

Dow University of Health Sciences



HEAD AND NECK & SPECIAL SENSES MODULE

STUDY GUIDE

Second Year MBBS

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INTRODUCTION

WHAT IS A STUDY GUIDE?

A study guide provides a focus for different educational activities in which the students are engaged. It equips students with information on the topic of study and assists in management of student learning. Furthermore, it imparts relevant information about the organization of the module and thus helps students organize their educational activities accordingly. Another important purpose of a study guide is the dissemination of information about rules and policies and teaching and assessment methods.

HOW DOES A STUDY GUIDE HELP LEARNERS?

- Includes information on organization and management of the module.
- Advises the learners about representatives who can be contacted in case of need.
- Defines the outcomes and objectives which are expected to be achieved at the end of the module.
- Elaborates the teaching and learning strategies which will be implemented during the module.
- Inform learners about the learning resources in order to maximize their learning.
- Provides information about the assessment methods that will be held to determine every student's achievement of objectives.

CURRICULUM MODEL:

Integrated modular curriculum is followed at Dow University of Health Sciences for MBBS program. This implies that instead of studying basic and clinical sciences separate and apart, students will experience a balanced and integrated combination of basic and clinical sciences in the form of a system-based modules.

The modular curriculum followed by Dow University of Health Sciences is integrated both in the vertical and the horizontal directions. However, in order to prepare the students for clinical teaching with a sound background knowledge of the basic sciences, the curriculum has been divided in three spirals.

The three spirals are:

1. Spiral -1 Basic Sciences
2. Spiral -2 Clinical Sciences
3. Spiral -3 Integrated Supervised Practical Training

The Basic Sciences Spiral is spread over the first two years and Clinical Sciences Spiral is distributed over the next two years. In the final year students are given practical hands-on training in the role similar to that of a shadow house officer. The whole curriculum is divided into modules, each module being related to a particular system. For example, Cardiovascular 1 module is in the Basic Sciences Spiral-1 and Cardiovascular 2 module is in the Clinical Sciences Spiral-2 and the relevant practical and clinical teaching/learning will be accomplished in Final year Spiral-3.

TEACHING & LEARNING METHODOLOGIES:

The following teaching/ learning methods may be used to facilitate the learning process:

1. **Interactive Lectures:** Lectures are considered as an efficient means of transferring knowledge to large audiences.
2. **Small Group Discussion:** Small group discussion such as Demonstrations, tutorials and case- based learning (CBL) sessions facilitate interactive learning which helps students develop discussion skills and critical thinking.
3. **Practicals:** Practical related to Basic Sciences are held to facilitate student learning.
4. **Skills:** Skills sessions are scheduled parallel with various modules at fully equipped Skills Lab and Simulation Lab in which students observe and learn skills relevant to the respective modules under guidance of Clinical Faculty.
5. **Self-Directed Learning (Self- Study):** Students have a measure of control over their own learning. They diagnose their needs, set objectives in accordance to their specific needs, identify resources and adjust their pace of learning

5 YEAR CURRICULAR ORGANIZATION

Spiral	year	Modules			
First Spiral	I	FND1- Foundation Cell, Genetics & Cell Death (Basics of Anatomy, Physiology, Biochemistry, Gen. Pathology, Gen. Pharmacology, Community Medicine & Behavioral Sciences. 9 Weeks		HEM1- Blood Module Immunity, Inflammation, Tissue repair, Antimicrobials & Neoplasia 9 Weeks	
		LCM1- Locomotion Bones, Joints, Nerves & Muscles 9 Weeks		RSP1- Respiratory System 6 weeks	CVS1- Cardiovascular System 4 weeks
	II	NEU1- Nervous System 8 weeks		HNN1- Head & Neck & Special Senses Module 6 weeks	END1- Endocrinology 5weeks
		GIL 1-GIT and Liver 8 weeks		EXC1- Renal and Excretory System 5 weeks	REP1- Reproductive System 5 weeks
Seco nd Spiral	III	IDD 1- Infectious diseases 5 weeks	HEM2- Hematology 5 weeks	RSP2- Respiratory System 5 weeks	CVS2- Cardiovascular System 5 weeks
		GIL 2-GIT and Liver (including Nutritional Disorders) 8weeks		EXC2- Renal & Excretory System 5 weeks	END2- Endocrinology 5 weeks
	IV	ORT2- Orthopedics, Rheumatology, Trauma 7 weeks	PMR-Physical Medicine & Rehabilitation DPS-Dermatology Plastic Surgery / Burns GEN-Genetics 6 weeks	REP2-Reproductive System 8 Weeks	
		NEU2- Neurosciences and Psychiatry 8 weeks		ENT* 4 weeks	OPHTHALMOLOGY/EYE 4 weeks
Thir d Spiral	V	Clinical Rotation 9:30 to 3:00 (with Ambulatory, Emergency, Intensive care) In Medicine, Pediatrics, Cardiology and Neurology units <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice aweek ▪ Ward tutorial twice a week ▪ Student research presentation once a week 		Clinical Rotation 9:30 to 3:00 (Inpatient, Ambulatory, Emergency, Intensivecare and Operation Theatres) In Surgery, Gynecology & Obstetrics, Orthopedics and Neurosurgery. <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice a week ▪ Ward tutorial twice a week ▪ Student research presentation once aweek 	

OVERVIEW

Program	MBBS	
Year	Second year	
Module Title	Head and Neck & Special Senses	
Module Code	HNN-1	
Duration	6 weeks	
	Anatomy	75 hours
	Physiology	32.5 hours
	Biochemistry	3.5 hours
	Community Medicine	3 hours
	Pathology	2.5 hours
Total Hours	Head and Neck & Special senses Module	116.5 hours

INTEGRATED MODULE COMMITTEE

RESPONSIBILITIES	NAMES	DESIGNATION	EMAILS
Chairperson Curriculum Committee, DUHS Chief Module coordinator	Prof. Naheed Khan	Prof. and Chairperson Anatomy	naheed.khan@duhs.edu.pk
Coordinator DIMC	Dr. Tanzeela Khan	Assistant Professor, Anatomy	tanzeela.khan@duhs.edu.pk
Co-coordinator DMC	Dr. Amna Mughal	Assistant Professor	amna.mughal@duhs.edu.pk

MODULE DESCRIPTION

This module has been designed for students to introduce them to the basic concepts of head and neck and special senses. This module includes Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Community medicine and Behavioral sciences.

Lectures, tutorials, small group sessions including CBL and practical are important components of this module. History taking, as part of clinical skills, is included in this module. Your co-operative and teamwork abilities will be improved by working in different teams. You will be able to develop problem solving skills to apply your medical knowledge to practical situations by means of group and individual tasks. This study guide has been developed to assist you and keep you focused to achieve your goals.

RATIONALE:

Head and neck is a special region of the body where brain, spinal cord, organs of special senses like eyes, ears, nose and the proximal alimentary and respiratory tracts exist in close proximity. The anatomical relationships of these organs to each other are important to understand as often diseases afflicting one of these also affect other organs by contiguity. Injuries to the region of head, face & neck are associated with high mortality & morbidity. It is necessary to study this region as a separate entity although it is not a separate system. This module provides the basic understanding of the anatomy and physiology of the components of head and neck.

LEARNING OUTCOMES

At the end of Five years MBBS program, student shall be able to:

- identify the common problems of Head and Neck and Special Senses
- to show improved confidence, attitudes and skills in treating common problems of Head and Neck and Special Senses
- manage appropriate referrals regarding problems of Head and Neck and Special Senses

DISCIPLINE-WISE LEARNING OBJECTIVES AND CONTENTS

At the end of the module, the student of 2nd year MBBS should be able to:

ANATOMY**Learning Objectives:**

- Define axial skeleton
- Describe bones of skull and cranium
- Explain overview of skull geography & Sutures
- Differentiate the various views of the skull
- Explain the extent of scalp
- Describe five layers of scalp, Scalp injuries & infections
- Define norma frontalis
- Explain the different regions of it
- Enumerate the muscle attachment
- Describe boundaries and features of its structure
- Enlist various bones in normal lateralis
- Describe the Cranial and facial subdivisions
- Define External acoustic meatus
- Describe bones forming the base of skull
- Explain the details of anterior, middle and posterior part of base of skull
- Identify different foramina and structures passing through them at the base
- Explain the attachments and relations of base of skull
- Describe bones forming the base of skull
- Explain the details of middle and posterior part of base of skull
- Identify different foramina and structures passing through them at the base
- Explain the attachments and relations of base of skull
- Describe the boundaries of the orbit
- Explain the relations of optic fascia
- Explain the muscles and their innervations, Injury to nerves supplying
- Eyelids & extraocular muscles
- Describe the foramina of orbital cavity with their contents.
- Explain the structures supplied by nerves of orbital cavity.
- Describe the blood vessels of orbit, Orbital tumors & fractures
- Ciliary ganglion and their disorders
- Describe the palpebarel fissure
- Explain the different layers of the eyelid and its muscles.
- Enumerate the blood supply and innervations of eyelids
- Retinal detachment, Horner syndrome, Presbyopia, Cataract, Glaucoma, Corneal ulcers & Transplants
- Describe the boundaries of face
- Enumerate the muscles and innervations of face
- Describe the blood supply of face

- Describe the disorders and applied of face, Facial lacerations & incisions, Facial Palsy, Trigeminal neuralgia.
- Describe arterial supply of head and neck, including:

External carotid artery origin and supply, Maxillary artery origin and supply, Facial artery origin and supply, Lingual artery origin and supply, Internal carotid artery origin, Major venous drainage to sinuses, Head and neck major veins, Pulsations of arteries in face & scalp, Compression of Facial artery

- Describe Parts of ear, Tympanic membrane perforations
- Explain functions of middle ear, Acute otitis externa & media, Mastoiditis, Blockage of Pharyngotympanic tube
- Explain functions of internal ear.
- Explain of organ of hearing and balance.
- Define vestibulocochlear nerve.
- Explain the components & structure and function of this nerve.
- Describe its attachment to the brain stem & its course through the cranial cavity.
- Describe its innervations & symptoms of damage like hearing loss, vertigo, nystagmus, motion sickness, false sense of motion, loss of equilibrium (in dark places), gaze-evoked tinnitus.
- Interpret related applied anatomy.
- Describe intracranial part of facial nerve.
- Define Location of mandible
- Describe Parts of mandible
- Explain Structural features of each part
- Enlist Attachments of each part
- Describe Blood and nerve supply of mandible
- Interpret Applied anatomy of mandible, Fracture of mandible
- Describe the boundaries and contents of temporal fossa.
- Enumerate the Temporomandibular joint, its type, formation, neurovascular supply and action.
- Clinically correlate disorders of the temporo mandibular joint, Dislocation of Temporomandibular joint.

Infection of Parotid gland, tumor of parotid gland and parotid gland stone

- Explain the submandibular region.
- Describe the anterior triangle of the neck.
- List the Suprahyoid muscles.
- Describe the submandibular gland.
- Describe the sublingual gland.
- Define what is submandibular ganglion
- Mandibular and inf. alveolar nerve block
- Describe the anatomy of external nose.
- Define the Boundaries of nasal cavity.
- Deflected Nasal Septum
- Explain Blood vessels of nose. Enumerate Nerve supply of nose, Epistaxis
- Define & list names of paranasal sinuses
- Describe functions of paranasal sinuses.
- Identify Radiographic Protocols for sinuses
- Explain diseases of sinuses, Sinusitis
- Define the boundaries of oral cavity
- Describe Structures forming the roof, lateral walls and floor of oral cavity.
- Enumerate Nervous supply of oral cavity, Carcinoma of lips

- Describe the palate and its types.
- Describe the hard palate.
- List muscles of the soft palate.
- Describe the vasculature and innervation of the palate
- Describe what is tongue and Papilla.
- Explain taste buds and Isthmus
- Enumerate the Extrinsic and Intrinsic muscles of the tongue
- Define functions of Hypoglossal nerve and Glossopharyngeal nerve Lingual carcinoma
- Describe Salivary glands and their location
- Describe Histology of parotid gland
- Describe Histology of submandibular gland
- Describe Histology of sublingual gland.
- Describe what is deep cervical fascia
- Explain the investing layer of deep cervical fascia and the structure it encloses.
- Define attachment of the fascia.
- Enlist the four parts namely: the investing layer, pretracheal fascia, prevertebral fascia & the carotid sheath Torticollis
- Right cardiac catheterization, Surgical dissection of carotid triangle
- Enlargement of thyroid gland, Thyroidectomy, Tonsillectomy, Adenoiditis, Injury to laryngeal & recurrent laryngeal nerve, Laryngoscopy, aspiration of foreign bodies from laryngopharynx, Pulsations of arteries of face & scalp, Trigeminal neuralgia.
- Facial Palsy
- Describe Retina development, Layers of retina,
- Explain Functions of retinal pigment epithelium,
- Define Neuronal retina, three deep neurons.
- Evaluate Photoreceptors and Rod cells.
- Describe the different parts of oral cavity.
- Explain the histology of these different parts of oral cavity
- Distinguish the location and histological similarities and dissimilarities among the different types of oral Mucosae.

Embryology:

- Define pharyngeal Apparatus
- Describe development of pharyngeal Apparatus
- List the different Parts of pharyngeal Apparatus
- Explain fate of pharyngeal Arch and pharyngeal Cleft
- Explain fate of pharyngeal Pouch and pharyngeal Membrane
- Describe the Congenital Anomalies related to pharyngeal Apparatus, Ectopic thymus and parathyroid tissue, Branchial fistulas, Branchial sinuses, cysts and fistulas. 1st arch syndrome (Treacher Collins Syndrome, Pierre Robin Syndrome).
- Describe the steps of development of human eye.
- Explain the derivatives of different embryonic primitive eye layers.

- Describe the development of various layers of eye individually, along with optic nerve.
- Describe the Developmental stages of Face
- Explain the congenital Anomalies of Face, Craniofacial defects, Developmental anomalies of nasolacrimal duct
- Explain developmental stages of nose.
- Describe development of nasal cavity.
- Explain development of paranasal sinuses.
- Explain congenital anomalies of nose and nasal cavity.
- Explain development of inner ear.
- Describe development of middle ear.
- Elaborate development of external ear. Deafness and external ear abnormalities.
- Facial clefts (facial and palatal clefts, including anterior and posterior clefts of lips and palates) Tongue tie, macro & microglossia and bifid tongue, Thyroglossal duct and congenital thyroid abnormalities (congenital hypothyroidism, accessory thyroid and thyroidal agenesis)

Topics/ Contents:

Lectures: (1 Hour each):

- Skull as a whole and vault
- Scalp (Layers, Nerves & Vessels)
- Skull; Norma frontalis
- Orbital cavity (Boundaries & extra ocular muscles)
- Skull: Norma Lateralis and Occipitalis
- Orbital cavity Contents except extra ocular muscles
- Eyelids & lacrimal Apparatus & Ciliary Ganglion
- Development of eye
- Gross Features of Eye
- Histology of eye
- Eyelids, Conjunctiva, Lacrimal Apparatus
- Face (Muscles, Nerves, extracranial part of CN V & VII)
- Arteries and Veins of Face
- Temporal Region & Temporomandibular Joint
- Infratemporal Fossa & its Contents
- Parotid Region
- Development of Face & Nose
- Pterygopalatine Fossa
- External Nose & its Boundaries
- Nasal Cavity
- Vessels & nerves of Nasal cavity
- Histology of Nasal Cavity (Respiratory & Olfactory Epithelium)
- Paranasal air Sinuses

- Gross and histology of Oral cavity
- Histology of Salivary Glands
- Hard & Soft Palate
- Gross and Histology of Tongue
- Deep cervical Fascia & Platysma
- Cervical vertebrae & Joints of Cervical Region
- Development of Soft & Hard palate and Congenital anomalies
- Posterior Triangle (Trapizeus & Sternocleidomastoid muscles) Cervical Plexus & Accessory Nerve
- Anterior Triangle of Neck+ Supra & Infra Hyoid Muscles
- Back of neck with Prevertebral fascia and Scalene muscles
- Gross and histology of Thyroid & Parathyroid gland
- Root of Neck
- Sub-Mandibular region
- Glossopharyngeal & Vagus nerves
- Gross and Histology of External Ear
- Gross and Histology of Middle Ear cavity & Its Contents
- Gross & Histology of Internal Ear
- Development of Branchial apparatus (Arches, pouches & clefts)
- Vestibulochochlear nerve & intracranial part of facial nerve
- Development of Ear
- Mandible
- Pharynx including tonsils
- Development of tongue & thyroid gland
- Larynx
- Arteries of Head & Neck
- Veins of head & neck and lymph drainage of head and neck
- Lesions of Cranial Nerve 1st -6th
- Lesions of Cranial Nerve 7th-12th

Practicals (1.5 Hour each):

- Histology of Eyelids and Lacrimal Apparatus
- Histology of Salivary Glands
- Histology of Tongue

Simulation (Digital Dissection):

- Head region
- Neck Region

PHYSIOLOGY**Learning Objectives:**

- Identify the structures of the eye, including the iris, pupil, cornea, retina, and lens,
- Recall the functions of the different structures in the eye,
- Recall that light is detected by specialized cells called photoreceptors,
- Distinguish between the function of the rods and cones on the retina, Recall the function of the lacrimal apparatus
- Recognize that light rays from a point at or beyond the far point of the human eye can be modeled as approximately parallel
- Recall that the near point of the human eye is the minimum distance of an object from the eye at which a sharp image of the object can be formed on the retina of the eye
- Apply the formula $D=1/f$ in all combinations, where D is the optical power of a lens and f is the focal length of the lens
- Recall that the diopter is the unit of optical power
- Recognize that the accommodation of the lens in the human eye is a deformation of the lens that allows the lens to vary its optical power
- Describe qualitatively the changes that occur to the lens of a human eye in order to form sharp images of objects on the retina of the eye where the distances of the objects from the eye vary
- Describe the process by which ciliary muscles function to change the focal length of the eyes so that the image is clearly formed on the retina.
- Recall that myopic eyes do not form a sharp image at the retina of the eye for objects at or beyond the far point of the eye
- Recall that hypermetropic eyes have near points with significantly greater magnitudes than healthy eyes
- Describe qualitatively how convex lenses can be used to correct the vision of myopic eyes
- Describe qualitatively how concave lenses can be used to correct the vision of hypermetropic eyes.
- Define visual acuity
- Describe the visual acuity for a normal eye for both near and far vision
- Discuss why clarity of vision vary with distance
- Compare the physiology of visual acuity of humans with birds of prey having visual acuity of 20/2.
- Summarize the composition of the aqueous humor compared with that of plasma and vitreous.
- Discuss the functions of aqueous humor
- Understand the mechanism how aqueous humor is formed which gives precise control to be maintained over composition of the fluid that bathes the structures essential for normal vision.
- Describe the circulation of aqueous humor in the eye.
- Describe the types of cells that make up the neural layer and the pigmented layer of the retina
- Describe the processing of visual signals in the retina
- Explain how receptor potentials arise in photoreceptors.
- Examine the relation of the wavelength of light to perceived color.
- Identify the perceptual principles of hue, saturation, and brightness.
- Explain how the three cones interact to influence color perception.

- Describe the trichromatic theory of color vision.
- Illustrate the opponent theory of color vision.
- Describe the concept of color deficiency and why it is a better term than *color blindness*.
- Define the term *constancy* and how it applies to color vision.
- Explain how purple is distinguished from violet.
- Distinguish between the types of color blindness
- Understand the symptoms of color blindness
- Define the tests done to diagnose color blindness
- Know that color blindness runs in families
- Understand that although there is no cure, but special glasses & contact lenses can help.
- Recall that the blockage to flow of aqueous humor may lead to glaucoma
- Know the normal intraocular pressure
- Be able to assess the signs and symptoms of potential glaucoma eye disease
- Be able to demonstrate knowledge about the 4 types of glaucoma
- Discuss the treatment of glaucoma
- Know the reason for the development of cataract
- Describe the treatment for cataract.
- Explain how photopigments respond to light and recover in darkness
- Describe how information processes in the retina
- Describe how central (low) visual pathways send signals from ganglion cells to lateral geniculate body in thalamus
- Describe how cortical (higher) visual pathways receive signals from thalamus to cerebral cortex.
- Identify the termination of the optic (II) nerve in the brain, the foramen through which it exits the skull, and its function
- Describe the pathway by which nerve impulses triggered by an object in the nasal half of the visual field of the left eye reach the primary visual area of the cortex.
- Identify the origins of the oculomotor (III), trochlear (IV), and abducens (VI) nerves in the brain, the foramen through which each exits the skull.
- Describe how the oculomotor (III), trochlear (IV), and abducens (VI) nerves related functionally
- Explain the effects if there were damage to the oculomotor, trochlear, or abducens nerves.
- Describe the anatomy of the structures in the three main regions of the ear
- Define the function of tympanic membrane and describe the effect if there is any rupture in the membrane
- Describe how muscles attached to the middle ear bone prevent inner ear cells damage from loud noise
- List the major events in the physiology of hearing.
- Describe how are sound waves transmitted from the auricle reach the spiral organ
- Describe the physiological anatomy and histology of cochlea
- Explain the mechanism by which hair cells in the cochlea and vestibular apparatus transduce mechanical vibrations into electrical signals.
- Discuss the ascending neural pathways from the cochlea to the auditory cortex.
- Identify the processes our auditory system uses to localize^[1]the sources of sounds in space.
- Explain the concept of auditory scene analysis and how it is achieved by the auditory system.
- Explain the function of each of the receptor organs for equilibrium
- Compare the function of the maculae in maintaining static equilibrium with the role of the cristae in maintaining dynamic equilibrium.
- Discuss the role of vestibular input to the cerebellum

- Describe the equilibrium pathways.
- Describe the structure of the olfactory receptors and other cells involved in olfaction
- Outline the neural pathway for olfaction.
- Identify the termination of the olfactory (I) nerve in the brain, the foramen through which it passes, and its function
- Identify the location of the olfactory epithelium
- Explain how basal cells contribute to olfaction
- Explain the sequence of events from the binding of an odorant molecule to an olfactory cilium to the arrival of a nerve impulse in the orbitofrontal area.
- Describe the structure of the gustatory receptors and the neural pathway for gustation.
- Differentiate between olfactory receptor cells and gustatory receptor cells regarding structure and function
- Trace the path of a gustatory stimulus from contact of a tastant with saliva to the primary gustatory area in the cerebral cortex.
- Compare the olfactory and gustatory pathways.
- Describe the abnormalities in sense of smell and taste
- Define the terms phantom taste perception, ageusia, hypogeusia, dysgeusia, anosmia, dysosmia, hyperosmia, hyposmia
- Know the cause of smell and taste disorders.

Topics/ Contents:

Lectures (1 hour each):

- Physiological structure and functions of eyeball
- Principles of Optics
- Image formation and errors of refraction and accommodation of eye
- Formation & circulation of aqueous humor
- Phototransduction
- Dark & light adaptation, Neural function of retina
- Color vision and color blindness
- Visual pathway & its lesion; Light reflex
- Eye movements & their control
- Sense of Smell – Receptors, Pathways
- Sense of hearing; role of external & middle ear
- Mechanism of hearing, role of internal ear
- Auditory Pathway
- Vestibular system
- Sense of Taste – Receptors, Pathways
- Olfaction & Taste Abnormalities

Practicals (1.5 hour each):

- To test the visual acuity of a subject.

- To determine the field of vision.
- To test the color vision of a subject.
- To test the hearing in a subject by Rinne's and Weber's tests.
- To check the sense of smell and taste in a person.

BIOCHEMISTRY

Learning Objectives:

- Describe the dietary sources and absorption of vitamin A.
- Explain its transportation and storage.
- Discuss the role of vitamin A in visual cycle.
- Describe the manifestation of deficiency of vitamin A.
- Describe visual cycle.
- Enumerate different steps for the formation of visual complex.
- Explain the role of retinaldehyde in vision.
- Describe Structure & Forms of vitamin A.
- Illustrate Storage and transport of vitamin A.
- Enlist Functions of vitamin A.
- Explain Disorders of Vitamin A deficiency.

Lectures (1 hour each):

- Sources and biochemical importance of Vit A
- Role of Retinaldehyde in Visual Cycle

Tutorials (1.5 Hour each):

- Vit A deficiency and its related disorders.

PATHOLOGY

Learning Objectives:

- Explain etiology, pathogenesis, contributing factors, and major subtypes of neoplastic lesions of head and neck.

Topics/ Contents:

Lectures (1 hour each):

- Neoplastic Lesions of Head and Neck.

Practicals (Museum Study) (1.5 hour each):

- Gross Pathology of Neoplastic Lesions of Head and Neck

COMMUNITY MEDICINE

Learning Objectives:

- Define Nuclear Medicine and its use in health
- Analyze the hazards of nuclear medicine
- Define school health
- List the important components of school health
- Define responsibilities of school health team MEMBERS
- Define the functions of school health program
- Recognize the importance of research in school health program
- Analyze the importance of school health services in promotion and maintenance of community health
- Define travel medicine and its significance in protection and promotion of health
- Describe travel trends
- Enlist the contents of travel kit.
- Manage the special groups of travelers adequately
- Explain the importance of travel medicine

Topics:

Lectures (1 hour each):

- Nuclear Medicine
- School health services
- Travel Medicine

SKILLS.

- CNS Examination

The contents are subjected to be altered according to the requirement of academic calendar.

LEARNING RESOURCES**ANATOMY:**

- Clinically oriented anatomy Keith.L.Moore, Arthur F. Dalley, Anne M.R. Agur 7th or latest edition
- Gray's Anatomy for students Drake & Vogl & Mitchell 3rd or latest edition
- Clinical Anatomy By Regions (Reference Book) Richard S. Snell 9th Edition
- Last's Anatomy: Regional & Applied (Reference Book) Chummy S. Sinnatamby 12th Or Latest Edition
- Atlas of Human Anatomy Frank H.Netter 6th Edition

EMBRYOLOGY:

- Langman's Medical Embryology T.W.Sadler 13th Edition
- The Developing Human Clinically Oriented Embryology (Reference Book) Moore & Persaud & Torchia 10th Edition.

HISTOLOGY:

- Wheaters Functional Histology Barbara Young 5th Edition
- Basic Histology (Text And Atlas) (Reference Book) Luiz Junqueira, Jose Carneiro 11th or Latest Edition

PHYSIOLOGY:

- Guyton and Hall Textbook of Medical Physiology- Guyton And Hall 13th Edition

BIOCHEMISTRY:

- Lippincott's Illustrated Reviews Series Denise R. Ferrier 6th Edition
- Harpers Illustrated Biochemistry (Reference Book) Victor Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil 28th Edition
- Textbook of Medical BIOCHEMISTRY Author: MN Chatterjee And Rana Shinde. 11th Edition.

PATHOLOGY:

- Robbins Basic Pathology Kumar & Abbas 10th Edition
- Robbins & Cotran Pathologic Basis Of Disease Kumar & Abbas & Aster 10th Edition

COMMUNITY MEDICINE:

- Public Health And Community Medicine Shah, Ilyas, Ansari 7th Edition

PHARMACOLOGY:

- Lippincott's Illustrated Review Pharmacology Karen Whalen 6th or Latest Edition
- Basic and Clinical Pharmacology Bertram G. Katzung 11th Edition.

ASSESSMENT

Assessment will be done in two parts:

At the end of module

- Module Exam (Theory) -20%
- Module Exam Practical Internal Evaluation- 20%

At the end of Year

- Annual Exam (Theory) -80%
- Annual Exam (ospe, Viva)-80%

MCQs (Multiple choice questions), OSPE (Objective Structured Practical Exam) and structured viva will be the main assessment tool.
