STUDY GUIDE	
PROGRAM	**BDS**
COURSE TITLE	**Anatomy**
ACADEMIC YEAR	**1st Year, 2023**
INTRODUCTION	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.
OUTCOMES	By the end of this course, students will be able to describe the structures in detail along with developmental Anatomy.
DEPARTMENTS INVOLVED	Anatomy
COURSE OBJECTIVES	By the end of the course, the students will be able to: **GENERAL ANATOMY** INTRODUCTION TO ANATOMY • Define anatomy and its branches. • Discuss their practical implication. TERMS OF POSITION AND MOVEMENT: • Define various planes, positions and terms of movement in relation to trunk, head & neck in particular. • Relate the movements with planes CARTILAGES • Define cartilage • Classify on the basis of location, morphology and function. BONES • Classify bone on the basis of shapes, development , structure & region) with examples • Compare parts of adult & young long bone • Summarize steps of bone development & ossification. MUSCLE

	• Differentiate the 3 types of muscle. • Define: origin& insertion; fast & slow fiber and connective tissue coverings • Classify skeletal muscle on the basis of architecture with examples (from H&N preferably) <u>JOINTS OF BODY</u> • Define joint • Classify joint with examples on structural, regional & functional basis. • Outline features of synovial joints. <u>INTRODUCTION TO LIMBS</u> • Identify the general arrangement of bones & muscles in the limb <u>GENERAL ORGANIZATION OF CVS</u> • Define the components of circulatory system. • Discuss the functional classification of vessels, types of circulation and anastomoses. <u>LYMPHATIC SYSTEM</u> • Define components of lymphatic system • Describe origin and termination of large lymphatic channels. • Discuss the role of lymphatics in the spread of infection &cancer <u>SKIN AND FASCIA</u> • Define epidermal & dermal components. • Differentiate tension, flexure& papillary ridges. • Define superficial & deep fascia with examples. <u>NERVOUS SYSTEM</u> • List the subdivisions (CNS, PNS, ANS) of nervous system & their component parts. • Tabulate different cells types (neuron & neuroglia) and their function. • Summarize formation of typical spinal nerve. • Differentiate spinal and peripheral nerves. **<u>HISTOLOGY</u>** <u>CELL</u> • Discuss histological aspects of cell components. • Relate cell junctions with their location & function. • Describe phases of cell cycle & steps of mitosis.

	EPITHELIAL TISSUE • Describe general features of epithelium. • Classify epithelium with examples. • Describe the specialization of each domain (surface modifications). • Classify exocrine glands according to morphology; type & mode of secretion. CONNECTIVE TISSUE • Relate the general features of connective tissue with the functions. • Describe the characteristic features, location and functions of its components (cell, matrix). • Classify connective tissue with examples. • Differentiate types of adipose tissue. HISTOLOGY OF CARTILAGES • Describe the components and coverings (perichondrium) . • Differentiate the 3 types histologically. HISTOLOGY OF BONES • Discuss the types of cells & constituents of matrix (organic & inorganic) . • Differentiate: Periosteum & endosteum; woven & lamellar bone; spongy & compact bone, with their localization in different bones. HISTOLOGY OF MUSCLE • Briefly describe the structural & ultra-structural (T tubules, ER ,myofibril, myofilaments) organization of 3 types of muscle. • Differentiate the 3 types of muscle histologically HISTOLOGY OF BLOOD VESSELS • Classify vascular system. • Describe general structure of blood vessel. • Compare the histological features of: arteries & veins; Elastic & muscular arteries & types of capillaries • HISTOLOGY OF LYMPHOID TISSUE • Classify the types of immunity. • Tabulate the lymphoid cells and their function. • Describe the histological features of main lymphoid organs. HISTOLOGY OF SKIN • Differentiate thick & thin skin. • Relate the function of each type of cell in epidermis.

- List the dermal appendages.
- Describe the glands of skin.

EMBRYOLOGY

INTRODUCTION TO EMBRYOLOGY

- Define: Embryonic & Fetal period, Trimesters, Terms of position related to fetus and induction factors.

REPRODUCTIVE SYSTEM EMBRYOLOGY

- Identify the parts of male & female reproductive system.
- Discuss their contribution in gamete formation and transportation.

CELL DIVISION

- List the types of cell division.
- Discuss steps of Meiosis

MEIOSIS AND GAMETOGENESIS

- Relate meiosis with gamete formation.

FERTILIZATION AND IMPLANTATION

- Discuss process of fertilization and events till implantation.
- Relate uterine changes in response to fertilization.

DEVELOPMENT 2ND WEEKS

- Describe the formation of structures during 2nd week.

DEVELOPMENT 3RD WEEKS

- Describe gastrulation and Neurulation.
- Discuss the differentiation of mesoderm and somite formation.
- List derivatives of germ layers.

EMBRYONIC PERIOD

- List week by week events during embryonic period.

FETAL PERIOD

- List the main events of fetal period during each month.

FETAL MEMBRANES AND PLACENTA

- List the fetal membranes
- Describe the maternal and fetal components of placenta.
- Describe briefly the amniotic fluid and its function.
- Describe the structure of placental barrier.

	ROLE OF GENES AND TERATOGENS IN BIRTH DEFECTS • Discuss the role of genes & environmental factors in causation of congenital formation. • List the teratogens producing facial, palatal & oral malformation. ANTENATAL DIAGNOSTIC TECHNIQUES • Discuss the most common antenatal diagnostic techniques : U/S , amniocentesis ,chorion villus sampling **NEUROANATOMY** CRANIAL FOSSAE • Identify the boundaries, bones and foramina of 3 cranial fossae. • Relate the contents passing through the foramen. DEVELOPMENT OF NERVOUS SYSTEM • Discuss differentiation of neural tube in brain vesicles. • List the derivatives of brain vesicles • Define Alar and Basal plates. BLOOD SUPPLY OF BRAIN AND SPINAL CORD • List the branches of internal carotid artery, vertebral artery & Basilar artery. • Describe location and formation of Circle of Willis. • Outline the course of internal carotid & vertebral arteries. • Demarcate the area of supply of the 3 cerebral arteries. • Describe the origin & area of supply of Spinal arteries. • Discuss the deficit caused by occlusion of cerebral arteries and spinal arteries. MENINGES • Describe the Dural folds and their function. • Define: Arachnoids Mater, sub arachnoid Space, arachnoid villi & granulations. • Describe Pia mater, its modification the denticulate ligament and its contribution to choroid plexus. • Discuss importance of epidural, subdural and subarachnoid spaces. DURAL VENOUS SINUSES • List Paired & Unpaired sinuses. • Discuss their association with dural folds and bones of cranial cavity. • Describe the location and contents of Cavernous sinus and its communication with veins of orbit & face.

	VENTRICULAR SYSTEM OF BRAIN • Relate the parts of ventricular system with the lobes of brain. • Identify the openings /apertures of ventricular system • Define Choroid Plexuses • Describe boundaries of 4th ventricle & features related to the its floor • Discuss clinical correlation of CSF flow. CRANIAL NERVES I-XII • Describe the origin, exit & functional components of nerves. SPINAL CORD. • Describe the gross appearance of Spinal cord. • State the location and function of Anterior & Posterior horns. BRAIN STEM, • Describe the location and division of brain stem. • Describe the gross appearance of Medulla, Pons and Midbrain and emergence of cranial nerves. CEREBELLUM, DIENCEPHALON • Describe the location and division of Diencephalon. • List the 3 anatomical and functional lobes of cerebellum. CEREBRUM • Identify the main Sulci and Gyri; and functional cortical areas. • Relate the function areas with their vascular supply. • Define the types of white fibers. AUTONOMIC NERVOUS SYSTEM • Classify Autonomic nervous system • Differentiate the components of sympathetic & parasympathetic system and their function. IMAGING OF BRAIN AND SPINAL CORD • Identify normal radiological anatomy of brain and spinal cord. **HEAD & NECK** INTRODUCTION OF HEAD AND NECK STRUCTURES • Describe the topography of head and neck region. THE 4 NORMAS OF SKULL • Identify the bones & anatomical features of 4 Normas'. • Relate the foramina with their respective contents.

OSTEOLOGY OF THE MANDIBLE & HYOID

- Describe features and landmarks of mandible& Hyoid bones.
- Discuss age related changes in mandible.

THE SCALP

- Discuss the associated clinical conditions associated with layers of scalp.
- Identify its neurovascular supply.

FACE

- Define its boundaries.
- Tabulate muscle & their actions.
- Describe neurovascular supply, lymphatics and their clinical aspects.
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PHARYNGEAL APPARATUS. (Embryology)

- Define components of pharyngeal apparatus
- Describe derivatives of each component.
- Discuss the important anomalies.

DEVELOPMENT FACE (Embryology)

- Describe formation of face from the prominences & its anomalies

ORBITAL BOUNDARIES, CONTENTS & LACRIMAL APPARATUS

- Describe the bony boundaries.
- List the contents.
- Discuss the connections of Ciliary ganglion
- List components of lacrimal apparatus.
- Trace the pathway of lacrimation.

EYE BALL& EXTRA- OCULAR MUSCLES

- Identify the 3 coats and the components of each coat.
- Identify the extra-ocular muscles.
- Discuss neurovascular supply & actions of these muscles.

EAR

- Describe the division of ear.
- Discuss the gross features &nerve supply of external ear.
- Identify the boundaries and relations of middle ear.
- List the contents of middle ear.

TEMPORAL AND INFRATEMPORAL FOSSAE

- Identify the boundaries of temporal and infratemporal Fossa
- Describe the contents of infratemporal fossa.

	PTERYGOPALATINE FOSSA • Discuss its boundaries & communications. • Describe maxillary artery (3rd part) & maxillary nerve and connections of ganglion. TMJ AND MUSCLES OF MASTICATION • Describe the Temporomandibular joint • Describe the muscles of mastication, their neurovascular supply • Discuss the movements and associated clinical conditions. NOSE AND PARANASAL SINUSES • Describe the features of external nose, nasal cavity and the openings in meatus. • Name the bones forming the nasal cavity & septum. • Discuss the formation and clinical importance of anastomoses at little's area. • List the paranasal sinuses & their location. • Describe boundaries of maxillary sinus and its clinically important relation with maxillary teeth. ORAL CAVITY • Discuss the boundaries & divisions of the oral cavity • Describe the vestibule and oral cavity proper with their contents HISTOLOGY OF ORAL CAVITY (Histology) • Describe the general features of oral mucosa in oral cavity. • List the types of oral epithelium. • Discuss the histology of lips, cheek, palate and gums. HARD & SOFT PALATE • Describe the boundaries. • Tabulate the muscles, neurovascular supply and actions. • Discuss the clinical (Gag reflex in dentistry) TONGUE • Describe the division and external features of tongue. • Tabulate the muscles, their action and nerve supply. • Describe the vascular supply and lymphatic drainage • Discuss the clinical correlation. HISTOLOGY OF TONGUE (Histology)

	• Describe the histological features of tongue: Mucosal papillae, taste buds, lingual salivary glands etc . DEVELOPMENT OF TONGUE (Embryology) • Describe the development of the tongue & its anomalies. • Describe how primary and secondary palate give rise to adult palate. • Discuss embryologic basis of cleft palate & associated cleft lip. SALIVARY GLANDS • Describe location, relations and neurovascular & lymphatic supply of these gland. • List the structure passing through parotid gland. • Discuss clinical correlations HISTOLOGY OF SALIVARY GLANDS (Histology) • Describe in general the acini, duct system & stroma. • Differentiate the 3 major glands histologically. DEVELOPMENT OF SALIVARY GLANDS (Embryology) • Discuss the derivation of secretory part, duct system and stroma from different embryonic sources. • State their timeline CERVICAL VERTERBRA • Describe the common features of cervical vertebra. • Identify the typical & atypical vertebra by their relevant identifying features. SKIN, FASCIA AND NECK MUSCLES • Define the layers of neck. • Describe the modifications of deep fascia. • Describe contents of carotid sheath. TRIANGLES OF NECK • Describe the boundaries of the triangles & their subdivision. • Enlist the component of each triangle. • Describe cervical plexus. • Discuss the clinical conditions related to them. PITUITARY GLAND • Describe the location & division of gland. • Differentiate the cells of pituitary according to staining.

	• List the 2 sources from which the adenohypophysis and neurohypophysis develops. THYROID AND PARATHYROID GLANDS • Describe the location, extend, relation and vascular supply of both glands and clinical related to it. DEVELOPMENT OF THYROID AND PARATHYROID GLANDS (Embryology) • Describe origin & derivation of both glands. • Discuss the anomalies of thyroid gland . GROSS ANATOMY OF PHARYNX • Describe the location, extent & divisions of pharynx. • Identify features related to each part (tonsils, Pharyngotympanic tube Ostia etc.). GROSS ANATOMY OF LARYNX • Describe its extent & location. • Enlist the cartilages & membranes of larynx. • Tabulate the muscles their nerve supply & actions. • Discuss the clinical conditions related to the innervation. CRANIAL NERVES V,VII,IX,X,XI&XII • Describe the brief course of each nerve. • Tabulate their branches & area of supply. • Discuss the impact of injury. MAJOR VESSELS OF NECK • Describe the origin and course of major arteries briefly in neck. • List their branches in neck. LYMPHATIC DRAINAGE • Describe the lymphatic drainage of head and neck. • Discuss its clinical significance in relation to oral structures. INTRODUCTION TO THORACIC CAVITY • State boundaries of thoracic cavity. • Identify the contents of thorax at their respective position. INTRODUCTION TO ABDOMINAL CAVITY • Identify abdominal viscera in relation to regions and quadrants

PRACTICALS/ DEMONSTRATIONS	**PRACTICALS** MICROSCOPY • Identify different parts of microscope along with their function. • Demonstrate operational steps of microscope handling. CELL • Identify different component in various cells, visualized under light microscope. EPITHELIUM • Differentiate different types of epithelia according to their characteristic identification CONNECTIVE TISSUE • Identify different varieties of connective tissue proper at different sites. BONE • Differentiate the light microscopic features of compact and spongy bone. CARTILAGE • Identify the 3 types of cartilage on the basis of their characteristic features. MUSCLE • Differentiate the three basic muscle types according to their histological features SKIN • Identify the layers of epidermis and the dermal appendages. LYMPHOID ORGANS • Differentiate the histological features of major lymphoid organs. BLOOD VESSELS • Identify the basic layers of blood vessels. • Differentiate artery from vein. HISTOLOGY OF TONGUE

	Identify the characteristic identification features of tongue . HISTOLOGY OF SALIVARY GLANDS • Differentiate the 3 major salivary gland 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.
INTERNAL ASSESSMENT	10% (Pre-professional Examination, Midterm Examination, Assignments and Class Presentations)
ANNUAL EXAMINATION	90% (MCQS, OSPE)
COURSE EVALUATION	This course will be evaluated as per JSMU & HEC policies