STUDY GUIDE	
PROGRAM	**MBBS**
MODULE TITLE	**HEAD AND NECK AND SPECIAL SENSES-1**
ACADEMIC YEAR	**2nd year -2025**
INTRODUCTION	The head and neck and special senses is an introductory module that provides knowledge about the vital structures present in the head and neck region, their functions, and clinical co-relations. These include the head and skull, organs for special senses (eyes, ears, nose, tongue), cranial nerves, great vessels, and the thyroid gland. This module will give the students basic knowledge about the structures present in the head and neck region along with their important functions and abnormalities which can lead to various diseases.
RATIONALE	Trauma to the face & neck is associated with high mortality & morbidity. Injuries or pressure on the neck can threaten life by causing damage to the great vessels or the airways. Undergraduate students need to have basic knowledge about the structures and functions of this region which play a very essential role in the life of a human being. This will enable them to understand more advanced and complex issues when they go to the clinics, in the latter years.
OUTCOMES	By the end of the module, students will be able to correlate the structures present within the head, neck and special senses with their functions with relevant abnormalities
DEPARTMENTS INVOLVED	1. Anatomy 2. Biochemistry 3. Physiology
MODULE OBJECTIVES	**By the end of the module, the students will be able to:**
LECTURES ANATOMY	**1. Bones of skull** • Name parts of skeleton (axial and appendicular) • Describe different bones and sutures of skull

	2. Norma Frontalis, Verticalis & Fontanelles with their clinical correlation • Name the different views (Norma) of skull • Describe Norma frontalis and verticalis and its features • List the bones and their parts which contribute to norma frontalis and verticalis. • Describe the different bony landmarks on norma frontalis and verticalis. • Relate the foramina with their respective contents • Discuss the clinical importance of the Sutures and fontanelles of norma verticalis and frontalis. **3. Pharyngeal apparatus & its anomalies** • Define pharyngeal arches, pouches, clefts and membranes • Describe the derivatives of each arch (Muscle, bones, cartilage) • Describe the fate of pouches, clefts and membranes • Describe the common anomalies of pharyngeal apparatus **4. Scalp & its layers** • Describe the extent and layers of scalp • Discuss the nerves, vessels of scalp, lymphatic and their clinical correlates. **5. Norma Laterals & occipitalis.** • Recognize different bony landmarks of norma lateralis & occipitalis. • Identify the sutures. • Relate the foramina with their respective contents. • Discus the clinical significance of its bony features. **6. Development of face & its anomalies** • Describe the formation of facial prominences.

	• Define nasal placode, nasal pit & nasolacrimal groove. • Describe the development of face. • Describe formation of different parts of face from the prominences • Discuss most common anomalies of face **7. Face (Muscles, Nerves: Extra Cranial Part of V &VII)** • Describe the boundaries of face • Enumerate the muscles and innervations of face • Discuss the action of muscles of face • Discuss the course and distribution of CNV and extra cranial part of CN VII • Describe the disorders and applied anatomy of face (Bell's palsy) **8. Arteries, veins & lymphatic of face** • Describe the arterial supply of face. • Discuss the major veins of face. • Explain the lymphatic drainage of face • Discuss the clinical importance of vascular and lymphatic drainage of face. **9. Norma Basalis** • List the bones forming the base of skull • Describe anterior, middle and posterior part of base of skull • Describe different foramina present at the base of skull • Name the structures passing through these foramina **10. Gross anatomy of Mandible and Hyoid bone** • Identify different anatomical features of mandible. • List attachments on each part of the mandible. • Identify the foramen on the mandible. • List the structures passing through these foramina.

	• Enumerate the joints formed by mandible. • Describe the ossification of mandible • Discuss the applied anatomy of mandible • Describe the location and vertebral level of hyoid bone • Describe the parts of hyoid bone • Explain the attachments on the hyoid bone **11. Parotid Gland and Parotid Region** • Describe the boundaries of the parotid region. • Discuss shape, size and course of parotid duct. • Describe the arrangement of structures traversing the gland. • Describe the secretion and function of parotid gland. • Discuss the clinical complications, stone formation and parotitis. **12. Orbital cavity and its contents** • Describe the boundaries, orbital fascia & content of orbital cavity. • Enumerate the relations of orbital cavity. • Describe location, relations and connections of ciliary ganglion. • Discuss the disorders associated with ciliary ganglion. **13. Development of eye** • Describe the development of eye and formation of retina. • List the sources from which parts of eye develops. • Describe the steps of development of retina, lens, choroid, ciliary body, cornea, iris, eyelid and lacrimal apparatus. • Discuss the common congenital anomalies of eye. **14. Eyelid & Lacrimal Apparatus** • Discuss Eyelid and its parts. • Explain the Innervation and blood supply of eyelids. • Describe parts of lacrimal apparatus. • Relate the diseases of lacrimal apparatus

15. Eyeball and Extraocular Muscles

- Explain the gross anatomical features of eyeball.
- Discuss different coats and compartment of the eyeball.
- Explain the neurovascular supply and lymphatic drainage of the eyeball.
- Describe the attachment, innervation and action of extraocular muscles.
- Discuss the related clinical anatomy.

16. Temporal Fossa & Temporomandibular Joint

- Describe the boundaries of temporal fossa.
- List the contents of temporal fossa.
- Describe the temporalis muscle, its innervations and action.
- Discuss the Temporomandibular joint, its type and its articular surfaces.
- Describe the ligaments, innervation and movements performed at Temporomandibular joint.

17. Infratemporal Fossa & Pterygopalatine Fossa

- Describe the boundaries of Infratemporal fossa.
- List the contents of Infratemporal fossa.
- Describe the contents and boundaries of Pterygopalatine fossa.
- Explain the connections and location of Pterygopalatine ganglion. List the openings in Pterygopalatine fossa.

18. Cranial Nerves I to VI & its clinical correlation

- Explain the functional component and nuclei of these nerves.
- Describe the intra and extra cranial pathway.
- Describe the areas innervated by these nerves.
- Explain the lesion of each cranial nerve.
- Discuss the clinical presentation of these lesions and their diagnostic

tests.

19. Cranial Nerves VII to XII & its clinical correlation

- Discuss the functional components of cranial nerves VII to XII.
- Describe their course through the cranial cavity.
- Discuss the areas innervated by these nerves.
- Explain the lesion of each cranial nerve.
- Discuss the clinical presentation of these lesions and their diagnostic tests.

20. Cervical Vertebrae

- Describe general features of cervical vertebrae
- Differentiate between the typical & atypical cervical vertebrae.
- Describe the joints between the cervical vertebrae.
- Describe the movement which occur in the region of the cervical vertebrae.

21.Neck, Deep Cervical Fascia, carotid sheath and Platysma Muscle

- Discuss the layers of neck; skin superficial fascia and deep fascia
- Describe the cutaneous supply of skin of neck.
- Describe the different modifications of deep fascia: prevertebral, pre-tracheal, investing layers of deep fascia and carotid sheath.
- List the contents of carotid sheath.
- Discuss the important relations of carotid sheath.
- Describe the platysma muscle, its innervations and action.

22. Anterior Triangle of Neck

- Discuss the division of triangles of neck.
- Name the subdivision of anterior triangle.
- Describe the boundaries and contents of sub divisions of anterior triangles

i.e., Sub mental, Submandibular, Muscular & Carotid.

23. Submandibular region &Submandibular gland

- Describe the boundaries of Submandibular triangle.
- Name the contents of Submandibular Triangle Describe the anatomy of Submandibular salivary gland. Describe the emergence and course of Wharton's duct.
- Describe the location & connections of Submandibular ganglion.
- Describe the location and area of drainage of Submandibular lymph nodes.

24. Gross Anatomy of thyroid & parathyroid gland

- Explain the gross anatomy of the thyroid & parathyroid gland.
- Discuss the blood supply and nerve supply of thyroid and parathyroid gland.
- Relate the clinical anatomy of thyroid and parathyroid gland with the relevant conditions.

25. Development of Thyroid, Parathyroid, Larynx and Thymus

- Describe the developmental anatomy of thyroid, parathyroid, larynx and thymus.
- Discuss congenital anomalies associated with their development.

26. Posterior triangle of neck, Cervical Plexus & Cranial Nerve XI

- Describe the boundaries of posterior triangle of neck.
- List the contents of posterior triangle of neck.
- Discuss the formation, branches and areas of innervation of cervical plexus.
- Discuss the origin, course, branches and functions of cranial nerve XI.
- Discuss the clinical conditions associated with posterior triangle of

	neck, cervical plexus and cranial nerve XI. **27. Pharynx Including Tonsils** • Discuss the morphology, location and extent of pharynx • Explain the division of pharynx: Nasopharynx, Oropharynx & Laryngopharynx. • Describe the pharyngeal and palatine tonsils. • Discuss the origin, insertion and actions of pharyngeal muscles. • Discuss the innervation and blood supply of pharynx along with the associated clinical conditions. **28. Gross & Histology of larynx** • Explain the gross anatomy of larynx. • Discuss the blood supply, nerve supply, and clinical anatomy of larynx. Describe the histological features of larynx. **29. Gross Anatomy of external nose, boundaries, blood & nerve supply** • Describe the features of external nose • List the bones forming the boundaries of nasal cavity • Describe the blood & nerve supply of nose • Discuss the formation of anastomoses at little's area and its clinical importance. **30.Histology of Nasal Cavity, respiratory & olfactory epithelia.** • Discuss the histological features of nasal cavity. • Discuss the features of olfactory and respiratory epithelium. • Describe the cells of olfactory and respiratory epithelium. **31. Para nasal air sinuses** • List the para nasal air sinuses.

	• Describe their location, important relations, drainage and nerve supply. • Discuss the clinical significance of para nasal air sinuses. **32. Development of nose & para nasal sinuses** • Describe development of different parts of nose and of para nasal sinuses • Describe congenital anomalies associated with their development. **33. Gross anatomy & Histology of oral cavity** • Discuss the boundaries and divisions of the oral cavity. • Describe the vestibule and oral cavity proper with their contents. • Describe the general features, classification, organization of oral mucosa. • Discuss the type and components of oral epithelium. • Discuss the histology of lips, cheek and gums. **34. Gross anatomy of tongue.** • Identify the gross anatomical features of the tongue. • Describe the intrinsic muscles and extrinsic musculature of tongue and their movements. • Discuss the blood supply, innervations and lymphatic of tongue. Relate the clinical conditions associated with it. **35. Histology of tongue.** • Describe the histological features of anterior 2\3rd and posterior 1/3rd of tongue. • Describe the variation of epithelium on different parts of tongue. • Discuss the types of lingual papillae and their relation with taste buds. • Discuss the location and type of secretion of lingual glands. **36. Development of Tongue & salivary glands**

	• Describe the development of the tongue. • Discuss the congenital anomalies associated with the development of tongue. • Explain the development of salivary glands. • Discuss the derivation of secretory part, duct system and stroma from different embryonic structures. **37. Hard and Soft Palate** • Discuss the boundaries, muscle attachments and mucosal coverings of hard and soft palate. • Discuss the function of hard and soft palate during process of mastication and deglutination. • Discuss the blood supply and nerve supply of hard and soft palate. • Discuss gag reflex. **38. Development of palate** • Describe palatal development during the seventh to ninth weeks of gestation. • Explain the embryologic basis of cleft lip and palate. • Discuss the clinical correlation palate. **39. Gross & Histology: External and Middle Ear** • Discuss the division of ear into external, middle and internal ear. • Describe the parts of external ear, and the boundaries & content of middle ear cavity. • Explain the histological features of parts of external and middle ear. • Discuss the functions of external and middle ear as an organ for hearing. Define the clinical conditions associated with external and middle ear. **40. Gross & Histology: Internal Ear**

	• Describe the parts of internal ear. • Describe the histological features of the parts of internal ear. • Discuss the functions of internal ear as an organ for hearing and balance. • Discuss the clinical conditions associated with internal ear. • **41. Development of Ear** • Explain the development of external, middle and internal ear. • Discuss congenital deafness and other anomalies of auricle, and rest of the ear. **42. Nerves & vessels of head and neck** • Describe the vessels of head & neck. • Describe the Formation of cervical nerves and its branches **43. Surface anatomy of head and neck (Facial Artery and Parotid Gland) Palpate the facial artery.** • Trace the course of facial artery on the face. • Palpate the Parotid gland. • Identify the landmarks of borders and surfaces of parotid gland. Trace the course and opening of parotid duct.
BIOCHEMISTRY	**1. Introduction to nutrition** • Discuss nutrition, nutrients, BMI, RDA and RMR • Discuss the biochemical importance of Balanced diet • Discuss the basic food groups • List the essential nutrients and their importance in the diet • Discuss the dietary sources and recommendations of micronutrients • Describe the importance and benefits of water • Discuss the importance of dietary fibers • Discuss the daily caloric requirements • Discuss the Dietary Reference Intakes (EAR, RDA, AI, UL) • Discuss the clinical disorders of nutrition

	2.Nutritional importance of dietary carbohydrates • Explain the biochemical importance of dietary carbohydrate • Discuss Balanced diet • Classify the types of dietary carbohydrates • Discuss the significance of simple and complex dietary carbohydrates • Explain the Glycemic index and Glycemic load • Describe the biochemical complications of Obesity • Discuss metabolic syndrome and its complications **3.Nutritional importance of dietary proteins** • Classify Protein according to their nutritional importance and give examples • List the biochemical functions of proteins in the body • Explain recommended dietary requirements of protein in different age groups • Describe the Amino acid pool & Nitrogen balance • Describe Protein energy malnutrition (Marasmus & Kwashiorkor) **4.Nutritional importance of dietary lipids** • Classify Lipids according to their nutritional importance and give examples • Explain the biochemical functions of dietary lipids • Discuss the sources and recommended daily allowance of dietary lipids • Discuss the biochemical mechanism of development of atherosclerosis • Discuss the clinical significance of dietary lipids (Metabolic syndrome, Atherosclerosis) **5.Vitamin A** • Explain the chemical structure of Vitamin A

	• Classify the different types of Vitamin A • Explain the biochemical functions of Vitamin A • Discuss the role of vitamin A in visual cycle • List the sources and daily requirement of Vitamin A • Discuss the clinical significance of Vitamin A deficiency and toxicity **6.Overview of Dietary Minerals** • List and classify the dietary minerals with their biochemical importance • Describe their sources and daily recommended allowances • Explain their biochemical functions • Discuss the clinical significance of mineral deficiency and toxicity
PHYSIOLOGY	**1.Optics of eye** • Explain the fundamental physiology of eye & its refractive surfaces • Discuss the basic principles of optics **2. Formation & circulation of aqueous humor** • Describe the formation and circulation of aqueous humor • Explain the mechanism of regulation of intraocular pressure • Define glaucoma & its types **3.Visual acuity & errors of refraction** • Define visual acuity • Describe the errors of refraction (Myopia, hyperopia, astigmatism) & their correction by using different lens systems **4.Accommodation** • Describe the mechanism of accommodation & its control **5.Photo-transduction** • Describe the physiology of retinal layers

	• Explain photochemistry of vision (rhodopsin – retinal cycle) • Describe the mechanism of activation of Rods and cones **6.Visual pathway & its lesions** • Explain the neural circuitry of the Retina • Describe the physiology of visual pathway • Name the optic lesions associated with visual pathway **7.Eye movements & its control** • Explain the muscular control of eye movement • Describe the fixation movements of eye • Define accommodation reflex & pupillary light reflex **8.Sense of hearing, mechanism of hearing** • Describe the physiology of hearing & function of tympanic membrane & ossicular system • Define impendence matching & attenuation reflex • Explain the conduction of sound waves in the cochlea **9.Organ of Corti** • Describe the function of the organ of Corti **10.Vestibular apparatus and vertigo** • Describe the components of vestibular system and their functions • Explain the causes of vertigo **11.Auditory pathway** • Explain the auditory nervous pathway & abnormalities associated with it • Describe the function of cerebral cortex in hearing

	12.Gustatory reflex and associated abnormalities • Describe the primary sensations of taste and associated disorders • Explain the mechanism of taste perception and its transmission into central nervous system **13.Olfactory pathway and associated abnormalities** • Mention the primary sensations of smell and associated disorders • Describe the stimulation of olfactory cells & its transmission into central nervous system
TUTORIALS **BIOCHEMISTRY**	**1. Balanced diet** • Discuss the clinical importance of balanced diet • Interpret clinical conditions correlated with their laboratory investigations **2. Vitamin A** • Discuss the clinical importance of vitamin A • Interpret clinical conditions correlated with their laboratory investigations **3. Deficiencies of minerals (e.g. Iron, calcium)** • Discuss the clinical importance of minerals • Interpret clinical conditions correlated with their laboratory investigations **4. Obesity** • Discuss the clinical importance of Obesity • Interpret clinical conditions correlated with their laboratory investigations **5. Protein Calorie Malnutrition (PCM), Marasmus and Kwashiorkor** • Discuss the clinical importance of PCM, Marasmus and Kwashiorkor • Interpret clinical conditions correlated with their laboratory

	investigations **6. Metabolic syndrome, Atherosclerosis** • Discuss the clinical importance of Metabolic syndrome & Atherosclerosis • Interpret clinical conditions correlated with their laboratory investigations
PHYSIOLOGY TUTORIALS	**1. Disorders of Eye:** • Discuss the various causes of common eye disorders, i.e. Glaucoma, Cataract and Squint. **2. Hearing Disorders:** • Explain the different types of deafness and its causes.
PRACTICALS ANATOMY	**1.Histology of Eye Ball** • Identify the histological features of eyeball • Describe the histological feature of each coat of eye ball • Describe the histology of cornea and lens • Discuss the arrangement and composition of the layers of retina **2.Histology of salivary gland:** • Identify the histological features of salivary gland • Differentiate 3 major types of salivary gland • Describe the different types of acini **3.Histology of Nasal Cavity, respiratory and olfactory epithelia** • Identify various histological parts under light microscope • Identify respiratory and olfactory epithelium. • Describe the cells of respiratory and olfactory epithelium. **4.Histology of Tongue:** • Identify the characteristic features of tongue under microscope. • Differentiate different types of lingual papillae • Describe lingual glands.

BIOCHEMISTRY	**1.Calculation of Body Mass Index (BMI)** • Explain the significance of calculation of Body Mass Index • Explain the method to calculate BMI • Calculate the BMI • Interpret the significance of the calculated BMI • Interpret clinical conditions correlated with their laboratory investigations **2.Interpretation of glycemic index** • Define Glycemic Index and Glycemic Load • Compare the Glycemic index of different carbohydrates • Interpret the significance of GI & GL • Outline the method for calculation of GI of various food items • Interpret clinical conditions correlated with their laboratory investigations
PHYSIOLOGY	**1.Visual acuity & color vision** • Determine the visual acuity using Snellen's chart • Examine the color vision of a subject using Ishihara eye chart • Discuss the errors in visual acuity and color vision **2. <u>Perimetry</u>** • Describe various parts of Perimeter and their uses • Determine the normal fields of vision using perimeter • Interpret perimeter chart of a patient and mention any abnormality is present Define physiological blind spot. **3. Hearing tests** • Describe the principles of various tuning fork tests: Rinne, Weber and Schwabach tests. • Elaborate bone conduction and air conduction • Identify conductive and sensorineural deafness based on the result and

	interpretation of various tuning fork tests **5.Sense of Smell** • Identify the smell of various given substances • Discuss the abnormalities associated with perception of smell **6. Sense of Taste** • Identify the taste of various given substances Discuss the abnormalities associated with sense of taste
INTERNAL ASSESSMENT	•Internal evaluation carries 20% weight in professional examination. The mode of internal assessment may vary from one institution to the next.
ANNUAL EXAMINATION	• MCQs and OSPE (observed + un-observed)