



<b>STUDY GUIDE</b>	
<b>PROGRAM</b>	<b>BDS</b>
<b>COURSE TITLE</b>	<b>Anatomy</b>
<b>ACADEMIC YEAR</b>	<b>1st Year BDS</b>
<b>INTRODUCTION</b>	Anatomy is one of the essential basic science disciplines which dental students across Pakistan and outside study. This discipline helps students learn about the macro- and microscopic structures and developmental Anatomy with special emphasis on the head and neck region. There is also an introduction to other body systems in order to provide a more holistic view of the body to the learners.
<b>OUTCOMES</b>	By the end of this course, students will be able to describe the structures in detail along with developmental Anatomy.
<b>COURSE TITLE: GENERAL ANATOMY</b>	
<b>INTRODUCTION TO ANATOMY</b>	<ul style="list-style-type: none"><li>• Define anatomy and its branches.</li><li>• Discuss their practical implication.</li></ul>
<b>TERMS OF POSITION AND MOVEMENT</b>	<ul style="list-style-type: none"><li>• Define various planes, positions, and terms of movement in relation to trunk, head &amp; neck in particular.</li><li>• Relate the movements with planes</li></ul>
<b>CARTILAGES</b>	<ul style="list-style-type: none"><li>• Define cartilage.</li><li>• Classify on the basis of location, morphology, and function.</li></ul>
<b>BONES</b>	<ul style="list-style-type: none"><li>• Classify bone on the basis of shapes, development, structure &amp; region with examples.</li><li>• Compare parts of adult &amp; young long bone.</li><li>• Summarize steps of bone development &amp; ossification.</li></ul>
<b>MUSCLE</b>	<ul style="list-style-type: none"><li>• Differentiate the 3 types of muscle.</li><li>• Define: origin &amp; insertion; fast &amp; slow fiber and connective tissue coverings.</li><li>• Classify skeletal muscle on the basis of architecture with examples (from H&amp;N preferably).</li></ul>



<b>JOINTS OF BODY</b>	<ul style="list-style-type: none"><li>• Define joint.</li><li>• Classify joint with examples on structural, regional &amp; functional basis.</li><li>• Outline features of synovial joints.</li></ul>
<b>INTRODUCTION TO LIMBS</b>	<ul style="list-style-type: none"><li>• Identify the general arrangement of bones &amp; muscles in the limb.</li></ul>
<b>GENERAL ORGANIZATION OF CVS</b>	<ul style="list-style-type: none"><li>• Define the components of circulatory system.</li><li>• Discuss the functional classification of vessels, types of circulation, and anastomoses</li></ul>
<b>LYMPHATIC SYSTEM</b>	<ul style="list-style-type: none"><li>• Define components of lymphatic system.</li><li>• Describe origin and termination of large lymphatic channels.</li><li>• Discuss the role of lymphatics in the spread of infection &amp; cancer.</li></ul>
<b>SKIN AND FASCIA</b>	<ul style="list-style-type: none"><li>• Define epidermal &amp; dermal components.</li><li>• Differentiate tension, flexure &amp; papillary ridges.</li><li>• Define superficial &amp; deep fascia with examples.</li></ul>
<b>NERVOUS SYSTEM</b>	<ul style="list-style-type: none"><li>• List the subdivisions (CNS, PNS, ANS) of the nervous system &amp; their component parts.</li><li>• Tabulate different cell types (neuron &amp; neuroglia) and their function.</li><li>• Summarize formation of typical spinal nerve.</li><li>• Differentiate spinal.</li></ul>
<b>COURSE TITLE: HISTOLOGY</b>	
<b>CELL</b>	<ul style="list-style-type: none"><li>• Discuss histological aspects of cell components.</li><li>• Relate cell junctions with their location &amp; function.</li><li>• Describe phases of cell cycle &amp; steps of mitosis.</li></ul>
<b>EPITHELIAL TISSUE</b>	<ul style="list-style-type: none"><li>• Describe general features of epithelium.</li><li>• Classify epithelium with examples.</li><li>• Describe the specialization of each domain (surface modifications).</li><li>• Classify exocrine glands according to morphology, type &amp; mode of secretion.</li></ul>
<b>CONNECTIVE TISSUE</b>	<ul style="list-style-type: none"><li>• Relate the general features of connective tissue with the functions.</li><li>• Describe the characteristic features, location and functions of its components (cell, matrix).</li><li>• Classify connective tissue with examples.</li><li>• Differentiate types of adipose tissue.</li></ul>
<b>HISTOLOGY OF</b>	<ul style="list-style-type: none"><li>• Describe the components and coverings</li></ul>



<b>CARTILAGES</b>	<p>(perichondrium).</p> <ul style="list-style-type: none"> <li>Differentiate the 3 types histologically.</li> </ul>
<b>HISTOLOGY OF BONES</b>	<ul style="list-style-type: none"> <li>Discuss the types of cells &amp; constituents of matrix (organic &amp; inorganic).</li> <li>Differentiate: Periosteum &amp; endosteum; woven &amp; lamellar bone; spongy &amp; compact bone, with their localization in different bones.</li> </ul>
<b>HISTOLOGY OF MUSCLE</b>	<ul style="list-style-type: none"> <li>Briefly describe the structural &amp; ultra-structural (T tubules, ER, myofibril, myofilaments) organization of 3 types of muscle.</li> <li>Differentiate the 3 types of muscle histologically.</li> </ul>
<b>HISTOLOGY OF BLOOD VESSELS</b>	<ul style="list-style-type: none"> <li>Classify vascular system.</li> <li>Describe general structure of blood vessel.</li> <li>Compare the histological features of: arteries &amp; veins; elastic &amp; muscular arteries &amp; types of capillaries.</li> </ul>
<b>HISTOLOGY OF LYMPHOID TISSUE</b>	<ul style="list-style-type: none"> <li>Classify the types of immunity.</li> <li>Tabulate the lymphoid cells and their function.</li> <li>Describe the histological features of main lymphoid organs.</li> </ul>
<b>HISTOLOGY OF SKIN</b>	<ul style="list-style-type: none"> <li>Differentiate thick &amp; thin skin.</li> <li>Relate the function of each type of cell in epidermis.</li> <li>List the dermal appendages.</li> <li>Describe the glands of skin.</li> </ul>
<b>COURSE TITLE: EMBRYOLOGY</b>	
<b>INTRODUCTION TO EMBRYOLOGY</b>	<ul style="list-style-type: none"> <li>Define: Embryonic &amp; Fetal period, Trimesters, Terms of position related to fetus and induction factors.</li> </ul>
<b>REPRODUCTIVE SYSTEM EMBRYOLOGY</b>	<ul style="list-style-type: none"> <li>Identify the parts of male &amp; female reproductive system.</li> <li>Discuss their contribution in gamete formation and transportation.</li> </ul>
<b>CELL DIVISION</b>	<ul style="list-style-type: none"> <li>List the types of cell division.</li> <li>Discuss steps of Meiosis.</li> </ul>
<b>MEIOSIS AND GAMETOGENESIS</b>	<ul style="list-style-type: none"> <li>Relate meiosis with gamete formation.</li> </ul>
<b>FERTILIZATION AND IMPLANTATION</b>	<ul style="list-style-type: none"> <li>Discuss process of fertilization and events till implantation.</li> <li>Relate uterine changes in response to fertilization.</li> </ul>
<b>DEVELOPMENT 2ND WEEK</b>	<ul style="list-style-type: none"> <li>Describe the formation of structures during 2nd week.</li> </ul>



<b>DEVELOPMENT 3RD WEEK</b>	<ul style="list-style-type: none"><li>• Describe gastrulation and Neurulation.</li><li>• Discuss the differentiation of mesoderm and somite formation.</li><li>• List derivatives of germ layers.</li></ul>
<b>EMBRYONIC PERIOD</b>	List week by week events during embryonic period.
<b>FETAL PERIOD</b>	<ul style="list-style-type: none"><li>• List the main events of fetal period during each month.</li></ul>
<b>FETAL MEMBRANES AND PLACENTA</b>	<ul style="list-style-type: none"><li>• List the fetal membranes.</li><li>• Describe the maternal and fetal components of placenta.</li><li>• Describe briefly the amniotic fluid and its function.</li><li>• Describe the structure of placental barrier.</li></ul>
<b>ROLE OF GENES AND TERATOGENS IN BIRTH DEFECTS</b>	<ul style="list-style-type: none"><li>• Discuss the role of genes &amp; environmental factors in causation of congenital formation.</li><li>• List the teratogens producing facial, palatal &amp; oral malformation.</li></ul>
<b>ANTENATAL DIAGNOSTIC TECHNIQUES</b>	Discuss the most common antenatal diagnostic techniques: U/S, amniocentesis, chorion villus sampling
<b>COURSE TITLE: NEUROANATOMY</b>	
<b>CRANIAL FOSSAE</b>	<ul style="list-style-type: none"><li>• Identify the boundaries, bones and foramina of 3 cranial fossae.</li><li>• Relate the contents passing through the foramen.</li></ul>
<b>DEVELOPMENT OF NERVOUS SYSTEM</b>	<ul style="list-style-type: none"><li>• Discuss differentiation of neural tube in brain vesicles.</li><li>• List the derivatives of brain vesicles.</li><li>• Define Alar and Basal plates.</li></ul>
<b>BLOOD SUPPLY OF BRAIN AND SPINAL CORD</b>	<ul style="list-style-type: none"><li>• List the branches of internal carotid artery, vertebral artery &amp; Basilar artery.</li><li>• Describe location and formation of Circle of Willis.</li><li>• Outline the course of internal carotid &amp; vertebral arteries.</li><li>• Demarcate the area of supply of the 3 cerebral arteries.</li><li>• Describe the origin &amp; area of supply of spinal arteries.</li><li>• Discuss the deficit caused by occlusion of cerebral arteries and spinal arteries.</li></ul>
<b>MENINGES</b>	<ul style="list-style-type: none"><li>• Describe the Dural folds and their function.</li><li>• Define: Arachnoid Mater, subarachnoid space, arachnoid villi &amp; granulations.</li><li>• Describe Pia mater, its modification the denticulate ligament and its contribution to choroid plexus.</li></ul>



	<ul style="list-style-type: none"><li>• Discuss the importance of epidural, subdural and subarachnoid spaces.</li></ul>
<b>DURAL VENOUS SINUSES</b>	<ul style="list-style-type: none"><li>• List Paired &amp; Unpaired sinuses.</li><li>• Discuss their association with dural folds and bones of cranial cavity.</li><li>• Describe the location and content of Cavernous sinus and its communication with veins of orbit &amp; face.</li><li>•</li></ul>
<b>VENTRICULAR SYSTEM OF BRAIN</b>	<ul style="list-style-type: none"><li>• Relate the parts of ventricular system with the lobes of brain.</li><li>• Identify the openings/apertures of ventricular system.</li><li>• Define Choroid Plexuses.</li><li>• Describe boundaries of 4th ventricle &amp; features related to its floor.</li><li>• Discuss clinical correlation of CSF flow.</li></ul>
<b>CRANIAL NERVES I-XII</b>	<ul style="list-style-type: none"><li>• Describe the origin, exit &amp; functional components of nerves.</li></ul>
<b>SPINAL CORD</b>	<ul style="list-style-type: none"><li>• Describe the gross appearance of spinal cord.</li><li>• State the location and function of Anterior &amp; Posterior horns.</li></ul>
<b>BRAINSTEM</b>	<ul style="list-style-type: none"><li>• Describe the location and division of brainstem.</li><li>• Describe the gross appearance of Medulla, Pons and Midbrain and emergence of cranial nerves.</li></ul>
<b>CEREBELLUM, DIENCEPHALON</b>	<ul style="list-style-type: none"><li>• Describe the location and division of Diencephalon.</li><li>• List the 3 anatomical and functional lobes of cerebellum.</li></ul>
<b>CEREBRUM</b>	<ul style="list-style-type: none"><li>• Identify the main Sulci and Gyri; and functional cortical areas.</li><li>• Relate the function areas with their vascular supply.</li><li>• Define the types of white fibers.</li></ul>
<b>AUTONOMIC NERVOUS SYSTEM</b>	<ul style="list-style-type: none"><li>• Classify Autonomic nervous system.</li><li>• Differentiate the components of sympathetic &amp; parasympathetic system and their function.</li></ul>
<b>IMAGING OF BRAIN AND SPINAL CORD</b>	Identify normal radiological anatomy of brain and spinal cord.
<b>COURSE TITLE: HEAD&amp;NECK</b>	
<b>INTRODUCTION OF HEAD AND NECK STRUCTURES</b>	<ul style="list-style-type: none"><li>• Describe the topography of head and neck region.</li></ul>



<b>THE 4 NORMALS OF SKULL</b>	<ul style="list-style-type: none"><li>• Identify the bones &amp; anatomical features of 4 Normas.</li><li>• Relate the foramina with their respective contents.</li></ul>
<b>OSTEOLOGY OF THE MANDIBLE &amp; HYOID</b>	<ul style="list-style-type: none"><li>• Describe features and landmarks of mandible &amp; Hyoid bones.</li><li>• Discuss age-related changes in mandible.</li></ul>
<b>THE SCALP</b>	<ul style="list-style-type: none"><li>• Discuss the associated clinical conditions associated with layers of scalp.</li><li>• Identify its neurovascular supply.</li></ul>
<b>FACE</b>	<ul style="list-style-type: none"><li>• Define its boundaries.</li><li>• Tabulate muscles &amp; their actions.</li><li>• Describe neurovascular supply, lymphatics and their clinical aspects.</li></ul>
<b>PHARYNGEAL APPARATUS (Embryology)</b>	<ul style="list-style-type: none"><li>• Define components of pharyngeal apparatus.</li><li>• Describe derivatives of each component.</li><li>• Discuss the important anomalies.</li></ul>
<b>DEVELOPMENT FACE (Embryology)</b>	<ul style="list-style-type: none"><li>• Describe formation of face from the prominences &amp; its anomalies.</li></ul>
<b>ORBITAL BOUNDARIES, CONTENTS &amp; LACRIMAL APPARATUS</b>	<ul style="list-style-type: none"><li>• Describe the bony boundaries.</li><li>• List the contents.</li><li>• Discuss the connections of Ciliary ganglion.</li><li>• List components of lacrimal apparatus.</li><li>• Trace the pathway of lacrimation.</li></ul>
<b>EYEBALL &amp; EXTRA-OCULAR MUSCLES</b>	<ul style="list-style-type: none"><li>• Identify the 3 coats and the components of each coat.</li><li>• Identify the extra-ocular muscles.</li><li>• Discuss neurovascular supply &amp; actions of these muscles.</li></ul>
<b>EAR</b>	<ul style="list-style-type: none"><li>• Describe the division of ear.</li><li>• Discuss the gross features &amp; nerve supply of external ear.</li><li>• Identify the boundaries and relations of middle ear.</li><li>• List the contents of middle ear.</li></ul>
<b>TEMPORAL AND INFRATEMPORAL FOSSAE</b>	<ul style="list-style-type: none"><li>• Identify the boundaries of temporal and infratemporal fossa.</li><li>• Describe the contents of infratemporal fossa.</li></ul>
<b>PTERYGOPALATINE FOSSA</b>	<ul style="list-style-type: none"><li>• Discuss its boundaries &amp; communications.</li><li>• Describe maxillary artery (3rd part) &amp; maxillary nerve</li></ul>



	and connections of ganglion.
<b>TMJ AND MUSCLES OF MASTICATION</b>	<ul style="list-style-type: none"><li>• Describe the Temporomandibular joint.</li><li>• Describe the muscles of mastication, their neurovascular supply.</li><li>• Discuss the movements and associated clinical conditions.</li></ul>
<b>NOSE AND PARANASAL SINUSES</b>	<ul style="list-style-type: none"><li>• Describe the features of external nose, nasal cavity and the openings in meatus.</li><li>• Name the bones forming the nasal cavity &amp; septum.</li><li>• Discuss the formation and clinical importance of anastomoses at Little's area.</li><li>• List the paranasal sinuses &amp; their location.</li><li>• Describe boundaries of maxillary sinus and its clinically important relation with maxillary teeth.</li></ul>
<b>ORAL CAVITY</b>	<ul style="list-style-type: none"><li>• Discuss the boundaries &amp; divisions of the oral cavity.</li><li>• Describe the vestibule and oral cavity proper with their contents.</li></ul>
<b>HISTOLOGY OF ORAL CAVITY (Histology)</b>	<ul style="list-style-type: none"><li>• Describe the general features of oral mucosa in oral cavity.</li><li>• List the types of oral epithelium.</li><li>• Discuss the histology of lips, cheek, palate and gums.</li></ul>
<b>HARD &amp; SOFT PALATE</b>	<ul style="list-style-type: none"><li>• Describe the boundaries.</li><li>• Tabulate the muscles, neurovascular supply and actions.</li><li>• Discuss the clinical (Gag reflex in dentistry).</li></ul>
<b>TONGUE</b>	<ul style="list-style-type: none"><li>• Describe the division and external features of tongue.</li><li>• Tabulate the muscles, their action and nerve supply.</li><li>• Describe the vascular supply and lymphatic drainage.</li><li>• Discuss the clinical correlation.</li></ul>
<b>HISTOLOGY OF TONGUE (Histology)</b>	<ul style="list-style-type: none"><li>• Describe the histological features of tongue: Mucosal papillae, taste buds, lingual salivary glands etc.</li></ul>
<b>DEVELOPMENT OF TONGUE (Embryology)</b>	<ul style="list-style-type: none"><li>• Describe the development of the tongue &amp; its anomalies.</li><li>• Describe how primary and secondary palate give rise to adult palate.</li><li>• Discuss embryologic basis of cleft palate &amp; associated cleft lip.</li></ul>
<b>SALIVARY GLANDS</b>	<ul style="list-style-type: none"><li>• Describe location, relations and neurovascular &amp; lymphatic supply of these glands.</li></ul>



	<ul style="list-style-type: none"><li>• List the structures passing through parotid gland.</li><li>• Discuss clinical correlations.</li></ul>
<b>HISTOLOGY OF SALIVARY GLANDS (Histology)</b>	<ul style="list-style-type: none"><li>• Describe in general the acini, duct system &amp; stroma.</li><li>• Differentiate the 3 major glands histologically</li></ul>
<b>DEVELOPMENT OF SALIVARY GLANDS (Embryology)</b>	<ul style="list-style-type: none"><li>• Discuss the derivation of secretory part, duct system and stroma from different embryonic sources.</li><li>• State their timeline.</li></ul>
<b>CERVICAL VERTEBRA</b>	<ul style="list-style-type: none"><li>• Describe the common features of cervical vertebra.</li><li>• Identify the typical &amp; atypical vertebra by their relevant identifying features.</li></ul>
<b>SKIN, FASCIA AND NECK MUSCLES</b>	<ul style="list-style-type: none"><li>• Define the layers of neck.</li><li>• Describe the modifications of deep fascia.</li><li>• Describe contents of carotid sheath.</li></ul>
<b>TRIANGLES OF NECK</b>	<ul style="list-style-type: none"><li>• Describe the boundaries of the triangles &amp; their subdivision.</li><li>• Enlist the components of each triangle.</li><li>• Describe cervical plexus.</li><li>• Discuss the clinical conditions related to them.</li></ul>
<b>PITUITARY GLAND</b>	<ul style="list-style-type: none"><li>• Describe the location &amp; division of gland.</li><li>• Differentiate the cells of pituitary according to staining.</li><li>• List the 2 sources from which the adenohypophysis and neurohypophysis develop.</li></ul>
<b>THYROID AND PARATHYROID GLANDS</b>	<ul style="list-style-type: none"><li>• Describe the location, extent, relation and vascular supply of both glands and clinical related to it.</li></ul>
<b>DEVELOPMENT OF THYROID AND PARATHYROID GLANDS (Embryology)</b>	<ul style="list-style-type: none"><li>• Describe origin &amp; derivation of both glands.</li><li>• Discuss the anomalies of thyroid gland.</li></ul>
<b>GROSS ANATOMY OF PHARYNX</b>	<ul style="list-style-type: none"><li>• Describe the location, extent &amp; divisions of pharynx.</li><li>• Identify features related to each part (tonsils, Pharyngotympanic tube Ostia etc.).</li></ul>
<b>GROSS ANATOMY OF LARYNX</b>	<ul style="list-style-type: none"><li>• Describe its extent &amp; location.</li><li>• Enlist the cartilages &amp; membranes of larynx.</li><li>• Tabulate the muscles, their nerve supply &amp; actions.</li><li>• Discuss the clinical conditions related to the</li></ul>





	innervation
<b>CRANIAL NERVES V, VII, IX, X, XI &amp; XII</b>	<ul style="list-style-type: none"> <li>Describe the brief course of each nerve.</li> <li>Tabulate their branches &amp; area of supply.</li> <li>Discuss the impact of injury.</li> </ul>
<b>MAJOR VESSELS OF NECK</b>	<ul style="list-style-type: none"> <li>Describe the origin and course of major arteries briefly in neck.</li> <li>List their branches in neck.</li> </ul>
<b>LYMPHATIC DRAINAGE</b>	<ul style="list-style-type: none"> <li>Describe the lymphatic drainage of head and neck.</li> <li>Discuss its clinical significance in relation to oral structures.</li> </ul>
<b>INTRODUCTION TO THORACIC CAVITY</b>	<ul style="list-style-type: none"> <li>State boundaries of thoracic cavity.</li> <li>Identify the contents of thorax at their respective position.</li> </ul>
<b>INTRODUCTION TO ABDOMINAL CAVITY</b>	<ul style="list-style-type: none"> <li>Identify abdominal viscera in relation to regions and quadrants.</li> </ul>
<b>PRACTICALS/DEMONSTRATIONS</b>	
<p><b>MICROSCOPY</b></p> <ul style="list-style-type: none"> <li>Identify different parts of the microscope along with their function.</li> <li>Demonstrate operational steps of microscope handling.</li> </ul> <p><b>CELL</b></p> <ul style="list-style-type: none"> <li>Identify different components in various cells, visualized under light microscope.</li> </ul> <p><b>EPITHELIUM</b></p> <ul style="list-style-type: none"> <li>Differentiate different types of epithelia according to their characteristic identification.</li> </ul> <p><b>CONNECTIVE TISSUE</b></p> <ul style="list-style-type: none"> <li>Identify different varieties of connective tissue proper at different sites.</li> </ul> <p><b>BONE</b></p> <ul style="list-style-type: none"> <li>Differentiate the light microscopic features of compact and spongy bone.</li> </ul> <p><b>CARTILAGE</b></p> <ul style="list-style-type: none"> <li>Identify the 3 types of cartilage on the basis of their characteristic features.</li> </ul> <p><b>MUSCLE</b></p> <ul style="list-style-type: none"> <li>Differentiate the three basic muscle types according to their histological features.</li> </ul> <p><b>SKIN</b></p> <ul style="list-style-type: none"> <li>Identify the layers of epidermis and the dermal appendages.</li> </ul> <p><b>LYMPHOID ORGANS</b></p> <ul style="list-style-type: none"> <li>Differentiate the histological features of major lymphoid organs.</li> </ul> <p><b>BLOOD VESSELS</b></p> <ul style="list-style-type: none"> <li>Identify the basic layers of blood vessels.</li> <li>Differentiate artery from vein.</li> </ul> <p><b>HISTOLOGY OF TONGUE</b></p> <ul style="list-style-type: none"> <li>Identify the characteristic identification features of tongue.</li> </ul>	



**HISTOLOGY OF SALIVARY GLANDS**

- Differentiate the 3 major salivary glands on the basis of mucous and serous acini.

**THYROID AND PARATHYROID GLANDS**

- Identify the follicular arrangement and follicular cells in thyroid gland.
- Identify the anastomosing cord and chief and oxyphil cells in parathyroid gland.

**Assessment Plan**

<b>Internal Assessment</b>	Internal assessment will be according to institution policy Internal Evaluation carries 10% weight age in summative examination.
<b>Annual Examination</b>	<b>Theory:</b> Annual exam will be consist of MCQs (one best answer) <b>Practical:</b> OSPE (observed and un observed stations) + Viva+ Practical 10% weight age is added into it.