be able to:

A.4 List Parasitic diseases which infect the eye.

A.4 Recall and differentiate the infective and diagnostic stages of each parasite.

A.4 Identify mode of infection of each parasite.

B.4 Demonstrate the pathological lesions in the eye caused by each parasite.

B.4 Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).

B.4 Describe laboratory diagnosis, imaging and pathological studies of lesions caused by these parasites, and **Recall** treatment and prevention of them.

NARS: (1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

Lecture notes

First aid for USMLE step 1. Student to student guide 2019. Pages: 158, 159, 177, 180, 182, Oxford handbook of Medical Sciences 2011. Pages: 825, 830, 834, 819, 863, 924.

Garcia, Lynne Shore, and David A Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.

Lecture (77): Infections of the eye and the ear (Microbiology)

By the end of the lecture the student will be able to:

A.4 Differentiate types of eye and ear infections.

A.4 List causes of various eye and ear infections.

A.4 Differentiate the morphological characteristics and **Identify** the mode of infection of the most common pathogens.

B.4 Demonstrate host parasite relationships (pathogenesis) of each pathogen.

B.4 Explain the main clinical presentations.

B.4 Describe laboratory diagnosis of each case.

NARS: (1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8).

Reference books:

YALE-G First Aid: CRUSH USMLE, Step2CK and Step 3 (page 34-37).

Elsevier's Integrated Review Immunology and Microbiology (page 117,118,129,145).

Lecture note and department book pages(38-43).

Lecture (78): Auditory and Vestibular pathways (Anatomy)

By the end of the lecture the student will be able to:

A.17 Recognize the components of the auditory and vestibular pathway.

B.17 Explain the effect of injury and the clinical manifestations of it at various levels of the auditory pathway on anatomical basis.

NARS: (4.1, 4.5).

Reference book: department book 171

First aid for the basic sciences (Organ Systems): Chapter 6, pp. 461-463.

Lecture (79): Gustatory and olfactory pathways (Anatomy)

By the end of the lecture the student will be able to:

A.18 Recognize the components of the olfactory and gustatory pathway.

B.18 Explain the effect of injury and the clinical manifestations of it at various levels of the pathway on anatomical basis.

NARS: (4.1, 4.5).

Reference book: department book 175

First aid for the basic sciences (organ systems): Chapter 6, pp. 464.

Lecture (80): Histological structure of sensory organs of hearing, balance, taste and smell (Histology)

By the end of the lecture the student will be able to:

A.7 Describe the structure of organ of Corti, the vestibule and the membranous semicircular canals.

B.7 Identify the structure of taste buds and olfactory epithelium.

B.7 Explain the structure of the olfactory epithelium.

NARS: (4.1, 4.2).

Reference books:

Integrated systems (pp.83-84), Basic histology (pp. 497, 498, 344, 345, 293& 294)

Lecture (81): Hearing mechanisms (I) (Physiology)

By the end of the lecture the student will be able to:

A.15 Identify properties of sound as pitch, loudness and temper.

A.15 Describe functions of external, middle and inner ear.

A.15 Describe the role of Eustachian tube in health and disease.

B.15 Explain the role of muscles of the middle ear in attenuation reflex.

B.15 Distinguish the role of ossicular system in impedance matching.

B.15 Explain mechanisms of auditory sensory transduction.

B.15 Differentiate between inner and outer hair cells.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.174-186

Gyton. Pp.633-644

Lecture (82): Hearing mechanisms (II) (Physiology)

By the end of the lecture the student will be able to:

A.15 Identify functions of primary and secondary auditory areas.

B.15 Explain mechanisms of pitch perception.

B.15 Explain mechanisms of sound localization and sound direction identification.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.174-186

Gyton. Pp.633-644

Lecture (83): Chemoreceptor functions (I) (Physiology)

By the end of the lecture the student will be able to:

A.16 List functions of chemical senses.

A.16 Identify chemoreceptors (name, location, adequate stimulus) and **Mechanism** of stimulation.

A.16 Recognize causes of anosmia.

B.16 Explain mechanisms of olfactory sensory transduction and mechanisms of adaptation.

B.16 Distinguish the roles of population and frequency coding in representing chemical sensory information.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.187-193

Gyton. Pp.645-653

Lecture (84): Chemoreceptor functions (II) (Physiology)

By the end of the lecture the student will be able to:

A.16 Identify chemoreceptors (name, location, adequate stimulus).

A.16 Recognize causes of ageusia (gustatory anesthesia).

B.16 Explain mechanisms of gustatory sensory transduction.

B.16 Distinguish the roles of population in representing chemical sensory information.

NARS: (4.1; 4.6; 4.8).

References books:

Neuroscience Physiology, pp.187-193

Gyton. Pp.645-653

B. Practical topics and their intended learning outcomes

Students are requested to:

1. Study and prepare the laboratory materials prior to the laboratory session.
2. Prepare a summary of the laboratory procedure.
3. Understand the class materials relevant to the laboratory session.
4. Find out, understand and learn the required skills by the aid of the instructors and faculty will be in the laboratory room to help.
5. Bring their atlas and relevant textbooks or notes to help you in identifying the structures in the anatomy Laboratory.
6. Spend time in the laboratory class to ensure learning the assigned skills.

Laboratory Sessions Instructions:

It is important that students get prepared for their lab sessions by:

7. Studying their reading material.
8. Having a preliminary idea by getting a look at their atlas.

9. Prepare a list of the structures ~~you~~ needed to identify micro and macro.
10. Ongoing to the lab (with atlases and books if wanted) ~~to~~ they develop their skills of comparing, identifying and observing how things fit on each other.
11. Instructors will facilitate the learning process.

Lab (1): Skull (Anatomy)

ILOs: To

C.1 Identify the normal features of skull (bones forming the cranium, mandible & cervical vertebrae – Identify the sites of fontanels in the fetal skull.

NARS: (4.1).

Lab (2): Skull & cervical vertebrae (Anatomy)

ILOs: To

C.2 Palpate the surface landmarks of skull, mandible & cervical vertebrae.

C.3 Recognize the articulation of mandible and cervical vertebrae.

NARS: (4.1).

Lab (3): Muscles of the head (Anatomy)

ILOs: To

C.1 Identify on a specimen the muscles of mastication and the muscles of the face.

NARS: (4.1).

Lab (4): Neck & Blood supply of the head and neck (Anatomy)

ILOs: To

C.1 Identify on a specimen the muscles of the neck.

C.2 Identify the arrangement of carotid and subclavian vessels and their branches in their normal places in cadavers.

NARS: (4.1).

Lab (5): Orbit and ear (Anatomy)

ILOs: To

C.1 Identify the bones forming the orbit on the skull.

C.2 Identify the contents of the orbit and structure of the eyeball on a model.

C.1 Identify the different parts of the ear.

C.2 Recognize the relations, contents and walls of the middle ear cavity.

NARS: (4.1).

Lab (6): Meninges and brain ventricles (Anatomy)

ILOs: To

C.1 Recognize the dura, arachnoid and pia matters on flesh specimens.

C.2 Identify the brain ventricles and the relationships of brain ventricles and various parts of the brain and the central canal of the spinal cord, together with choroid plexuses on plastinated sections and brain models.

NARS: (4.1).

Lab (7): Blood supply of the brain (Anatomy)**ILOs: To**

C.1 Identify the arrangement of vertebrobasilar and carotid vessels with their branches (in preserved specimens) and models of the central nervous system.

NARS: (4.1).

Lab (8): Slide demonstration and examination of: Nerve trunk (Hx&E and Osmic acid), spinal ganglia (Hx&E) and cervical spinal cord (Weigert Pal) (Histology)**ILOs: To**

C1. Identify the slide of nerve trunk by different stains.

C1. Identify the slide of spinal ganglion by Hx&E.

C4. Label a diagram of cervical spinal cord.

NARS: (4.8).

Lab (9): Brain stem, attachments of cranial nerves and spinal cord (Anatomy)**ILOs: To**

C.1 Identify the gross morphology of, brain stem (parts and attachments of cranial nerves) and spinal cord in fresh specimens and models.

NARS: (4.1).

Lab (10): Somatosensory functions (Physiology)**ILOs: To**

C.1 Test fine touch, crude touch, proprioceptive, stereognosis and pain sensation.

NARS: (1.8; 1.10).

Lab (11): Local and general Anesthetics (Pharmacology)**ILOs: To**

C.1 Test the response of experimental animals to local and general anesthetics.

NARS: (1.8; 1.10).

Lab (12): Drug dependence (Pharmacology)**ILOs: To**

C.2 Assess the manifestation of drug dependence.

C.2 Apply the appropriate pharmacological approaches for treatment of drug dependence.

NARS: (1.8; 1.10; 1.16).

Lab (13): Cerebral hemisphere (Anatomy)**ILOs: To**

C.1 Identify the gross morphology of cerebral hemisphere (surfaces, borders, lobes, sulci and gyri) on fresh specimens.

NARS: (4.1).

Lab (14): Spinal reflexes (Physiology)**ILOs: To**

C.2 Test muscle tone for different muscle groups.

C.2 Acquire the skill of examining superficial and deep reflexes.

C.2 Assess muscle power for different muscles of the body.

NARS: (1.8; 1.10).

Lab (15): Coronal sections of the brain (Anatomy)**ILOs: To**

C.1 Label the internal structures of the cerebral hemisphere on plastinated sections (**coronal**).

C.2 Identify the arrangement of various parts of diencephalon and basal ganglia in their normal places (in plastinated sections of cerebrum and preserved specimens).

C.4 Interpret anatomical structure with CT scan and carotid angiography.

NARS: (4.1, 4.8).

Lab (16): Transverse sections of the brain (Anatomy)**ILOs: To**

C.1 Label the internal structures of the cerebral hemisphere on plastinated sections (**sagittal and horizontal**).

C.2 Identify the arrangement of various parts of diencephalon and basal ganglia in their normal places (in plastinated sections of cerebrum and preserved specimens).

C.4 Interpret anatomical structure with CT scan and carotid angiography.

NARS: (4.1, 4.8).

Lab (17): Slide demonstration and examination of Cerebral cortex & Brain stem (midbrain, pons, medulla oblongata) & Cerebellum (Histology)**ILOs: To**

C.4 Identify the slide of cerebral cortex by Hx & E.

C.4 Identify the slide of cerebellum by Hx& E.

C.4 Label diagram of cerebellum.

C.3 Identify and differentiate between levels of midbrain, pons and medulla oblongata

NARS: (4.8).

Lab (18): Cerebellum (Anatomy)**ILOs: To**

C.1 Identify the gross morphology of cerebellum on fresh specimens.

C.2 Label the internal structures of the cerebellum on both flesh sections plastinated sections.

NARS: (4.1).

Lab (19): Cerebellum and vestibular apparatus examinations (Physiology)**ILOs: To**

C.1 Test cerebellar function as Nystagmus, tests of the upper and lower limbs (finger to nose, finger to finger, dysdiadokokinesia, heel to knee test, walking on straight line... etc) and to differentiate between sensory and motor ataxia; Romberg's test.

C.2 Acquire the skill to do tests for vestibular apparatus (Vestibuloocular reflex, caloric test, mechanical stimulation, thermal stimulation and electrical stimulation, e.g. Barany chair test and caloric test).

NARS: (1.8; 1.10).

Lab (20): Lumbar puncture & Lab Diagnosis of microbial infections of the CNS (Microbiology)**ILOs: To**

C.1 Describe the method of specimen collection, including the process of lumbar puncture, transportation of specimen, storage and microbiological processing.

C.1 Demonstrate the microscopic features of causative bacterial pathogens.

C.1 Identify media used incubation environment, colonial morphology and biochemical reactions for bacterial identification.

NARS: (1.8, 1.11, 2.5, 4.6, 4.8).

Lab (21): Lab diagnosis of microbial infections of the CNS (Microbiology)

ILOs: To

C.2 Demonstrate the microscopic features of causative fungal pathogens.

C.2 Identify media used incubation environment, colonial morphology and biochemical reactions for fungal identification.

C.2 Demonstrate the microscopic features and laboratory techniques for diagnosis of causative viral pathogens.

C.2 Study a sample resembling CSF specimen and Identify the organisms involved.

NARS: (1.8, 1.11, 2.5, 4.6, 4.8).

Lab (22): Slide demonstration of Schwannoma and Meningioma (Pathology)

ILOs: To

C.1 Examine H&E stained slides and try to reach a provisional diagnosis.

NARS: (1.8, 1.9, 4.8).

Lab (23): Gross demonstration of specimens of intracranial hemorrhage and examples of brain tumor (Pathology)

ILOs: To

C.1 Identify the organs grossly.

C.2 Examine size, shape, and any pathological changes and try to reach a provisional diagnosis.

NARS: (1.8, 1.9, 4.8).

Lab (24): Epilepsy, antiparkinsonism and antidepressant (samples, prescriptions) (Pharmacology)

ILOs: To

C.3 Integrate with samples of drugs used in different CNS diseases, e.g., Epilepsy, Parkinsonism and depression, etc.

C.3 Acquire the skill to write the prescription for different CNS diseases e.g., epilepsy, parkinsonism and depression, etc.

NARS: (1.8; 1.10, 1.16).

Lab (25): Slide demonstration and examination of: Eye Cornea, iris, retina, eye lid & lacrimal gland), Organ of Corti and Taste buds (Histology)

ILOs: To

C.5 Microscopic identification of different parts of the eye.

C.6 Microscopic identification of organ of corti.

C.6 Label diagram of organ of corti.

C.6 Label diagram of taste buds.

NARS: (4.8).

Lab (26): Visual system examination (Physiology)

ILOs: To

C.1 Test corneal reflex (blink reflex).

C.2 Assess pupillary light and near (accommodation) reflexes.

C.3 Monitor visual acuity and **Test** the visual field.

C.5 Assess the color vision.

NARS: (1.8; 1.10).

Lab (27): Hearing tests (Physiology)

ILOs: To

C.1 Acquire the skill of doing hearing tests for differentiating between conductive and sensorineural deafness.

C.2 Assess report on audiometer results.

NARS: (1.8; 1.10).

Lab (28): Parasitic infection of the brain and eye (Parasitology)

ILOs: To

C.1 Demonstrate microscopic diagnostic features of the causative parasites.

C.1 Identify the infective and diagnostic stages of the parasites under microscope, pathological features in sections of the brain or eye tissues.

NARS: (1.8, 1.11, 2.5, 4.6, 4.8).

C. Topics of Case -based Group Discussion and their intended learning outcomes

Case (1): Fracture of the skull base, Cephalohematoma, Epidural hematoma (Anatomy, 60 min)

ILOs: To

B.7 correlates anatomical facts concerning the relation of the middle ear to the middle cranial fossa in cases of fracture of the base of the skull and infections of the middle ear.

D.1 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

D.2 Practice the skill of respect colleagues.

D.3 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference book:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, Case # 28.

Case Files Anatomy Case # 43, page 288.

Case Files Anatomy Case # 44, page 294.

Case (2): Trigeminal nerve injury (trigeminal neuralgia) (Anatomy, 60 min)

ILOs: To

B.5 Explain the signs of cranial nerves injury on the basis of anatomical facts **D.1**

D.1 Practice the skill of respect colleagues.

D.2 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference books:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, pp. Case 34 &38 Anatomy test one.

First Aid Q&A USMLE step Case # 6, pp. 311.

Case files anatomy Case # 41, page 274.

Case (3): Injury of facial nerve (Anatomy, 60 min)**ILOs: To**

B.5 Explain the signs of cranial nerves injury on the basis of anatomical facts

D.1 Practice the skill of respect colleagues.

D.2 Adhere the value of team work by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference books:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, Anatomy test 2, Cases 35.

First Aid Q&A USMLE step 1 Case # 15 pp. 313

Case files anatomy Case # 40, pp. 268.

Case (4): Hypoglossal nerve and oculomotor nerve injuries (Anatomy, 60 min)**ILOs: To**

B.5 Explain the signs of cranial nerves injury on the basis of anatomical facts

D.1 Practice the skill of respect colleagues.

D.2 Adhere the value of team work by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference books:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, Anatomy test 2, Cases 40

Case files anatomy Case # 42, pp. 280.

Case (5): Branchial arches development (Cleft lip) -Torticollis (Anatomy, 60 min)**ILOs: To**

B.1 Interpret some clinical findings in relation to developmental basis.

D.1 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

NARS: (1.8, 4.5).

Reference books:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, pp. Anatomy test Two, Case 39.

Case files anatomy Case # 38, pp. 256.

Case (6): Schizophrenia (glutamate hypothesis of schizophrenia) (Biochemistry, 60 min)**ILOs: To**

D2 Present a case of schizophrenia.

D4 Discuss schizophrenia manifestations and its possible hypotheses.

B.1 Describe major classes of glutamatergic receptors.

B.1 Mention vital processes mediated by glutamatergic neurons.

B.1 Draw glutamate glutamine cycle in the brain.

NARS: (1.8; 1.10; 3.8; 3.9).

Reference book: The nervous system, basic science and clinical conditions, second edition, Cases # 15.1 and 15.2, pp. 268 – 275.

Case (7): Depression (Biochemistry, 60 min)**ILOs: To**

D.1 Discussion of a case of depression.

D.1 Define depression and its clinical characteristics.

D.1 Relation between brain neurotransmitters and depression.

D.1 Explain processes that might lower brain neurotransmitter levels.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

The nervous system, basic science and clinical conditions, second edition, Case # 16.1, pp. 281 – 287.

Case (8): Depression (Pharmacology, 60 min)

ILOs: To

D.2 Present a case of depression with its clinical manifestation.

D.2 Discuss the pharmacological basis of the drugs used in the treatment of depression.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

The First Aid Cases for the USMLE, 3rd Edition, Case # 4, pp. 315.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 144-145.

Case (9): Stroke & Hydrocephalus (Pathology, 60 min)

ILOs: To

B.1 Use information by all means (history, clinical & radiological data) to diagnose a case of stroke & identify its causes.

B.2 Analyze pathology of brain infarction in correlation to radiologic data.

B.3 Differentiate between epidural & subdural hemorrhage.

B.4 Explore types & complications of cerebral aneurysms.

D.1 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.2 Organize time and resources effectively and set priorities.

D.3 Discuss their work and that of others, using constructive feedback.

NARS: (1.9, 1.10, 4.8).

Reference books:

Case File pathology, 2nd edition (Case # 12, pp. 109).

First AID Cases for the USMLE Step1 3rd edition (Case #29, pp.296).

First AID Cases for the USMLE Step1 3rd edition (Case #32, pp.299).

Case (10): Cerebral arteries – Stroke (Anatomy, 60 min)

ILOs: To

B.12 Interpret anatomical facts with its major clinical applications (vascular injuries of basal ganglia and internal capsule).

D.1 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

D.2 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference books:

First Aid Q&A USMLE step 1 Case # 10, pp. 312; Case # 21, pp. 314.

Case (11): Headache (Physiology, 30 min)

ILOs: To

B.1 Explore the mechanism of headache.

D.1 Use information by all means, including electronically differentiating between types and different causes of headache.

D.1 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.1. Organize time and resources effectively and set priorities.

D.1 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (12): Migraine (Pharmacology, 30 min)

ILOs: To

D.2 Present a case of migraine.

D.4 Discuss the pharmacological basis of the drugs used in the treatment of migraine.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition, pp. 466-468, CASE number 12-1.

Case (13): Thalamic syndrome (Physiology, 30 min)

ILOs: To

B.2 Explore different symptoms and signs of thalamic syndrome.

D.2 Use information by all means, including electronically differentiating between lesions of different nuclei of the thalamus and identifies symptoms and signs of thalamic syndrome.

D.2 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.2 Organize time and resources effectively and set priorities.

D.2 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

References books:

Case of physiology

Case (14): Cases of upper and lower motor neuron lesions (Physiology, 30 min)

ILOs: To

B.2 Explore different symptoms and signs of thalamic syndrome.

D.2 Use information by all means, including electronically differentiating between lesions of different nuclei of the thalamus and identifies symptoms and signs of thalamic syndrome.

D.2 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.2 Organize time and resources effectively and set priorities.

D.2 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

References books:

Case of physiology

Case (15): Chronic pain (Physiology, 60 min)

ILOs: To

D.4 Use information by all means, including electronically to apply theories of pain control (gate control theory and descending control of pain) in the management of chronic intractable pain conditions (arthritis and malignancy).

D.4 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.4 Organize time and resources effectively and set priorities.

D.4 Discuss their work and that of others, using constructive feedback.

NARS: (1.8; 1.10).

References books:

Case of physiology

Case (16): Drug dependence (Pharmacology, 60 min)

ILOs: To

D.2 Present a case of drug dependence.

D.4 Discuss the manifestation and treatment of drug dependence.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

References books:

The First Aid Cases for the USMLE, 3rd Edition, Case #8, pp. 9.

Case (17): Lesions of different motor and sensory areas of the cerebral cortex (Physiology, 60 min)

ILOs: To

B.5 Explore the effect of lesion of different somatosensory and motor areas to diagnose and locate the site of damage of neurological cases.

D.5 Use information by all means, including electronically differentiating between lesions of different motor and sensory areas of the cerebral cortex.

D.5 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.5 Organize time and resources effectively and set priorities.

NARS: (1.8; 1.10).

References books:

Case of physiology

Case (18): Meningitis (Pathology, 30 min)

ILOs: To

B.1 Analyze and interpret the available data to achieve the diagnosis of different types of meningitis.

D.1 Differentiate between viral & suppurative meningitis.

D.2 Evaluate the consequences of meningitis.

D.3 Organize time and resources effectively and set priorities.

NARS: (4.3, 4.5, 4.6).

References books:

First AID Cases for the USMLE Step1 3rd edition (Case #40, pp.307).

Case (19): Cerebral abscess (Pathology, 30 min)

ILOs: To

D.1 Use history, clinical, laboratory & radiological data to diagnose brain abscess & differentiate it from other causes of SOL.

B.1 Explore tuberculous CNS lesions.

D.2 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.3 Organize time and resources effectively and set priorities.

NARS: (1.9, 1.10, 4.8, 5.3) (1.9, 1.10, 4.8, 5.3).

Reference books:

Robbins & Cotran Review of Pathology 4th edition (Cases # 36, pp.437-438).

Case (20): Transection of the spinal cord (complete, hemi-, quadrant transections) (Physiology, 60 min)

ILOs: To

D.6 Use information by all means, including electronically differentiating between complete, hemi section, anterior and posterior quadrant lesions of the spinal cord.

D.6 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.6 Organize time and resources effectively and set priorities.

D.6 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (21): Syringomyelia (Anatomy, 60 min)

ILOs: To

D.1 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

D.2 Practice the skill of respect colleagues.

D.3 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference book:

First Aid Q&A USMLE step 1 Case # 23; pp. 314.

Case (22): Parasitic infections cause space occupying lesions of the brain/ Parasitic infections of the eye (Parasitology, 60 min)

ILOs: To

B.1 Identify the main parasites causing space occupying lesions of the brain/ infections of the eye.

B.2 Analyze and interpret history, clinical, laboratory and radiological data to achieve the diagnosis of these parasitic infections.

B.3 Explain the mode of transmission, parasitological course and complications of the parasites.

B.4 Recall treatment and prevention

D.1 Practice the skill of self-learning.

D.2 Practice the value of teamwork by acting in small groups.

D.3 Develop adequate cooperation with his colleagues.

D.4 Arrange the efforts required to accomplish the tasks in specified time.

D.5 Reflect on and assess his/her performance using various performance indicators and information sources.

D6. Modify his capability to describe, discuss and solve problems.

NARS: (1.8, 2.5, 2.9, 4.5, 4.6, 4.7, 4.8, 1.11).

Reference books:

Cases in Human Parasitology Judith S. Heelan Washington, DC press, 2004. Case #13, pp55, Case # 14, pp. 59, Case #17, pp.71, Case# 18, pp. 75, Case#21, pp.87, Case #29, pp. 109.

Case (23): Parasitic infections cause brain diseases (Encephalitis, Meningoencephalitis, Cerebrovascular diseases) (Parasitology, 60 min)

ILOs: To

B.1 Identify the main parasites causing Encephalitis, Meningoencephalitis, Cerebrovascular diseases .

B.2 Analyze and interpret history, clinical, laboratory and radiological data to achieve the diagnosis of these parasitic infections .

B.3 Explain the mode of transmission, parasitological course and complications of the parasites.

B.4 Recall treatment and prevention

D.1 Practice the skill of self-learning.

D.2 Practice the value of teamwork by acting in small groups.

D.3 Develop adequate cooperation with his colleagues.

D.4 Arrange the efforts required to accomplish the tasks in specified time.

D.5 Reflect on and assess his/her performance using various performance indicators and information sources.

D6. Modify his capability to describe, discuss and solve problems.

NARS :(1.8, 2.5, 2.9, 4.5, 4.6, 4.7, 4.8, 1.11)

Reference books:

Cases in Human Parasitology Judith S. Heelan Washington, DC press, 2004. Case #13, pp55, Case # 14, pp. 59, Case #17, pp.71, Case# 18, pp. 75, Case#21, pp.87, Case #29, pp. 109.

Case (24): Neural tube defect-cerebellum development (Anatomy, 60 min)

ILOs: To

D.1 Deduce how and why common malformations occur in the nervous system.

D.2 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

D.3 Practice the skill of respect colleagues.

D.4 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5).

Reference book:

First Aid Q&A USMLE step 1 Case # 30, pp. 316.

Kaplan Medical USMLE Step 1 Lecture Notes 2008, Case # 27 Anatomy test one.

Kaplan Medical USMLE Step 1 Lecture Notes 2008, Case # 11. Anatomy test one

Case (25): Aphasia and dysarthria (Physiology, 30 min)

ILOs: To

B.11 Differentiate between various types of aphasia.

D.11 Use information by all means, including electronically, differentiating between different types of aphasia and dysarthria.

D.11 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.11 Organize time and resources effectively and set priorities.

D.11 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (26): Demyelinated diseases (Physiology, 30 min)

ILOs: To

D.7 Use information by all means, including electronically, diagnosing a case of demyelinating disease.

D.7 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.7 Organize time and resources effectively and set priorities.

D.7 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (27): Ataxia (Physiology, 30 min)

ILOs: To

D.8 Use information by all means, including electronically, to evaluate the consequences of lesions of different parts of the cerebellum.

D.8 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively to differentiate between sensory and motor ataxia.

D8 Organize time and resources effectively and set priorities.

D.8 Discuss their work and that of others, using constructive feedback.

NARS: (1.8; 1.10).

Reference book:

Case of physiology

Case (28): Vertigo (Physiology, 30 min)

ILOs: To

D.9 Use information by all means, including electronically, differentiating between causes vertigo (labyrinth, cerebellum, brain stem).

D.9 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.9 Organize time and resources effectively and set priorities.

D.9 Discuss their work and that of others, using constructive feedback.

NARS: (3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (29): Parkinsonism, athetosis, hemiballismus and chorea (Physiology, 60 min)

ILOs: To

D.10 Use information by all means, including electronically differentiating between basal ganglia disorders (manifestation, causes, management).

D.10 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.10 Organize time and resources effectively and set priorities.

D.10 Discuss their work and that of others, using constructive feedback.

NARS: (3.1; 5.2; 5.3; 5.4; 5.6; 5.7)

Reference book:

Case of physiology

Case (30): Tetanus, botulism, Rabies, Poliomyelitis and prion diseases (Microbiology, 60 min)

ILOs: To

B.1 Analyze and interpret the available data to achieve the diagnosis

D.1 Practice the skill of self-learning.

D.2 Practice the value of teamwork by acting in small groups.

D.3 Develop adequate cooperation with his colleagues.

D.4 Arrange the efforts required to accomplish the tasks in specified time.

D.5 Reflect on and assess his/her performance using various performance indicators and information sources.

D.6 Modify his capability to describe, discuss and solve problems.

NARS: (1.8, 2.5, 2.9, 4.5, 4.6, 4.7, 4.8, 1.11)

Reference books:

Pretest Microbiology: (Case # 40 pp.44, Case # 214 pp.188).

First Aid Q&A: (Case # 14 pp.67, Case # 24 pp.69).

Case (31): Alzheimer & Parkinsonism (Pathology, 60 min)

ILOs: To

B.1 Discuss the key difference between neurologic degenerative diseases.

B.2 Analyze pathology & microscopic finding of Alzheimer disease.

B.3 Assess definition & causes of dementia.

D.1 Practice the skill of self-learning.

NARS: (4.3, 4.5, 4.6).

Reference books:

Case File pathology, 2nd edition (Case # 13 ppt. 117).

First AID Cases for the USMLE Step1 3rd edition (Case #26, pp.296).

Case (32): Multiple Sclerosis (MS) (Pathology, 60 min)

ILOs: To

B.1 Analyse & interpret the available data to achieve the diagnosis of MS.

D.1 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.2 Practice the skill of self-learning.

NARS: (4.3, 4.5, 4.6).

Reference book:

First AID Cases for the USMLE Step1 3rd edition (Case #23, pp.288).

Case (33): Epilepsy (Pharmacology, 30 min)**ILOs: To**

D.4 Present cases of epilepsy.

D.4 Discuss the pharmacological basis of different drugs used in the treatment of epilepsy.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

The First Aid Cases for the USMLE, 3rd Edition, Case # 28, pp. 295.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition; pp. 169-170.

Case (34): Alzheimer disease (Pharmacology, 30 min)**ILOs: To**

D.5 Present a case of Alzheimer.

D.5 Discuss the pharmacological basis of drugs used in the treatment of Alzheimer disease.

NARS: (3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

The First Aid Cases for the USMLE, 3rd Edition, Case # 1, pp. 266.

Lippincott Illustrated Reviews: Pharmacology, Sixth Edition; pp. 118-119.

Case (35): Tumors of nervous system (Pathology, 60 min)**ILOs. To**

B.1 Analyze how to differentiate between various brain tumors according to site & age.

B.2 Explore most common CNS tumors in children & adult.

B.3 Compare & contrast the location of CNS tumors in children & adult.

B.4 Analyze the available data to achieve the diagnosis of metastatic tumors.

D.1 Discuss their work and that of others, using constructive feedback.

D.2 Practice the skill of self-learning.

NARS: (4.3, 4.5, 4.6).

Reference books.

First AID Cases for the USMLE Step1 3rd edition (Case #20 pp.285).

Case File pathology, 2nd edition (Case # 14, pp. 127).

First AID Cases for the USMLE Step1 3rd edition (Case #10 pp.275).

Case (36): Tumors of nervous system (Pathology, 60 min)**ILOs. To**

B.1 Analyze history, clinical & radiological data to Diagnose brain & spinal cord tumors.

D.1 Organize time and resources effectively and set priorities.

D.2 Discuss their work and that of others, using constructive feedback.

B.3 Compare between Schwannoma & Neurofibroma.

B.4 Explore neurofibromatosis type 1 & 2.

D.3 Present information clearly in written, electronic and oral forms, & communicates ideas and arguments effectively.

NARS. (1.9, 1.10, 4.3, 4.5, 4.6, 4.8)

Reference books:

First AID Cases for the USMLE Step1 3rd edition (Case #17 &18 pp.282&283).

Case File pathology, 2nd edition (Case #15 pp. 133).

Case (37): Corneal abrasion, clinical cases about abnormalities in neurons, glial cells and synapses (Histology, 60 min)**ILOs: To**

- D.1 Explain the signs of these diseases on the basis of histological facts.
 D.2 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.
 D.3 Practice the skill of respect colleagues.
 D.4 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5).

Reference book:

Case files Neuroscience (cases 1.2, 1.3, 2.1, 2.3, 5.1 & 5.3. pp. 11, 12, 20, 21, 46 &47), FIRST AID CASES for the USMLE STEP 1, Case # 4, pp. 269.

Case (38): Visual field defects (Anatomy, 60 min)

ILOs: To

B.16 Explain the effect of injury and its clinical manifestations at various levels of the visual pathway on anatomical basis.

D.1 Set the use of sources of biomedical information to remain current with advances in knowledge and practice.

D.2 Practice the skill of respect colleagues.

D.3 Adhere the value of teamwork by acting in small groups.

NARS: (1.8, 4.5, 5.3).

Reference book:

Kaplan Medical USMLE Step 1 Lecture Notes 2008, pp. Anatomy test One, Case # 4.

Case (39): Meningoencephalitis (Microbiology, 30 min)

ILOs: To

B.1 Analyze and interpret the available data to achieve the diagnosis.

D.1 Practice the skill of self-learning.

D.2 Practice the value of teamwork by acting in small groups.

D.3 Develop adequate cooperation with his colleagues.

D.4 Arrange the efforts required to accomplish the tasks in specified time.

D.5 Reflect on and assess his/her performance using various performance indicators and information sources.

D.6 Modify his capability to describe, discuss and solve problems.

NARS: (1.8, 2.5, 2.9, 4.5, 4.6, 4.7, 4.8, 1.11).

Reference books:

Pretest Microbiology. (Case # 58, pp.49, Case # 340, pp. 293).

First Aid Q&A: (Case # 5, pp.64, Case # 21, pp.68, Case # 1, pp.310).

Case (40): Otitis media and conjunctivitis (Microbiology, 30 min)

ILOs: To

B.1 Analyze and interpret the available data to achieve the diagnosis.

D.1 Practice the skill of self-learning.

D.2 Practice the value of teamwork by acting in small groups.

D.3 Develop adequate cooperation with his colleagues.

D.4 Arrange the efforts required to accomplish the tasks in specified time.

D.5 Reflect on and assess his/her performance using various performance indicators and information sources.

D.6 Modify his capability to describe, discuss and solve problems.

NARS: (1.8, 2.5, 2.9, 4.5, 4.6, 4.7, 4.8, 1.11).

Reference books:

Pretest Microbiology: (Case # 96 pp.93, Case # 289 pp.214).

Case (41): Errors of refraction night blindness (Physiology, 30 min)

ILOs: To

D.12 Use information by all means, including electronically to **distinguish** the different types of refractive errors that can occur in the eye and to **apply** optical principles for correction of errors of refraction.

D.12 Present information clearly in written, electronic and oral forms to know the importance of vit A in dim vision and to **diagnose** a case of night blindness.

D.12 Organize time and resources effectively and set priorities.

D.12 Discuss their work and that of others, using constructive feedback.

NARS: (1.8; 1.10).

Reference book:

Case of physiology

Case (42): Color blindness and glaucoma (Physiology, 30 min)

ILOs: To

B.6 Applied information to know the different types and causes of colour blindness.

B.14 Distinguish synthesis, flow and drainage of aqueous humor to explain the pathophysiology of glaucoma.

D.13 Use information by all means, including electronically to know different types of glaucoma.

D.13 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively to identify causes and types of colour blindness.

D.13 Organize time and resources effectively and set priorities.

D.13 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Case (43): Deafness (Physiology, 60 min)

ILOs: To

D.14 Use information by all means, including electronically differentiating between conductive and perceptive deafness.

D.14 Present information clearly in written, electronic and oral forms, and communicates ideas and arguments effectively.

D.14 Organize time and resources effectively and set priorities.

D.14 Discuss their work and that of others, using constructive feedback.

NARS: (1.9; 3.1; 5.2; 5.3; 5.4; 5.6; 5.7).

Reference book:

Case of physiology

Time table of Course

Time table of Week # 1

Number	Title	Departments
Lectures		
1	Scalp, face and Muscles of the head.	Anatomy
2	Muscles of the neck.	Anatomy
3	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy
4	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy
5	Blood supply and lymphatic of the head and neck.	Anatomy
6	Contents of orbit.	Anatomy
7	Blood supply of the brain.	Anatomy
8	Development of the head and neck.	Anatomy
9	Meninges and ventricular system.	Anatomy
10	Meninges and ventricular system.	Anatomy
11	Histological structure of the neurons, synapses and neuroglial cells.	Histology
12	Histological structure of the meninges (pia and arachnoid and dura matters), choroids plexus and different types of brain barriers.	Histology
Practical sessions		
1	Skull.	Anatomy
2	Skull and cervical vertebrae.	Anatomy
3	Muscles of the head.	Anatomy
4	Neck. Blood supply of the head and neck.	Anatomy
Case based groups discussion		
1	Fracture of the skull base. Cephalohematoma. Epidural hematoma.	Anatomy (60 min)
2	Trigeminal nerve injury (trigeminal neuralgia).	Anatomy (60 min)
3	Injury of facial nerve	Anatomy (60 min)
4	Hypoglossal nerve and oculomotor nerve injuries	Anatomy (60 min)
5	Branchial arches development (Cleft lip)- Torticollis.	Anatomy (60 min)

Time table of Week # 2

Number	Title	Departments
Lectures		
1	Structure of the ear.	Anatomy
2	Cerebral circulation and Physiology of cerebrospinal fluid.	Physiology
3	Basic functions of the synapses and neurotransmitters.	Physiology
4	Basic functions of the synapses and neurotransmitters	Physiology
5	Basic functions of the synapses and neurotransmitters.	Physiology
6	Neurotransmitters.	Biochemistry
7	Neurotransmitters.	Biochemistry
8	Somatosensory function.	Physiology
9	Histological structure of the spinal cord (nuclei and lamination). Differentiate between different levels of the spinal cord.	Histology
10	Antidepressants.	Pharmacology
11	Basic Pathology of CNS.	Pathology
12	Cerebrovascular Diseases.	Pathology
Practical sessions		
1	Orbit and ear.	Anatomy
2	Meninges and brain ventricles.	Anatomy
3	Blood supply of the brain	Anatomy
4	Slide demonstration and examination of: Nerve trunk (Hx&E Osmic acid), Spinal ganglion (Hx&E). Cervical spinal cord.	Histology
Case based groups discussion		
1	Schizophrenia (glutamate hypothesis of schizophrenia)	Biochemistry (60 min)
2	Depression.	Biochemistry (60 min)
3	Depression.	Pharmacology (60 min)
4	Stroke & Hydrocephalus.	Pathology (60 min)
5	Cerebral arteries ,stroke	Anatomy (60 min)

Time table of Week # 3

Number	Title	Departments
Lectures		
1	Spinal cord.	Anatomy
2	Spinal cord.	Anatomy
3	Peripheral nervous system.	Anatomy
4	Brain stem.	Anatomy
5	Physiology of pain (I).	Physiology
6	Physiology of pain (II).	Physiology
7	Local anesthetics.	Pharmacology
8	General anesthetics.	Pharmacology
9	Opioids.	Pharmacology
10	Stretch reflex (I)	Physiology
11	Stretch reflex (II)	Physiology
12	Cerebrum (I).	Anatomy
Practical sessions		
1	Brain stem, attachments of cranial nerves and spinal cord.	Anatomy
2	Somatosensory function.	Physiology
3	Local and general Anesthetics.	Pharmacology
4	Drug dependence	Pharmacology
Case based groups discussion		
1	Headache.	Physiology (30 min)
	Migraine.	Pharmacology (30 min)
2	Thalamic syndrome.	Physiology (30 min)
	Upper and lower motor neuron lesions.	Physiology (30 min)
3	Chronic pain.	Physiology (60 min)
4	Drug dependence.	Pharmacology (60 min)
5	Lesions of different motor and sensory of areas of the cerebral cortex.	Physiology (60 min)

Time table of Week # 4

Number	Title	Departments
Lectures		
1	Cerebrum (II).	Anatomy
2	Myelination in PNS and CNS and Types of nerve fibers and nerve endings.	Histology
3	Histological structure of the cerebral and cerebellar cortex.	Histology
4	Sensory and motor areas of the cerebral cortex (I).	Physiology
5	Sensory and motor areas of the cerebral cortex (II).	Physiology
6	Intellectual Functions of the Brain, Physiology of speech.	Physiology
7	Infection of CNS. Meningitis. Encephalitis.	Pathology
8	Protozoa causing CNS diseases (I).	Parasitology
9	Protozoa causing CNS diseases (II).	Parasitology
10	Meningitis and Encephalitis (I)	Microbiology
11	Meningitis and Encephalitis (II)	Microbiology
12	Brain abscess, Poliomyelitis, Rabies.	Microbiology
Practical sessions		
1	Cerebral hemisphere	Anatomy
2	Spinal reflexes	Physiology
3	Transverse sections of the brain	Anatomy
4	Coronal sections of the brain	Anatomy
Case based groups discussion		
1	Meningitis.	Pathology (30 min)
	Cerebral abscess.	Pathology (30 min)
2	Transection of the spinal cord (complete, hemi-, quadiant transections).	Physiology (60 min)
3	Syringomyelia	Anatomy (60 min)
4	Parasitic infections cause space occupying lesions of the brain/ Parasitic infections of the eye.	Parasitology (60 min)
5	Parasitic infections cause brain diseases (Encephalitis, Meningoencephalitis, Cerebrovascular diseases).	Parasitology (60 min))

Time table of Week # 5

Number	Title	Departments
Lectures		
1	Helminths causing CNS diseases (I).	Parasitology
2	Helminths causing CNS diseases (II)	Parasitology
3	Tetanus, Botulism, Prion disease.	Microbiology
4	Cerebellum.	Anatomy
5	Cerebellum (functions).	Physiology
6	Functions of vestibular apparatus.	Physiology
7	Development of the nervous system.	Anatomy
8	Physiology of basal ganglia.	Physiology
9	Antiparkinsonian.	Pharmacology
10	Limbic system.	Physiology
11	Learning and Memory.	Physiology
12	Hypothalamus.	Physiology
Practical sessions		
1	Slide demonstration and examination of: Cerebral cortex. Brain stems (midbrain, pons, and medulla oblongata). Cerebellum.	Histology
2	Cerebellum.	Anatomy
3	Cerebellum and vestibular apparatus examinations.	Physiology
4	Lumbar puncture & Lab diagnosis of microbial infections of the CNS.	Microbiology
Case based groups discussion		
1	Neural tube defect-cerebellum development	Anatomy (60 min)
2	Aphasia and dysarthria	Physiology (30 min)
	Demyelinated diseases.	Physiology (30 min)
3	Ataxia.	Physiology (30 min)
	Vertigo.	Physiology (30 min)
4	Parkinsonism, athetosis, hemiballismus, chorea.	Physiology (60 min)
5	Tetanus, botulism, Rabies, Poliomyelitis and prion diseases.	Microbiology (60 min)

Time table of Week # 6

Number	Title	Departments
Lectures		
1	Reticular activating system and Wakefulness.	Physiology
2	Anticonvulsants.	Pharmacology
3	Physiology of sleep.	Physiology
4	Hypnotics / Anxiolytic.	Pharmacology
5	Degenerative and demyelinated diseases.	Pathology
6	Brain tumors (I).	Pathology
7	Brain tumors (II).	Pathology
8	Metabolism of brain.	Biochemistry
9	Antipsychotics.	Pharmacology
10	Visual pathway.	Anatomy
11	Histological structure of the eye and its accessory structures.	Histology
12	Functions of different parts of the eye.	Physiology
Practical sessions		
1	Lab diagnosis of microbial infections of the CNS.	Microbiology
2	Slide demonstration of: - Schwannoma. - Meningioma.	Pathology
3	Gross demonstration of specimens of intracranial hemorrhage and examples of brain tumors.	Pathology
4	Antiepileptics, antidepressant antipsychotics and antiparkinsonian drugs (samples, prescriptions).	Pharmacology
Case based groups discussion		
1	Alzheimer disease & Parkinson diseases.	Pathology (60 min)
2	Multiple Sclerosis.	Pathology (60 min)
3	Epilepsy	Pharmacology (30 min)
	Alzheimer disease.	Pharmacology (30 min)
4	CNS tumors.	Pathology (60 min)
5	CNS tumors.	Pathology (60 min)

Time table of Week # 7

Number	Title	Departments
Lectures		
1	The optical system of the eye.	Physiology
2	The visual process.	Physiology
3	Light- dark adaptation cycle and color vision.	Physiology
4	Parasitic infections of the eye.	Parasitology
5	Infections of the eye and the ear.	Microbiology
6	Auditory and vestibular pathways.	Anatomy
7	Gustatory and olfactory pathways.	Anatomy
8	Histological structure of sensory organs of hearing, balance, taste and smell.	Histology
9	Hearing mechanisms (I).	Physiology
10	Hearing mechanisms (II).	Physiology
11	Chemosensory functions (I).	Physiology
12	Chemosensory functions (II).	Physiology
Practical sessions		
1	Slide demonstration and examination of: Eye: Cornea, iris, retina, eye lid & lacrimal gland. Organ of Corti. Taste buds.	Histology
2	Visual system examination.	Physiology
3	Hearing tests.	Physiology
4	Parasitic infections of the brain and eye.	Parasitology
Case based groups discussion		
1	Corneal abrasion, clinical cases about abnormalities in neurons, glial cells and synapses.	Histology (60 min)
2	Visual field defects.	Anatomy (60 min)
3	Meningoencephalitis	Microbiology (30 min)
	Otitis media and conjunctivitis	Microbiology (30 min)
4	Errors of refraction, and Night blindness.	Physiology (30 min)
	Color blindness and glaucoma	Physiology (30 min)
5	Deafness.	Physiology (60 min)

NEU-312 End-block exam Blueprint			
Lecture number	Lecture title	Departments	mark
1	Scalp, face and Muscles of the head.	Anatomy	1
2	Muscles of the neck.	Anatomy	-----
3	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy	1
4	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy	-----
5	Blood supply and lymphatic of the head and neck.	Anatomy	1
6	Contents of orbit.	Anatomy	1
7	Blood supply of the brain.	Anatomy	1
8	Development of the head and neck.	Anatomy	1
9	Meninges and ventricular system.	Anatomy	1
10	Meninges and ventricular system.	Anatomy	-----
11	Histological structure of the neurons, synapses and neuroglial cells.	Histology	1
12	Histological structure of the meninges (pia and arachnoid and dura matters), choroids plexus and different types of brain barriers.	Histology	1
13	Structure of the ear.	Anatomy	1
14	Cerebral circulation and Physiology of cerebrospinal fluid.	Physiology	1
15	Basic functions of the synapses and neurotransmitters.	Physiology	1
16	Basic functions of the synapses and neurotransmitters	Physiology	1
17	Basic functions of the synapses and neurotransmitters.	Physiology	1
18	Neurotransmitters.	Biochemistry	1
19	Neurotransmitters.	Biochemistry	1
20	Somatosensory function.	Physiology	1
21	Histological structure of the spinal cord (nuclei and lamination). Differentiate between different levels	Histology	-----

	of the spinal cord.		
22	Antidepressants.	Pharmacology	-----
23	Basic Pathology of CNS.	Pathology	2
24	Cerebrovascular Diseases.	Pathology	1
25	Spinal cord.	Anatomy	-----
26	Spinal cord.	Anatomy	-----
27	Peripheral nervous system.	Anatomy	-----
28	Brain stem.	Anatomy	----
29	Physiology of pain (I).	Physiology	1
30	Physiology of pain (II).	Physiology	1
31	Local anesthetics.	Pharmacology	1
32	General anesthetics.	Pharmacology	1
33	Opioids.	Pharmacology	1
34	Stretch reflex (I)	Physiology	1
35	Stretch reflex (II)	Physiology	1
36	Cerebrum (I).	Anatomy	1
37	Cerebrum (II).	Anatomy	-----
38	Myelination in PNS and CNS and Types of nerve fibers and nerve endings.	Histology	1
39	Histological structure of the cerebral and cerebellar cortex.	Histology	-----
40	Sensory and motor areas of the cerebral cortex (I).	Physiology	1
41	Sensory and motor areas of the cerebral cortex (II).	Physiology	1
42	Intellectual Functions of the Brain, Physiology of speech.	Physiology	1
43	Antiparkinsonian.	Pharmacology	1
44	Meningitis	Microbiology	1
45	encephalitis	Microbiology	1
46	Protozoa causing CNS diseases (I).	Parasitology	1
47	Protozoa causing CNS diseases (II).	Parasitology	1

total			37
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NEU-312final-block exam Blueprint			
Lecture number	Lecture title	Departments	mark
1	Scalp, face and Muscles of the head.	Anatomy	1
2	Muscles of the neck.	Anatomy	1
3	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy	1
4	Nerves of head and neck (cranial nerves & cervical plexus).	Anatomy	1
5	Blood supply and lymphatic of the head and neck.	Anatomy	1
6	Contents of orbit.	Anatomy	1
7	Blood supply of the brain.	Anatomy	1
8	Development of the head and neck.	Anatomy	1
9	Meninges and ventricular system.	Anatomy	
10	Meninges and ventricular system.	Anatomy	1
11	Histological structure of the neurons, synapses and neuroglial cells.	Histology	1
12	Histological structure of the meninges (pia and arachnoid and dura matters), choroids plexus and different types of brain barriers.	Histology	
13	Structure of the ear.	Anatomy	1
14	Cerebral circulation and Physiology of cerebrospinal fluid.	Physiology	1
15	Basic functions of the synapses and neurotransmitters.	Physiology	1
16	Basic functions of the synapses and neurotransmitters	Physiology	1
17	Basic functions of the synapses and neurotransmitters.	Physiology	0
18	Neurotransmitters.	Biochemistry	1
19	Neurotransmitters.	Biochemistry	1
20	Somatosensory function.	Physiology	1

21	Histological structure of the spinal cord (nuclei and lamination). Differentiate between different levels of spinal cord	Histology	1
22	Antidepressants.	Pharmacology	1
23	Basic Pathology of CNS.	Pathology	0
24	Cerebrovascular Diseases.	Pathology	1
25	Spinal cord.	Anatomy	1
26	Spinal cord.	Anatomy	
27	Peripheral nervous system.	Anatomy	1
28	Brain stem.	Anatomy	1
29	Physiology of pain (I).	Physiology	1
30	Physiology of pain (II).	Physiology	1
31	Local anesthetics.	Pharmacology	-----
32	General anesthetics.	Pharmacology	-----
33	Opioids.	Pharmacology	1
34	Stretch reflex (I)	Physiology	1
35	Stretch reflex (II)	Physiology	1
36	Cerebrum (I).	Anatomy	1
37	Cerebrum (II).	Anatomy	1
38	Myelination in PNS and CNS and Types of nerve fibers and nerve endings.	Histology	
39	Histological structure of the cerebral and cerebellar cortex.	Histology	1
40	Sensory and motor areas of the cerebral cortex (I).	Physiology	1
41	Sensory and motor areas of the cerebral cortex (II).	Physiology	1
42	Intellectual Functions of the Brain, Physiology of speech.	Physiology	1
43	Infection of CNS. Meningitis. Encephalitis.	Pathology	1
44	Protozoa causing CNS diseases (I).	Parasitology	
45	Protozoa causing CNS diseases (II).	Parasitology	
46	Meningitis	Microbiology	-----

47	Encephalitis	Microbiology	-----
48	Brain abscess, Poliomyelitis, Rabies.	Microbiology	1
49	Helminths causing CNS diseases (I).	Parasitology	1
50	Helminths causing CNS diseases (II)	Parasitology	1
51	Tetanus, Botulism, Prion disease.	Microbiology	2
52	Cerebellum.	Anatomy	1
53	Cerebellum (functions).	Physiology	1
54	Functions of vestibular apparatus.	Physiology	1
55	Development of the nervous system.	Anatomy	1
56	Physiology of basal ganglia.	Physiology	1
57	Antiparkinsonian.	Pharmacology	1
58	Limbic system.	Physiology	-----
59	Learning and Memory.	Physiology	1
60	Hypothalamus.	Physiology	1
61	Reticular activating system and Wakefulness.	Physiology	1
62	Anticonvulsants.	Pharmacology	2
63	Physiology of sleep.	Physiology	1
64	Hypnotics / Anxiolytic.	Pharmacology	1
65	Degenerative and demyelinated diseases.	Pathology	1
66	Brain tumors (I).	Pathology	1
67	Brain tumors (II).	Pathology	1
68	Metabolism of brain.	Biochemistry	1
69	Antipsychotics.	Pharmacology	1
70	Visual pathway.	Anatomy	1
71	Histological structure of the eye and its accessory structures.	Histology	1
72	Functions of different parts of the eye.	Physiology	1
73	The optical system of the eye.	Physiology	1

74	The visual process.	Physiology	1
75	Light- dark adaptation cycle and color vision.	Physiology	1
76	Parasitic infections of the eye.	Parasitology	2
77	Infections of the eye and the ear.	Microbiology	1
78	Auditory and vestibular pathways.	Anatomy	1
79	Gustatory and olfactory pathways.	Anatomy	1
80	Histological structure of sensory organs of hearing, balance, taste and smell.	Histology	2
81	Hearing mechanisms (I).	Physiology	1
82	Hearing mechanisms (II).	Physiology	1
83	Chemosensory functions (I).	Physiology	1
84	Chemosensory functions (II).	Physiology	1
Total	84hours		75 mark

Practical exam blueprint			
Experiment number	Laboratory name	Departments	mark
1	Skull.	Anatomy	1
2	Skull and cervical vertebrae.	Anatomy	2
3	Muscles of the head.	Anatomy	2
4	Neck. Blood supply of the head and neck.	Anatomy	2
5	Orbit and ear.	Anatomy	2
6	Meninges and brain ventricles.	Anatomy	2
7	Blood supply of the brain	Anatomy	2
8	Slide demonstration and examination of: Nerve trunk (Hx&E Osmic acid), Spinal ganglion (Hx&E). Cervical spinal cord.	Histology	2
9	Brain stem, attachments of cranial nerves and spinal cord.	Anatomy	2
10	Somatosensory function.	Physiology	2
11	Local and general Anesthetics.	Pharmacology	2
12	Drug dependence	Pharmacology	1
13	Cerebral hemisphere	Anatomy	2
14	Spinal reflexes	Physiology	2
15	Transverse sections of the brain	Anatomy	1
16	Coronal sections of the brain	Anatomy	1
17	Slide demonstration and examination of: Cerebral cortex. Brain stems (midbrain, pons, and medulla oblongata). Cerebellum.	Histology	2
18	Cerebellum.	Anatomy	1.5
19	Cerebellum and vestibular apparatus examinations.	Physiology	2.5
20	Lumbar puncture & Lab diagnosis of microbial infections of the CNS.	Microbiology	2
21	Lab diagnosis of microbial infections of the CNS.	Microbiology	2.5

22	Slide demonstration of: - Schwannoma. - Meningioma.	Pathology	2
23	Gross demonstration of specimens of intracranial hemorrhage and examples of brain tumors.	Pathology	2
24	Antiepileptics, antidepressant, antipsychotics and antiparkinsonian drugs (samples, prescriptions).	Pharmacology	3.5
25	Slide demonstration and examination of: Eye: Cornea, iris, retina, eye lid & lacrimal gland. Organ of Corti. Taste buds.	Histology	2.5
26	Visual system examination.	Physiology	2
27	Hearing tests.	Physiology	2
28	Parasitic infections of the brain and eye.	Parasitology	3.5
Total	56 hours		57

Department	Lectures hours	Mid-term (20%, 37.5 marks)	Final Written exam (40%, 75 marks)	Total written marks (112.5 marks)	Practical hours	Practical exam (30%, 57 marks)	Cases hours	Formative (10%, 18 marks)	Total (187.5 marks)
Medical Physiology	28	12	26	38	10	10.5	9.5	5	53.5
Anatomy	22	9	20	29	24	21.5	9	4.5	55
Pharmacology	8	4	7	11	6	6.5	4	2	19.5
Histology	7	3	6	9	6	6.5	1	1	16.5
Pathology	6	3	5	8	4	4	6	3	15
Microbiology	5	2	4	6	4	4.5	2	1	11.5
Parasitology	5	2	4	6	2	3.5	2	1	10.5
Biochemistry	3	2	3	5	-	-	2	1	6
TOTAL	84	37	75	112	56	57	35	18.5	187.5