

MINISTRY OF HEALTH OF THE KYRGHYZ REPUBLIC
MINISTRY OF EDUCATION AND SCIENCE OF KYRGHYZ REPUBLIC
INTERNATIONAL MEDICAL UNIVERSITY

Approved by
at a meeting of the Training
Council Chairman of the IMU,
“ _____ ” _____ 2022.

SYLLABUS

Discipline _____ Normal Anatomy _____

Specialty _____ Morphology _____

Course _____ 1st year _____

Semester _____ 1st & 2nd _____

Credits _____ 6 _____

Total hours for the curriculum__ 212 hours _____

Lectures _____ 50 _____

Practical _____ 76 _____

Independent work _____ 54 _____

Reviewed and approved on the cafedral session of Medical disciplines of the IMU Protocol № _____
from _____ 2022.

Head of department _____ Almaz Duishenov. _____

**EDUCATIONAL AND METHODOICAL COMPLEX
in the discipline "Normal Anatomy"**

Educational and methodical complex is compiled
on the basis of the State Educational Standard of Higher Professional Education of the
Kyrgyz Republic
in the specialty "General Medicine" (5 years).

The educational and methodical complex was developed at the Department of Morphology,
Pathology and Public Health

Developed by: Dr. Ramsha Rao & Dr. Adnan Sami

Bishkek 2022

OBJECTIVES

At the end of the course, the student should be able to:

- Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of the various structures in the body.
- Identify the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
- Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyze the integrative and regulative functions on the organs and systems. He/She should be able to locate the site of gross lesions according to the deficits encountered.
- To understand the basic principles of embryology including genetic inheritance and stages involved in development of the organs and systems from the time of conception till birth. The student should recognize the critical stages of normal development and the effects of common teratogens, genetic mutations and environmental hazards on it. He/She should be able to explain the developmental basis of the occurrence of major variations, abnormalities and congenital anomalies.

COURSE CONTENT

1. Gross Anatomy

Introduction to Anatomy, nomenclature, anatomical position, planes, tissues and movements.

I. Osteology

- (a) Names of the bones of the body and their position; classification of the bones with examples; general features of the bone and normal development; microscopic anatomy of bone; general pattern of blood supply; ossification of the bones of the limbs for age determination. X-rays of bones.
- (b) Process of repair of bone.

2. Muscular System

- (a) Classification and identification of the muscles of the body: main attachments, nerve supply and action(s), microscopic anatomy of muscles and the nerve terminations.
- (b) Details of attachments of the muscles; ultrastructural features of muscle; mechanism of the movement caused by the muscle/muscles and various forces exerted by them and their detailed action(s).

3. Arthology

- (a) Definition and classification of joints, general features of different types of joints; detailed study of major joints of the limbs and movements performed at various joints in the body.
- (b) Microscopic anatomy of articular cartilage; maintenance of articular cartilages; blood supply and nerve supply of the joints.

4. Cardio Vascular System

- (a) Normal position, external features and parts of the heart; internal features of the chambers of heart, names of the blood vessels and venous drainage of the organs, structures and body as a whole, conducting system of heart, fibro skeleton of heart.
- (b) Variation(s), developmental anomalies of heart and blood vessels, valvular defects and their effects in pathogenesis of the anomalies.

5. Respiratory System

- (a) Position, parts, relations, blood supply of upper and lower respiratory tract. Pleura, its reflection, nerve supply, pleural recesses and their significance, bronchopulmonary segments, their

importance.

- (b) Mechanism of respiration

6. Digestive System

- (a) Position, extent, parts, relations, blood supply, nerve supply, lymphatic drainage and sphincters of the gastrointestinal system.
(b) Sphincter action including functional implications.

7. Genito-Urinary System

- (a) Parts, position, relations, blood supply, nerve supply and lymphatic drainage of uterus, cervix, vagina, ovary, ovarian duct, testes, epididymis, seminal vesicle, ductus deferens, prostate, kidney, ureter, urinary bladder and urethra
(b) Innervation of urinary bladder in detail

8. Endocrine System and Individual Endocrine Glands

- (a) Various endocrine glands, their location, relations, blood supply, nerve supply and lymphatic drainage.
(b) Clinical manifestations of common endocrine disorders.

9. Nervous System and its components

- (a) Parts of nervous system, neuron meninges, nerve terminals, neuroglia, myelination, degeneration and regeneration, ventricles, CSF, spinal cord and its blood supply. Motor and sensory pathways, cranial nerves, thalamus, cerebellum, limbic and autonomic pathways. Functional cortical areas, motor and sensory cortex and their blood supply.

10. Special Sensory Organs

- (a) Gross Anatomy of:
(i) eye ball, extra ocular muscles their nerve supply and actions (s)
(ii) ear
(iii) nose

(iv) tongue, its musculature blood supply and lymphatic drainage.

11. Lymphatic System

- (a) Location of the major groups of the lymph nodes of the body and their drainage areas. Gross anatomy of the major lymphatics especially thoracic duct and its tributaries.

12. Surface Anatomy

- (a) Surface features of the body and projection of the outline of heart, its borders, surfaces and valves, lungs, their borders, fissures and hila, pleura, liver, kidneys and various abdominal and pelvic organs and important vessels and nerves

13. Cross Sectional Anatomy

Cross sections of thorax, abdomen and pelvis to understand the interrelationship of organs and structures.

II. Microanatomy

Microscope and basic principles of microscopy, commonly used stains, basophilic and acidophilic staining reactions and their significance. Commonly encountered artifacts. Brief principle of electron microscopy and interpretation of ultrastructural features.

GENERAL HISTOLOGY

Cell: detailed structure of cell and its components and their functional mechanisms.

Four primary tissues

Epithelium: Microscopic characteristics, types, functions, distribution, basal lamina, cell junctions,

specialization of the cell surface and their structural details and functions; metaplasia.

Connective tissue: Cells, fibers and their structural features and functions. Intercellular substances, amorphous ground substance, types of connective tissue (loose areolar tissue, dense connective tissue) and their distribution. *Specialized connective tissue:* different types of cartilages and their functions and distribution. *Bone:* Cells, bone matrix, structural features of compact and cancellous bone, their distribution and functions, ossification, blood supply of a long bone.

Muscle: General features, detailed structure of: skeletal muscle, and molecular mechanisms of contraction, innervation of skeletal muscle, neuromuscular junction, morphological and histochemical basis of classification into type I and type II muscle fibers and their significance, structural and functional characteristics of cardiac and smooth muscle; innervation of cardiac and smooth muscle.

Nervous tissue: Structural characteristics of a neuron, axon and dendrites. Different types of neurons and their specific structural and functional features and distribution. Axonal transport, synapse, morphological and functional characteristics of different types of synapses. Neuroglia: types, structure and functions, blood brain barrier. Brief cytoarchitecture of the central nervous system, regeneration in CNS with particular emphasis on stem cells. Sensory and autonomic ganglia, peripheral nerves, myelin and myelination, degeneration and regeneration in peripheral nerves.

Histology of various organs/organ systems

Exocrine glands: Characteristics, simple and compound glands; types of secretions, modes of secretion, detailed structural features of a serous secreting cell and mucous secreting cell, serous and mucous acini, duct system, features of salivary glands, exocrine pancreas, sweat and sebaceous glands, mammary gland, bulbourethral gland etc.

Circulatory system: Structural features of heart; conducting and distributing arteries and arterioles; types of capillaries, their structural features and distribution and microcirculation, detailed structure of endothelium; structural characteristics of large and small veins and venules arteria-venous shunts, lymphatics.

Respiratory system: Structural features of nose, nasopharynx, larynx, trachea, principal bronchi, lung including intrapulmonary bronchi, bronchioles, alveolar ducts, atria, alveoli, blood-air-barrier. Functions of different parts of respiratory system.

Skin and nerve-end-organs: Thick, thin and hairy skin, cell renewal and pigmentation of skin, skin appendages, healing of skin wounds, sensory receptors of skin. Functions of skin.

Immune system and lymphoid organs: Lymphocytes, their subtypes and functions. Humoral and cell mediated immunity. Thymus, lymph nodes, spleen, tonsils and other mucous associated lymphoid follicles.

Digestive system (GIT) : General organization, oral cavity, lip, cheek, tongue, taste buds, associated salivary glands. Layers of tubular digestive tract, esophagus, stomach, small intestine, gastroesophageal junction, gastroduodenal junction, large intestine, anal canal and recto anal junction. Liver, internal organization of liver, liver lobule, liver acinus, significance of zonation in liver acinus, liver sinusoids, detailed structure of hepatocyte, bile canaliculi, bile ducts, gall bladder, bile duct and pancreas.

Endocrine glands: Thyroid, parathyroid, Islets of Langerhans's gland, adrenal cortex and medulla, their structural details, functional mechanisms, hypothalamus, cell types secretion and their functions, hypophyseal portal circulation, common endocrine disorders

Urinary system: Detailed microscopic structure of kidney, cortex, medulla, pyramids, medullary rays, cortical columns, glomerulus, nephron, glomerular filtration juxtaglomerular apparatus, its structural features and functions, renal interstitial, collecting ducts, renal sinus, minor and major calyces, microcirculation of kidney, histophysiology of the kidney, renal pelvis and ureters, urinary bladder and urethra.

Female reproductive system : Ovary, ovarian stroma, primary and secondary graafian follicles, functions of various constituents and structural details of graafian follicles, atretic follicles, corpus luteum and its functions, corpus albicans. Oviducts, uterus, arterial supply of uterus, cyclic changes in uterine endometrium, fertilization, vagina, female external genitalia and mammary glands.

Male reproductive system : Testes, spermatogenesis, spermatozoon, cycle of seminiferous epithelium, sertoli cells, interstitial tissue Leydig cells, histophysiology of testes, epididymus, vas deferens, prostate, seminal vesicles, penis.

III. Embryology

III. A General Embryology

(a) Definition of embryology; gestation period: definition of gamete sperm, Ovum; gametogenesis, migration of primordial germ cells into gonadal ridge; spermatogenesis; structure of sperm, oogenesis; structure of ovum; growth of ovarian follicles, ovarian and uterine cycles.

(b) Sperm in the male genital tract; sperm in the female genital tract, activation and capacitation of sperm in the female genital tract.

(c) *First Week of Development*

Definition and normal site and process of fertilization, formation of zygote, cleavage division; formation of morula and blastocyst.

(d) *Second Week of Development*

Differentiation of embryoblast and trophoblast; changes in the embryoblast formation of bilaminar germ disc; changes in the trophoblast; formation of cytotrophoblast, syncytiotrophoblast, amniotic membrane, yolk sac, extra embryonic mesoderm and extra embryonic coelom and connecting stalk; formation of chorion, amniotic cavity, primary yolk sac cavity appearance of prochordal plate.

Implantation; formation of decidua, types of implantation and abnormal sites of implantation

(e) *Third Week of Development*

Appearance of primitive streak and primitive node; formation of intraembryonic mesoderm resulting in trilaminar germ disc; gastrulation formation of notochord, buccopharyngeal and cloacal membranes, paraxial, intermediate and lateral plate mesoderm, secondary yolk sac, intraembryonic coelom and allantoic diverticulum; derivatives of ectoderm, mesoderm and endoderm.

(f) *Fourth To Eighth week of Development (Embryonic period)*

Formation of somites, neural tube, cephalocaudal folding, lateral foldings, body form, stomodeum, proctodeum, gut and vitelline duct; subdivisions of gut into foregut, midgut and hindgut.

Development from third month to birth (Fetal period)

(g) Maturation of tissues and organs and rapid growth of body.

(h) Estimation of age.

Placenta

(i) Formation of placenta and chorionic villi, decidua basalis; features and functions of placenta; placental circulation; abnormalities; placental barrier; placentalome, types of placenta.

Umbilical Cord

(j) Formation of umbilical cord; features of umbilical cord.

Amniotic Cavity

(k) Amniotic cavity and membrane; amniotic fluid – functions, expansions of amniotic cavity and fusion with chorion; chorion laeve with decidua capsularis; decidua capsularis with parietalis; obliteration of chorionic and uterine cavities; function of fused foetal membranes to dilate cervical canal.

(l) Abnormalities; obliteration of chorionic and uterine cavities; abnormalities of chorion.

(m) Formation of twins and types of twins.

(n) Arrangement of foetal membranes. Conjoined twins.

Teratology

(o) Genetical and environmental factors as causative factors for congenital malformations.

(p) Mode of actions of teratogenes and critical periods.

III.B Systemic Embryology

- (a) Development of the individual organs of digestive system, genital system, urinary system,, respiratory system, cardiovascular system. Nervous system, special sensory organs, endocrine glands and mammary gland.
- (b) Developmental abnormalities of individual organs/systems, pathogenesis of the anomalies.
- (c) Histogenesis of various organs.
- (d) Development of skeletal system, muscular system and derivatives of coelomic cavities
- (e) Development of face and the pharyngeal arches and the associated congenital anomalies.

III.C Human Genetics

- (a) Cell, cell division, mitosis and meiosis, nucleus, DNA, chromosomes, classification, karyotype, chromosomal aberrations (Klinefelter, Turner and Down's Syndrome) Prenatal diagnosis for congenital abnormalities, sex determination.
- (b) Pedigree chart, pathogenesis of chromosomal aberrations and their effects, recombinant DNA, genetic inheritance, genetic counselling, inborn errors of metabolism.

4.THEORY SYLLABUS & PRACTICAL SYLLABUS

(1) GENERAL ANATOMY SYLLABUS (12 hours)

| Topic and duration of study | Must Know 60% | Desirable to know 30% | Nice to know 10% |
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| Introduction to anatomy | | | |
| Anatomical terminology | An understanding of the various subdivisions of anatomy Anatomical position Anatomical planes Terms of direction, relation, comparison, laterality & movement | | |
| Introduction to bones | Composition of bone and bone marrow Regional classification of skeleton Structural classification of bone a. Distribution of spongy and compact bone in the body Classification of bone according to shape Classification of bone based on ossification Parts of a long bone Blood and nerve supply of a long bone Special features of a | Laws of ossification, including direction of nutrient foramen and the growing end of the bone Exceptions to the laws of ossification | |

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| | sesamoid bone | | |
| Introduction to joints | <ul style="list-style-type: none">▪ Definition▪ Classification according to<ol style="list-style-type: none">a. Structure- with subtypes and examples of fibrous, cartilaginous and synovial jointsb. Mobility | | Types of sutures (Unnecessary detail) |

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| | <p>c. Axes of movement</p> <p>Complex and compound joints</p> <p>Nerve supply of joints- Hilton's law</p> <p>Blood supply of joints</p> | | |
| Introduction to the muscular system | <p>Structural classification of muscle</p> <p>Parts of a skeletal muscle</p> <p>Differentiate tendon and aponeurosis</p> <p>General principles about how attachments of muscles affect the joints they cross</p> <p>Classification of muscle according to action (agonists, antagonists, synergists, fixators)</p> | <ul style="list-style-type: none"> ▪ Classification of muscle according to direction of muscle fibres and shape | <p>Actions of muscles as compared to systems of levers</p> <ul style="list-style-type: none"> ▪ Shunt and spurt muscles (Unnecessary detail) ▪ Classification of skeletal muscle according to type of contraction <p>(Will be covered in Physiology)</p> |

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| <p>Introduction to the cardiovascular system</p> | <ul style="list-style-type: none"> ▪ Classification into blood vascular system ▪ Differentiate pulmonary and systemic circulation ▪ Layers of any blood vessel ▪ Types of blood vessels <ul style="list-style-type: none"> a. General differences between arteries and veins b. Functional difference between elastic, muscular arteries and arterioles c. Function of meta-arterioles, precapillary sphincters, arterio-venous anastomoses d. Microvasculature-types of capillaries and their functional significance ▪ Venous return <ul style="list-style-type: none"> a. Musculo-venous pumps b. Role of valves ▪ Definition and structure of a portal system ▪ Concept of anastomoses and | <p>Concepts of thrombosis, infarction, aneurysm</p> <p>Concept of lymphoedema and spread of tumors via lymphatics and venous system</p> | |
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| Lymphatic system | collateral circulation <ul style="list-style-type: none">▪ Significance of end-arteries▪▪ Components and function of the lymphatic system<ol style="list-style-type: none">a. Structure of lymph capillariesb. Concept that lymphatics accompany blood vesselsc. Concept that lymph ultimately drains into the venous systemd. Function of lymph nodes in the lymphatic system | | |
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For the following regions (2) Upper limb and (3) Lower limb, (4) Thorax, (5) Abdomen and (6) Head & Neck- General concept of the parts of the bones to which each muscle is attached, and the relation of the fibres to the axes of the joints they cross in order to understand how a muscle causes a particular movement must be taught. Muscles may be discussed as muscle groups.

Wherever clinical conditions are mentioned only the relevant anatomical basis is required.

| (2) UPPER LIMB – SYLLABUS (100 hours) | | | |
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| Topic | Must Know | Desirable to know | Nice to know |
| Overview | Major segments (e.g. shoulder) | | |
| Bones Side determination (one feature for each of the opposite directions) Anatomical position Identification and description of features of each part Articulations | Clavicle Unique features Scapula Humerus Ulna Radius | <ul style="list-style-type: none"> ▪ Muscle attachments | <ul style="list-style-type: none"> ▪ |
| Bones | <u>Articulated hand:</u> <ul style="list-style-type: none"> ▪ Identify and name the various bones in the articulated hand ▪ Prominent features of carpal bones <ul style="list-style-type: none"> o Tubercle of scaphoid o Crest of trapezium o Hook of hamate ▪ Parts of metacarpals and phalanges | <ul style="list-style-type: none"> ▪ Scaphoid fractures and avascular necrosis ▪ Peculiarities of pisiform bone in its development, muscle attachment | <ul style="list-style-type: none"> ▪ |

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| Pectoral Region | <u>Muscles:</u> <ul style="list-style-type: none"> ▪ Position, name of bones to which attached, nerve supply and actions of pectoralis major, pectoralis minor and <u>Breast:</u> <ul style="list-style-type: none"> ▪ Location, extent, deep relations ▪ Type of gland, structure ▪ Age changes ▪ Blood supply ▪ Lymphatic drainage ▪ Applied anatomy: | <ul style="list-style-type: none"> ▪ Attachments of subclavius | <u>Clavipectoral fascia:</u> <ul style="list-style-type: none"> ▪ Position, extent, structures piercing it |
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| | <ul style="list-style-type: none"> ○ Breast abscess ○ Breast cancer ○ Developmental anomalies | | |
| Axilla | <ul style="list-style-type: none"> ▪ Boundaries, contents ▪ <u>Axillary Artery:</u> <ul style="list-style-type: none"> ○ Origin, extent, course, parts, relations, branches ▪ <u>Axillary Vein:</u> <ul style="list-style-type: none"> ○ Formation, extent, course, relations, tributaries ▪ <u>Brachial plexus:</u> <ul style="list-style-type: none"> ○ formation, branches, relations, area of supply of branches, course and relations of terminal branches ▪ <u>Axillary lymph nodes:</u> <ul style="list-style-type: none"> ○ Anatomical groups and their areas of drainage | <p>Brachial plexus:</p> <ul style="list-style-type: none"> - Variations - Prefixed and postfixed plexuses - Injuries – Erb palsy and Klumpke paralysis - Anaesthetic block <p>Enlargement of axillary lymph nodes</p> | |
| Back Shoulder Region | <ul style="list-style-type: none"> - Concept of layers of muscles of the back with emphasis on trapezius and latissimus dorsi - Injury of spinal accessory nerve, and axillary nerve - deltoid, rotator cuff muscles ● Movements of the scapula and muscles involved <p>Testing of serratus anterior</p> <ul style="list-style-type: none"> ● Shoulder joint – description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, Subacromial bursa Injury of axillary nerve during intramuscular injections | <p>Specific attachments of trapezius and latissimus dorsi muscles</p> <p>Arterial anastomosis around the scapula and collateral circulation</p> <p>Dislocation of glenohumeral joint</p> | Triangle of auscultation |

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| Free upper limb | <ul style="list-style-type: none">▪ Fascia of upper limb and compartments▪ Veins of upper limb- Superficial and deep• Lymphatic drainage | | |
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| | <p>Cutaneous nerves of upper limb</p> <p>Dermatomes of upper limb</p> | | |
| Arm and cubital fossa | <ul style="list-style-type: none"> ▪ Muscle groups of upper arm with emphasis on biceps and triceps ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels <p>Cubital fossa – boundaries, roof, floor, contents and relations of contents</p> <p>Venepuncture of cubital veins</p> <ul style="list-style-type: none"> ▪ Saturday night paralysis | <ul style="list-style-type: none"> - Nerves liable to be involved in fracture of the humerus and clinical manifestations - Anastomosis around the elbow joint | <p>Deep tendon reflexes of biceps and triceps</p> |

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| <p>Front of Forearm and Palm</p> | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> of forearm with attachments, nerve supply and actions of: ▪ Flexor muscles in the superficial, intermediate and deep layers of the forearm ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Position for palpation of radial artery pulsations ▪ Flexor retinaculum and its attachments ▪ Carpal tunnel syndrome <ul style="list-style-type: none"> • <u>Palm and hand</u> thenar and hypothenar muscles, lumbricals and interossei <p>- Ulnar and median claw hand</p> <p>Movements of the thumb and muscles involved</p> <p>Long flexor tendons, fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths</p> <p>Course and branches of blood vessels and nerves in the hand</p> | <p>- Boundaries and contents of fascial compartments and spaces</p> <p>Dupuytren contracture of palmar aponeurosis</p> <p>Applied anatomy of fascial spaces</p> <p>Tenosynovitis</p> | |
| <p>Back of forearm</p> | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> of forearm with attachments, nerve supply and actions of: extensor muscles of forearm | | |

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| | <ul style="list-style-type: none"> ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Wrist drop <p>- Compartments deep to extensor retinaculum and contents of each one</p> | | |
| Dorsum of hand | <ul style="list-style-type: none"> ▪ Extensor expansion - formation and muscles attached | <ul style="list-style-type: none"> ▪ Anatomical “snuff box” | |
| Joints of upper limb | <p>Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations movements, blood and nerve supply of:</p> <ul style="list-style-type: none"> ▪ Elbow joint (including muscles involved in movements of the joint) ▪ Proximal and distal radio-ulnar joints (including muscles involved in movements of the joint) ▪ Wrist joint (including muscles involved in movements of the joint) ▪ First carpometacarpal joint (including muscles involved in movements of the joint) | <p>Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations movements, blood and nerve supply of:</p> <ul style="list-style-type: none"> ▪ Sternoclavicular joint ▪ Acromioclavicular joint <p>Dislocation of radial head</p> | <p>Carrying angle</p> <ul style="list-style-type: none"> ▪ Intercarpal joints ▪ Intermetacarpal joints ▪ Carpometacarpal joints, except first carpometacarpal joint ▪ Metacarpophalangeal joint ▪ Interphalangeal joint |
| Radiology | <ul style="list-style-type: none"> ▪ Anteroposterior and lateral views of bones and joints of upper limb | | |
| Surface anatomy | <ul style="list-style-type: none"> ▪ <u>Bony landmarks:</u> ▪ Jugular notch, sternal angle, acromial angle, ▪ spine of the scapula - vertebral level of the medial end ▪ Inferior angle of the scapula – vertebral level ▪ <u>Surface projection of:</u> ▪ Axillary artery ▪ Axillary nerve ▪ Cephalic and basilic vein ▪ Brachial artery ▪ Radial artery | | <ul style="list-style-type: none"> ▪ |
| Embryology | <ul style="list-style-type: none"> ▪ Basic concept of development of upper limb | | |

(10) GENERAL HISTOLOGY – SYLLABUS (40 hours)

| Topic | Must Know | Desirable to know | Nice to know |
|-------|---|-------------------|--------------|
| | Epithelium | | |
| | Connective tissue proper Loose areolar tissue, dense connective tissue –regular, adipose tissue | | |
| | Cartilage | | |
| | Bone | | |
| | Muscle | | |
| | Blood vessels | Microvasculature | |
| | Lymphoid tissue | | |
| | Nervous tissue | | |

(8) GENERAL EMBRYOLOGY – SYLLABUS (8 hours)

| Topics | Must know | Desirable to know | Nice to know |
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| Introduction | Terms used in embryology Stages of development | | |
| Mitosis and Meiosis and | Primordial germ cells Concept of Chromosomal abnormalities – numerical / structural Gene mutation | | |

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| Gametogenesis | Oogenesis Spermatogenesis | | |
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| Uterine and ovarian cycles | Uterine and ovarian cycles Ovulation | | |
| Fertilization and Blastocyst | Definition, Phases of fertilization, Results of fertilization, Contraceptive methods- barrier techniques, contraceptive pills, IUD, vasectomy and tubectomy, Infertility Embryonic and adult stem cells | Assisted reproductive technology – IVF, GIFT, ZIFT, ICSI | |
| Bilaminar germ disc | Implantation Abnormal implantation | | |
| Trilaminar germ disc | • Gastrulation | | |
| Embryonic period | Definition, Neurulation – neural pores and the time of closure, Derivatives of each of the 3 germ layers, Somites | External appearance during 2 nd month Induction and organogenesis | |
| Foetal membranes and Placenta | Structure, Placental circulation, Function, Placental barrier | | Erythroblastosis fetalis and fetal hydrops |
| Amnion and umbilical cord | Structure and function | Amniotic fluid- hydramnios and oligohydramnios | Umbilical cord anomalies, Amniotic bands |
| Birth defects | Types of abnormalities – malformation, disruption, deformation, syndrome, Teratogens | | |
| Prenatal diagnosis | Ultrasonography, Maternal serum screening, Amniocentesis, Chorionic villus sampling | | |
| Twinning | Monozygotic and dizygotic twins, Conjoint twins | | |
| (3) LOWER LIMB – SYLLABUS (80 hours) | | | |

| Topic | Must Know | Desirable to know | Nice to know |
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| Overview | Regions | | |

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| <p>Bones</p> <p>Side determination (one feature for each of the opposite directions)</p> <p>Anatomical position</p> <p>Identification and description of features of each part</p> <p>Articulations</p> | <ul style="list-style-type: none"> ▪ Hip bone ▪ Femur - ossification of lower end ▪ Patella ▪ Tibia -Ossification of upper end ▪ Fibula ▪ Articulated foot | | <ul style="list-style-type: none"> ▪ Neck-shaft angle |
| <p>Fascia, veins, lymphatics cutaneous nerves of lower limb</p> | <ul style="list-style-type: none"> ▪ Fascia lata ▪ Intermuscular septa ▪ Venous drainage of lower limb ▪ Varicose veins and deep vein thrombosis ▪ Musculo-venous pump ▪ Lymphatic drainage of lower limb including areas draining into inguinal lymph nodes ▪ Dermatomes of lower limb ▪ Cutaneous nerves of lower limb | <ul style="list-style-type: none"> ▪ Enlarged inguinal lymph nodes ▪ Flexor, extensor and peroneal retinacula | |
| <p>Front of thigh</p> | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve supply and actions ▪ Insertion of psoas major, and quadriceps femoris ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Boundaries, floor, roof and contents of femoral triangle | <ul style="list-style-type: none"> ▪ Psoas abscess ▪ Femoral hernia ▪ Palpation of femoral artery ▪ Knee jerk | <ul style="list-style-type: none"> ▪ |
| <p>Medial side of thigh</p> | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve supply and actions ▪ Adductor canal | | <ul style="list-style-type: none"> ▪ |

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| Gluteal region | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve supply and actions ▪ Insertion of gluteus maximus, medius and minimus ▪ Relations of piriformis and ischial spine ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels <p>- Liability of sciatic nerve to injury during gluteal intramuscular injections</p> | <ul style="list-style-type: none"> - Trendelenburg sign - Pudendal block | <ul style="list-style-type: none"> ▪ |
| Back of thigh | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve | | <ul style="list-style-type: none"> ▪ |

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| | <p>supply and actions</p> <ul style="list-style-type: none"> ▪ Position, name of bones to which attached, nerve supply and actions of hamstrings, ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels | | |
| Hip joint | <p>Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the joint,</p> <p>Fracture neck of femur</p> | <p>Dislocation of hip joint Surgical hip replacement</p> | |
| Popliteal fossa | <ul style="list-style-type: none"> ▪ Boundaries, roof, floor, contents and relations of contents • ● Popliteal pulse ▪ Position, attachments, nerve supply and actions of popliteus | | |
| Front of leg Anterior compartment, Dorsum of foot and Lateral Compartments | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve supply and actions of muscles in each compartment ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Injury to common peroneal nerve and foot drop | <ul style="list-style-type: none"> ▪ | <ul style="list-style-type: none"> ▪ |
| Knee joint | <ul style="list-style-type: none"> ● Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the joint, ▪ Locking and unlocking of the knee joint | <ul style="list-style-type: none"> ▪ Anastomosis around the knee ▪ Knee joint injuries ▪ Bursitis in knee region ▪ Osteoarthritis | |

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| Back of leg | <ul style="list-style-type: none"> ▪ Muscle <u>groups</u> with their attachment, nerve supply and actions of muscles in superficial and deep muscle groups ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Relations of ankle joint ▪ “Peripheral heart” ▪ Tendocalcaneus | <ul style="list-style-type: none"> ▪ Ankle jerk | Rupture of calcaneal tendon |
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| Sole of foot | <ul style="list-style-type: none"> ▪ Basic organization ▪ Factors maintaining and importance of arches of the foot | <ul style="list-style-type: none"> ▪ Flat foot, ▪ Club foot ▪ Plantar fasciitis | <ul style="list-style-type: none"> ▪ |
| Joints of lower limb | <ul style="list-style-type: none"> • Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the: <ul style="list-style-type: none"> ▪ Tibiofibular joints ▪ Ankle joint | <ul style="list-style-type: none"> ▪ Subtalar and transverse tarsal joints | |
| Radiology | <p>AP and Lateral views of bones and joints of lower limb:</p> <p>Lateral view of the foot-identification of bones of the foot</p> | <ul style="list-style-type: none"> ▪ Shenton's line | |
| Surface Anatomy | <ul style="list-style-type: none"> ▪ <u>Bony landmarks:</u> ▪ Vertebral levels of highest point of iliac crest, posterior superior iliac spines, iliac tubercle, pubic tubercle, ischial tuberosity, adductor tubercle, ▪ Tibial tuberosity, head of fibula, ▪ Medial and lateral malleoli, ▪ Condyles of femur and tibia, ▪ ▪ Palpation of pulsations of arteries- femoral, popliteal, posterior tibial and dorsalis pedis ▪ ▪ Mid inguinal point ▪ Midpoint of the inguinal ligament ▪ ▪ Femoral artery, vein and nerve, ▪ Saphenous opening ▪ Dorsalis pedis artery, ▪ Sciatic nerve, tibial and common peroneal nerves, deep peroneal nerve, | | <ul style="list-style-type: none"> ▪ Nelaton's line, ▪ Shoemaker's line ▪ Bryant's triangle ▪ |

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| | ▪ great and small saphenous veins | | |
| Embryology | ▪ Basic concept of development of lower limb | | |
| (5) ABDOMEN & PELVIS – SYLLABUS (135 hours) | | | |
| Topic | Must Know | Desirable to know | Nice to know |
| Abdominal wall | Planes | | |

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| Anterior abdominal wall | Transpyloric, Transtuberular, Subcostal Lateral vertical Linea alba, Linea semilunaris Fascia of anterior abdominal wall Regions and quadrants of abdomen Nerves & blood vessels of abdominal wall <u>Muscles</u> Name of the muscles, direction of fibers, their actions and nerve supply, neurovascular plane Rectus sheath formation, its contents | Abdominal incisions Collateral routes for abdominopelvic venous blood | |
| Inguinal canal | Superficial inguinal ring, Deep inguinal ring <u>Inguinal ligament</u> Attachment & modifications Extent, boundaries, contents | Attachments of muscles of anterior abdominal wall | |
| Male external genitalia | Inguinal (Hasselbach's) triangle Inguinal hernia <u>Testis</u> Coverings, internal structure, blood supply, nerve supply, lymphatic drainage, descent of testis, cryptorchidism, ectopic testis <u>Epididymis</u> Parts | <u>Clinical anatomy</u> Varicocele <u>Penis</u> Parts, components, blood supply and lymphatic drainage Phimosis, Circumcision Lymphatic spread in carcinoma testis and scrotum Cremasteric reflex, Rupture urethra, Ligaments of penis | |
| Posterior abdominal wall | | | |
| Muscles of the back (intrinsic muscles) | Muscles – Name, attachments, nerve supply and action Lumbar plexus – root value, formation & branches Position, nerve supply and action | Thoracolumbar fascia <u>Clinical anatomy</u> Psoas abscess | |

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| Peritoneal cavity | <u>Lesser sac</u> | | |
| | Boundaries and recesses, Epiploic foramen | | |
| | <u>Greater sac</u> | | |
| | Boundaries of subdiaphragmatic spaces | Duodenal recesses | |
| | Definition of ligaments, omentum and mesentery | Caecal recesses | |
| | <u>The mesentery</u> | <u>Clinical anatomy</u> | |
| | Attachment and contents, Rectouterine pouch, | Ascitis, Peritonitis | |

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| | Uterovesical pouch Rectovesical pouch | Subphrenic abscess | |
| Viscera | Name, position, external and internal features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied aspects of: Spleen, Abdominal part of oesophagus Stomach, Liver & its vascular segments Gall bladder, Pancreas, Small intestines Caecum, Appendix, Colon, Kidneys, Ureter Suprarenals, Extrahepatic biliary apparatus | <u>Clinical anatomy:</u> Importance of splenic notch during palpation of spleen Accessory spleens <u>Anatomical basis of</u> o Kehr's sign (Referred pain in the left shoulder during splenic infarction) o different types of vagotomy in gastric ulcer o Liver biopsy – site of needle puncture o Referred pain in cholecystitis o obstructive jaundice in biliary tract obstruction o Referred pain around umbilicus in acute appendicitis o Radiating pain of kidney to groin Lymphatic spread in carcinoma stomach – special emphasis on Trosier's sign Clinical importance of Calot's triangle | |
| Blood vessels & nerves | Veins: Formation, course relations and tributaries of- Portal vein, portosystemic anastomosis o haemetemesis, malena, caput medusae in portal hypertension Inferior vena cava, Renal vein <u>Arteries</u> Origin, course, important relations and branches of abdominal aorta, coeliac artery, superior mesenteric artery, inferior mesenteric artery, common iliac artery, external iliac artery Autonomic nervous system Coeliac ganglion | Concept of superior mesenteric plexus, inferior mesenteric plexus, renal plexus, superior hypogastric plexus, inferior hypogastric plexus Reason for preserving 1 st lumbar sympathetic ganglion in lumbar sympathectomy | |

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| Diaphragm | Attachments, openings, nerve supply & action | Abnormal openings and diaphragmatic hernia | |
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| Pelvis | <p><u>Muscles:</u> Levator ani & coccygeus (pelvic diaphragm), Obturator internus, Piriformis</p> <p><u>Viscera:</u> Position, features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and</p> <p>Clinical aspects of-Urinary bladder & pelvic part of ureter, Rectum, Anal canal</p> <p>Prostate, age changes</p> <p>Seminal vesicle, Vas deferens, Ejaculatory ducts, Male urethra</p> <p>Uterus & its supports, Fallopian tube</p> <p>Ovary, Vagina, Female urethra</p> <p>Blood vessels: Origin, course, important relations and branches of - Internal iliac artery</p> <p>Nerves:</p> <p>Structures palpable during</p> <ul style="list-style-type: none"> o Vaginal examination o Rectal examination <p>Internal and external haemorrhoids</p> <p>Anal fistula</p> | <p><u>Clinical anatomy</u></p> <p>Anatomical basis of :</p> <ul style="list-style-type: none"> o suprapubic cystotomy o Urinary obstruction in benign prostatic hypertrophy o Retroverted uterus o Prolapse uterus <p><u>Neurological lesions of the bladder</u></p> <ul style="list-style-type: none"> o Autonomous neurogenic bladder o Atonic bladder o Automatic bladder Lobes involved in benign prostatic hypertrophy & prostatic cancer, Vasectomy <p>Tubal pregnancy, Tubal ligation</p> <p><u>Sacral plexus</u></p> <p>Branches</p> <p>Pelvic splanchnic nerve</p> | |
| Perineum | <p>Extent and Subdivisions of perineum</p> <p>Superficial perineal pouch - boundaries and contents</p> <p>Deep perineal pouch – boundaries and contents</p> <p>Perineal body, Perineal membrane</p> <p>Ischiorectal / ischioanal fossa, Perianal abscess and anal fissure</p> | <p><u>Clinical anatomy</u></p> <p>Perineal tear / episiotomy</p> | |
| Joints | <p>Curvatures of the vertebral column</p> <p>Type, articular ends, ligaments and movements of: Intervertebral joints, Sacroiliac joints, Pubic symphysis</p> <p>Lumbar puncture: Site, direction of the needle, structures pierced during the lumbar puncture</p> | <p>Scoliosis, lordosis, prolapsed disc, spondylolisthesis, spina bifida</p> | |
| Cross-sectional anatomy | <p>Cross-section at the level of L1 (transpyloric plane)</p> | <p>Cross-sectional anatomy of abdomen and pelvis</p> | |

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| Microanatomy | <u>Gastro-intestinal system:</u> Oesophagus, Fundus of stomach, Pylorus of stomach, Duodenum, Jejunum, Ileum, Large intestine, Appendix, Liver, Gall bladder, Pancreas, Suprarenal gland <u>Urinary system:</u> Kidney, Ureter, Urinary bladder Male Reproductive System: Testis, vas deferens, | Cardio-oesophageal junction | |
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| | Prostate <u>Female reproductive system:</u> Ovary, uterus, Uterine tube, cervix, Placenta, umbilical cord | Epididymis, seminal vesicle, Uterus - Proliferative and secretory phases of Corpus luteum | |
| Embryology | Anterior abdominal wall Diaphragm Development and congenital anomalies of: Foregut & spleen, midgut and hindgut Derivatives of dorsal and ventral mesenteries Urinary system Male reproductive system Female reproductive system | Abdominal aorta <u>Embryological basis and clinical presentation of congenital anomalies</u> Achalasia cardia, Congenital hypertrophic pyloric stenosis, Annular pancreas, Errors of rotation of the gut, Errors of fixation, Exomphalos, Gastroschisis, Umbilical hernia, Situs inversus <u>Congenital obstruction:</u> Atresia, Stenosis Meckel's diverticulum, Imperforate anus, Hirschsprung disease (Congenital megacolon), Horseshoe kidney Congenital polycystic kidney, Aberrant renal arteries, Ectopia vesicae, Epispadias Hypospadias, Rectovaginal fistula | Inferior vena cava Portal vein |
| Osteology | Features of typical and atypical lumbar vertebra, Sacrum <u>Bony pelvis:</u> Anatomical position Define true pelvis and false pelvis Boundaries of pelvic inlet, pelvic cavity, pelvic outlet, Sex determination | Coccyx <u>Bony Pelvis</u> Types <u>Clinical Anatomy</u> Sacralization of lumbar vertebra, Lumbarization of 1 st sacral vertebra | |

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| Radiological anatomy | Plain x-ray abdomen <u>Contrast X-rays</u> : Barium swallow, Barium meal, Barium enema, Cholecystography Intravenous pyelography, Hysterosalpingography, Arteriography | Principles of USG, ERCP, CT abdomen, MRI | |
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| Surface anatomy | Regions and planes of abdomen, Stomach Liver, Fundus of gall bladder, Kidneys, Abdominal aorta , Inferior vena cava, Superficial inguinal ring, Deep inguinal ring, McBurney's point | Spleen, Duodenum Pancreas Ileocaecal junction Root of the mesentery | |
| (4) THORAX – SYLLABUS (60 hours) | | | |
| Topic | Must Know | Desirable to know | Nice to know |
| Osteology | <p>Sternum</p> <p>Ribs</p> <ul style="list-style-type: none"> ▪ Definition of a true and false rib ▪ Features of a typical rib and 1st rib <p>Thoracic vertebra</p> <ul style="list-style-type: none"> ▪ Features of a typical thoracic vertebra | <ul style="list-style-type: none"> ▪ Features of 2nd, 11th and 12th ribs ▪ Features of the 1st, 11th and 12th thoracic vertebrae | |
| Thoracic cage | Boundaries of thoracic inlet, cavity and outlet and structures passing through them | | |

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| Walls of thorax | <u>Muscles</u> Extent, attachments, direction of fibres, nerve supply and actions of external intercostal, internal intercostal, innermost intercostal, | | |
| | <u>Typical spinal nerve</u> <ul style="list-style-type: none"> ▪ Origin, course, relations and branches <u>Anterior and posterior intercostal arteries, veins and lymphatics</u> <ul style="list-style-type: none"> ▪ Origin, course, relations and branches or tributaries | <u>1st and 2nd intercostal nerves</u> <ul style="list-style-type: none"> ▪ Origin, course, relations and branches <u>Subcostal nerve</u> <ul style="list-style-type: none"> ▪ Origin, course, relations and branches | |



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| | <p><u>Internal thoracic artery</u></p> <ul style="list-style-type: none"> ▪ Origin, course, relations and branches | | |
| <p>Pleural cavity</p> | <p><u>Pleura</u></p> <ul style="list-style-type: none"> ▪ Parietal pleura and visceral pleura ▪ Suprapleural membrane ▪ Pleural recesses ▪ Blood supply, lymphatic drainage and nerve supply ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> ● Pleuritis ● Pneumothorax ● Pleural effusion ● Thoracocentesis <p><u>Lungs</u></p> <ul style="list-style-type: none"> ▪ External features and relations ▪ Difference between hilum and root ▪ Structures which form the root of lung ▪ Description of a bronchopulmonary segment ▪ Blood supply, lymphatic drainage and nerve supply ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> ● Lung abscess <p><u>Trachea</u></p> <ul style="list-style-type: none"> ▪ Extent, length, relations, blood supply, lymphatic drainage and nerve supply ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> ● Tracheostomy <p><u>Bronchi</u></p> | <p>Bronchial asthma</p> <p>Bronchogenic carcinoma</p> <ul style="list-style-type: none"> ● Lobe of azygos vein | |

- Relations, blood supply, lymphatic



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| | <p>drainage and nerve supply</p> <ul style="list-style-type: none"> ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> • Bronchitis <p><u>Phrenic nerves</u></p> <p>Origin, course, relations and area of supply</p> <p>Applied anatomy</p> | | |
| Mediastinum | <ul style="list-style-type: none"> ▪ Subdivisions, boundaries and contents of superior, anterior, middle and posterior mediastina | | |

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| <p>Middle mediastinum</p> | <p><u>Pericardium</u></p> <ul style="list-style-type: none"> ▪ Subdivisions, sinuses in the pericardium, blood supply and nerve supply ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> • Pericardial effusion <p><u>Heart</u></p> <ul style="list-style-type: none"> ▪ External and internal features ▪ Description of the interior of each chamber ▪ <p><u>Conducting system of heart</u></p> <ul style="list-style-type: none"> ▪ Parts, position and arterial supply <p><u>Coronary arteries</u></p> <ul style="list-style-type: none"> ▪ Origin, course and branches ▪ Applied anatomy <p><u>Venous drainage of heart</u></p> <p>Coronary sinus</p> <ul style="list-style-type: none"> • Formation, course, tributaries and termination • Anterior cardiac veins • Venae cordis minimae <p><u>Nerve supply of heart</u></p> <ul style="list-style-type: none"> ▪ Position and components of superficial and deep cardiac plexuses ▪ <p><u>Blood vessels</u></p> | | <p>Fibrous skeleton of heart</p> |
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| <p>Posterior mediastinum</p> | <p><u>Oesophagus</u></p> <ul style="list-style-type: none"> ▪ External appearance, relations, blood supply, nerve supply and lymphatic drainage ▪ <u>Applied anatomy</u> <ul style="list-style-type: none"> • Oesophageal varices <p><u>Thoracic sympathetic chain</u></p> <ul style="list-style-type: none"> ▪ Location, extent and relations ▪ Splanchnic nerves <p><u>Thoracic duct and right lymphatic duct</u></p> <ul style="list-style-type: none"> ▪ Extent, external appearance, relations and tributaries <p><u>Venous drainage of posterior abdominal wall:</u></p> <p><u>Azygos vein</u></p> <ul style="list-style-type: none"> ▪ Origin, course, relations, tributaries and termination <p><u>Hemiazygos vein</u></p> <ul style="list-style-type: none"> ▪ Origin, course, relations, tributaries and termination <p><u>Accessory hemiazygos vein</u></p> <ul style="list-style-type: none"> ▪ Origin, course, relations, tributaries and termination <p><u>Descending thoracic aorta</u></p> <ul style="list-style-type: none"> ▪ Extent, branches and relations ▪ <p><u>Vagus nerve in thorax</u></p> | | |
| <p>Joints of thorax</p> | <p>Type, articular surfaces, capsule, ligaments, nerve supply and movements of manubriosternal, sternocostal, costovertebral, costotransverse and xiphisternal joints</p> <p>Intervertebral joint</p> <p>Mechanics of respiration</p> | <p>Costochondral and interchondral joints</p> | |

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| | Types of respiration | | |
| Microscopic anatomy | Trachea Lung | | |

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| Embryology | <ul style="list-style-type: none"> ▪ Development of pleura ▪ Development of respiratory system <p><u>Development of heart</u></p> <ul style="list-style-type: none"> ▪ Development of the chambers, interatrial and interventricular septa <p><u>Development of vascular system</u></p> <ul style="list-style-type: none"> ▪ Aortic arch arteries ▪ Superior vena cava and inferior vena cava ▪ Coronary sinus <ul style="list-style-type: none"> ▪ <u>Clinical correlates</u> ● Atrial septal defect ● Ventricular septal defect ● Fallot's tetralogy ● Transposition of great vessels ● Dextrocardia <p>Patent ductus arteriosus</p> <ul style="list-style-type: none"> ● Coarctation of aorta <ul style="list-style-type: none"> ▪ <u>Foetal circulation and changes at birth</u> <ul style="list-style-type: none"> ● Patent ductus arteriosus ▪ <u>Development of oesophagus</u> | Brachiocephalic veins | |
| Living Anatomy | <ul style="list-style-type: none"> ● Internal thoracic artery ● Parietal pleura ● Lungs, root of lungs and fissures ● Trachea ● Heart ● Apex beat ● Arch of aorta ● Oesophagus <p>Surface projection of valves of heart</p> | | |
| Radiology | <ul style="list-style-type: none"> ● Plain X-ray chest – PA view | CT and MRI of Thorax | |
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(6) HEAD AND NECK – SYLLABUS (135 hours)

| Topics | Must know | Desirable to know | Nice to know |
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| Osteology | ▪ Anatomical position of skull | ▪ Concept of bones which | ▪ |

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| | <p>Identification and locations of individual skull bones in an articulated skull</p> <p>Features seen in Normas frontalis, verticalis, occipitalis, lateralis and basalis</p> <p>Cranial cavity- subdivisions, foraminae and structures passing through them</p> <p>Details of Mandible and Maxilla,</p> <p>Features of typical and atypical cervical vertebrae</p> | <p>ossify in membranes and cartilage</p> <p>Frankfort Plane</p> <p>Parietal, Occipital, Frontal and Temporal bones</p> <p>Sphenoid,</p> | |
| Scalp | <ul style="list-style-type: none"> ▪ Layers of scalp, Extent/ attachment of each layer, Surgical importance of each layer, Blood supply, nerve supply and lymphatic drainage | | |
| Superficial dissection of the face | <ul style="list-style-type: none"> ▪ Muscles of facial expression <p>Muscle groups acting upon the angle of the mouth</p> <p>- Attachments of the orbicularis oculi, orbicularis oris and buccinator muscles only</p> <ul style="list-style-type: none"> ▪ Sensory innervation of the face | <p>- Names of the superficial muscles in the face, with their actions and nerve supply</p> | |
| Deep dissection of the face | <p>Facial artery: Origin, course and branches</p> <p>Facial vein: Formation, course and tributaries</p> <p>Facial nerve: Branches in the face</p> <p>Lymphatic drainage of the face</p> <p>Surgical importance of the deep facial vein</p> <p>Facial palsy</p> | | |

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| Parotid Region | <p>Parts, borders, surfaces, contents, relations and nerve supply of parotid gland</p> <p>Course of parotid duct</p> | <p>Parotitis (mumps)</p> <p>Parotid abscess</p> <p>Plane of dissection and main complication of superficial parotidectomy</p> <p>Frey's Syndrome</p> | |
| The side of the neck Posterior Triangle | <p>Boundaries and subdivisions of posterior triangle</p> <ul style="list-style-type: none"> ▪ Boundaries and contents of the subclavian and occipital triangles ▪ Special emphasis on with nerve supply and actions ▪ Sternocleidomastoid with attachments and relations, Wry neck | <ul style="list-style-type: none"> ▪ Erbs palsy ▪ Klumpke's palsy ▪ Injury to accessory nerve during lymph node biopsies ▪ inferior belly of omohyoid <p>scalenus anterior, scalenus</p> | |

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| | Lymphatic drainage of head and neck | medius, levator scapulae | |
| Dissection of back | <ul style="list-style-type: none"> ▪ Contents of the vertebral canal | <p>Suboccipital triangle: Boundaries and contents</p> <ul style="list-style-type: none"> ▪ Position, direction of fibres, relations, nerve supply, actions of: <p>Semispinalis capitis, Splenius capitis</p> | |
| Cranial Cavity | <p>Cranial fossae: structures related and major foramina and structures passing through</p> <p>Pituitary gland</p> <p>Dural venous sinuses</p> | <ul style="list-style-type: none"> ▪ Clinical importance of dural venous sinuses | <ul style="list-style-type: none"> ▪ Pituitary tumours |
| Orbit | <p>Attachments, nerve supply and actions of muscles of eyeball</p> <p>Nerves and vessels in the orbit</p> <p>Ciliary ganglion</p> <p>Horner's Syndrome</p> | <ul style="list-style-type: none"> ▪ Strabismus | <ul style="list-style-type: none"> ▪ Testing of extraocular muscles |
| Anterior Triangle | <p>Boundaries and subdivisions of the anterior triangle</p> <p>Boundaries and contents of the muscular, carotid, digastric and submental triangles</p> | | |
| Temporal and Infratemporal regions | <p>Extent, boundaries and contents of temporal and infratemporal fossae</p> <p>Attachments, direction of fibres, nerve supply and actions of muscles of mastication</p> <p>Temporomandibular joint</p> | <p>Clinical significance of pterygoid venous plexus</p> <p>Dislocation of temporomandibular joint</p> | |

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| Submandibular region | <p>Parts, borders, surfaces, relations, nerve supply of submandibular gland</p> <p>Course and relations of submandibular duct</p> <p>Submandibular ganglion</p> <p>Position, relations and nerve supply of sublingual gland</p> | <p>Submandibular stones</p> <p>Bidigital palpability of submandibular swellings</p> | |
| Deep structures in the neck | <ul style="list-style-type: none"> ▪ Thyroid gland- location, parts, borders, surfaces, relations, blood supply ▪ Parathyroid glands- location, blood supply ▪ Trachea, Tracheostomy- structures encountered ▪ Subclavian artery- Origin, parts, course, | <ul style="list-style-type: none"> ▪ Thyroid swellings- anatomically relevant clinical features ▪ Awareness of liability of injury to external and recurrent laryngeal nerves during thyroidectomy | |

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| | <p>branches</p> <p>Vagus Nerve in the neck- Course and branches</p> <p>Accessory Nerve- Course and supply</p> <p>Cervical Sympathetic chain- Components, branches, area of supply</p> <p>Deep cervical fascia- parts, extent, attachments, modifications</p> <p>Deep cervical lymph nodes</p> | <p>Compression of subclavian artery by cervical rib</p> <p>Fascial spaces of neck</p> <p>Thymus</p> | |
| Mouth, Pharynx, Palate | <p>Subdivisions and contents</p> <p>Names, position, actions and nerve supply of muscles of palate and pharynx</p> <p>Palatine tonsil- Position, relations, blood supply</p> <p>Waldeyer's lymphatic ring- Components and their function</p> <p>Boundaries and clinical significance of pyriform fossa</p> | <p>Tonsillitis and tonsillectomy</p> <p>Adenoids</p> <p>Paratonsillar abscess</p> | <ul style="list-style-type: none"> ▪ Killian's dehiscence |
| Cavity of Nose | <p>Nasal septum</p> <p>Epistaxis- significance of Little's area</p> <p>Lateral wall of nasal cavity</p> <p>Paranasal sinuses concept of referred pain</p> | <p>Maxillary sinus tumours</p> <p>Sinusitis</p> | |
| Larynx | <p>Cartilages and ligaments</p> <p>Names, nerve supply and actions of intrinsic and extrinsic muscles of larynx</p> | <p>Laryngitis</p> <p>Recurrent laryngeal nerve injury</p> | |

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| | Sensory innervation and blood supply of larynx | | |
| Tongue | Names, nerve supply and actions of extrinsic and intrinsic muscles of tongue Nerve supply and lymphatic drainage of tongue | <ul style="list-style-type: none"> ▪ Hypoglossal nerve palsy | |
| Organs of hearing and equilibrium | <ul style="list-style-type: none"> ▪ Parts, boundaries, contents, relations, blood supply and nerve supply of external ear, middle ear and Auditory tube | Internal ear, Mastoid Antrum, Otitis externa, Otitis media, McEwan's triangle-Approach to mastoid antrum, Myringotomy | |
| Eyeball | <ul style="list-style-type: none"> ▪ Parts and layers of eyeball | Cataract, Glaucoma, Central retinal artery occlusion, Intraocular muscles- position, nerve supply and actions | |
| Prevertebral region and Joints of Head and neck | <ul style="list-style-type: none"> ▪ Concept of prevertebral muscles ▪ Atlanto-occipital joint | | |

| | | | |
|-----------------|--|---|---------------|
| | ▪ Atlantoaxial joint | | |
| Microanatomy | <ul style="list-style-type: none"> Pituitary gland Thyroid and Parathyroid gland Tongue Tonsil Epiglottis | Olfactory epithelium, Eyelid, Lip, Salivary glands, Cornea, Retina, Sclero-corneal junction, Optic Nerve, Crista ampullaris, Macula, Cochlea-organ of Corti, Pineal gland | ▪ Adult Tooth |
| Embryology | <ul style="list-style-type: none"> Face Palate Tongue Branchial apparatus Pituitary gland Thyroid gland Eye | Facial clefts, First Arch Anomalies, Developmental anomalies of tongue, Branchial cysts and fistulae, Ectopic thymic, parathyroid or thyroid tissue, Thyroglossal cyst, Coloboma iridis | |
| Surface Anatomy | <ul style="list-style-type: none"> Vertebral levels of: Hyoid bone, Thyroid cartilage, Cricoid cartilage Surface Projection of Thyroid gland, Parotid gland and duct, Pterion, Common carotid artery, Internal jugular vein, Subclavian vein, External jugular vein, Facial artery | Accessory nerve | |
| Radiology | <ul style="list-style-type: none"> Plain X ray skull: AP view, Lateral view Plain X ray cervical spine lateral view Plain X ray of paranasal sinuses Carotid angiogram | CT and MRI of Head and Neck | |

(7) THE NERVOUS SYSTEM – SYLLABUS (75 hours)

| Topics | Must know | Desirable to know | Nice to know |
|--------|-----------|-------------------|--------------|
|--------|-----------|-------------------|--------------|

| | | | |
|-------------------|--|--------------------------------------|------------------|
| Subdivisions | Subdivisions of nervous system into Central and peripheral nervous system, somatic and autonomic nervous system | | |
| External features | External features of the brain and spinal cord and its meningeal coverings and blood supply | | |
| Spinal cord | <ul style="list-style-type: none"> a) External and internal features b) Organization of grey matter into nuclei c) Coverings of spinal cord d) Ascending and descending tracts and their functions | Upper and lower motor neuron lesions | Laminar concept, |

| | | | |
|--------------------------|---|--|--|
| | <ul style="list-style-type: none"> e) Upper and lower motor neurons f) Spinal segment and dermatome g) Blood supply h) Modifications of pia mater | | |
| Brainstem | External and internal features of | | |
| Cerebellum | Gross features and subdivisions of cerebellum. Deep nuclei, afferent and efferent connections. Cerebellar peduncles | Morphological subdivisions of cerebellum into archi, paleo and neocerebellum, Cerebello-pontine angle tumour, symptoms of cerebellar disease | |
| Thalamus | Structure, nuclei, connections and functions | | |
| Hypothalamus | Structure, nuclei, connections and functions | Epithalamus, | Circumventricular organs |
| Cerebrum | Gross features (gyri and sulci) of the cerebral hemisphere – superolateral, Medial and inferior surface, and the subdivisions into lobes, and blood supply. Functional areas and Brodmann's numerals (motor, sensory, visual, auditory, speech, frontal eye field, prefrontal cortex) Horizontal section of cerebrum Midsagittal section of cerebrum | | |
| White fibres of cerebrum | Association, commissural and projection fibres | Anatomical basis of stroke | |
| Basal nuclei | Components, basic connections and functions) | Parkinson's disease, Chorea, Athetosis, Huntingtons disease | |
| Ventricles of the brain | Features of lateral, third and fourth ventricle. Choroid plexus, Circulation of Cerebro-Spinal Fluid (CSF). | Subarachnoid cisterns, blood- CSF barrier. | |
| Limbic system | | | Limbic system – parts and function Connections of limbic system |

| | | | |
|------------------------------|--|--|--|
| Reticular formation and ARAS | | | Reticular formation and ARAS-General arrangement, zones, basic connections and functions |
|------------------------------|--|--|--|

| | | | |
|---|---|---|--|
| Cranial nerve nuclei Optic and auditory pathways | Cranial nerve nuclei - location Optic and auditory pathways | | Functional columns |
| Blood supply of brain and spinal cord | Blood supply of brain and spinal cord | Clinical importance of blood supply of brain and spinal cord, Lateral medullary syndrome, Medial medullary syndrome, pontine hemorrhage, Weber's syndrome, posterior circulation stroke, Middle cerebral artery stroke. | |
| Microanatomy | Transverse sections of spinal cord at cervical, thoracic, lumbar and sacral levels Cerebral cortex Cerebellar cortex Nerve endings Transverse sections of Medulla oblongata at levels of motor decussation, sensory decussation and mid-olivary level Transverse section of Pons at upper and lower pons, Transverse section of Midbrain at superior and inferior colliculi | Neuromuscular junction- Motor end plate | Differentiation between motor and sensory cortex Muscle spindle |
| Embryology | Formation and histogenesis of the developing neural tube Derivatives, curvatures and cavities of Prosencephalon, Mesencephalon and Rhombencephalon Neural crest derivatives Hypophysis cerebri | Developmental anomalies: hydrocephalus, anencephaly, spina bifida, meningocoele, meningomyelocoele, | Development of functional columns |

(8) GENERAL EMBRYOLOGY – SYLLABUS (8 hours)

| Topics | Must know | Desirable to know | Nice to know |
|--------------|---|-------------------|--------------|
| Introduction | Terms used in embryology Stages of development | | |

| | | | |
|-------------------------|---|--|--|
| Mitosis and Meiosis and | Primordial germ cells Concept of Chromosomal abnormalities – | | |
|-------------------------|---|--|--|

| | | | |
|-------------------------------|--|---|--|
| | numerical / structural Gene mutation | | |
| Gametogenesis | Oogenesis Spermatogenesis | | |
| Uterine and ovarian cycles | Uterine and ovarian cycles Ovulation | | |
| Fertilization and Blastocyst | Definition, Phases of fertilization, Results of fertilization, Contraceptive methods- barrier techniques, contraceptive pills, IUD, vasectomy and tubectomy, Infertility Embryonic and adult stem cells | Assisted reproductive technology – IVF, GIFT, ZIFT, ICSI | |
| Bilaminar germ disc | Implantation Abnormal implantation | | |
| Trilaminar germ disc | <ul style="list-style-type: none"> Gastrulation | | |
| Embryonic period | Definition, Neurulation – neural pores and the time of closure, Derivatives of each of the 3 germ layers, Somites | External appearance during 2 nd month Induction and organogenesis | |
| Foetal membranes and Placenta | Structure, Placental circulation, Function, Placental barrier | | Erythroblastosis fetalis and fetal hydrops |
| Amnion and umbilical cord | Structure and function | Amniotic fluid- hydramnios and oligohydramnios | Umbilical cord anomalies, Amniotic bands |
| Birth defects | Types of abnormalities – malformation, disruption, deformation, syndrome, Teratogens | | |
| Prenatal diagnosis | Ultrasonography, Maternal serum screening, Amniocentesis, Chorionic villus sampling | | |
| Twinning | Monozygotic and dizygotic twins, Conjoint twins | | |

(9) GENETICS - SYLLABUS (5 hours)

| Topic | Must Know | Desirable to know | Nice to know |
|-------|-----------|-------------------|--------------|
|-------|-----------|-------------------|--------------|

| | | | |
|--|--|---|--|
| | | | |
| Chromosomes | <p>Structure of chromosomes</p> <p>Classification of chromosomes based on position of centromere</p> | | |
| Karyotyping | <p>Technique of preparing a Karyotype</p> <p>Types of banding</p> <p>Clinical applications of karyotyping</p> <p>Reading of karyotypes for normal male, female, Trisomies, Turner syndrome, Klinefelter syndrome</p> | | Fluorescent in situ hybridisation (FISH) |
| Sex Chromatin | <p>Barr bodies and their clinical significance</p> <p>Lyon hypothesis</p> | | |
| Patterns of Inheritance and pedigree charts | <p>Mendelian laws of inheritance, Common symbols used in construction of pedigree charts, Understand the characteristics of the types of single gene inheritance, Examples of diseases of each mode of inheritance, Interpret pedigree charts for the various modes of inheritance, Multifactorial inheritance with examples</p> | <p>Clinical features of the examples described: Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Hemophilia, Duchene's muscular dystrophy, Sickle cell anaemia</p> | |
| Chromosomal Aberrations | <p>Causes of chromosomal aberrations Structural aberrations- types and examples Numerical aberrations- types, examples and clinical features True and pseudohermaphroditism Mosaics and chimeras</p> | <p>Clinical features of other examples of chromosomal aberrations: Prader Willi syndrome, Edward syndrome, Patau syndrome</p> | |

| | | | |
|---------------------------|---|---|--|
| Prenatal Diagnosis | ▪ | Methods of prenatal diagnosis- indications, complications Screening maternal blood for diagnosis of neural tube defects and Down syndrome Ultrasound Fetal echocardiography Amniocentesis Chorionic villus sampling Umbilical blood sampling Genetic counseling and ethical issues in prenatal diagnosis | |
|---------------------------|---|---|--|

6.REFERENCES FOR LEARNING (BOOKS)

Gross Anatomy

1. Cunningham's Manual of Practical Anatomy Volumes 1, 2 and 3 15th edition by GJ Romanes
2. Gray's Anatomy 41st Edition 2016 Standring S
3. Clinical Oriented Anatomy 7th edition by Moore KL, Agur AMR and Dalley AF
4. Essentials of Human Anatomy Vols 1, 2 and 3 by AK Datta
5. A Textbook of Human Anatomy, 2000 by T.S. Ranganathan

Neuroanatomy

1. Clinical Neuroanatomy 7th edition 2009 by Richard S. Snell
2. Essentials of Human Anatomy Neuroanatomy 4th edition 2012 by AK Datta
3. Textbook of Clinical Neuroanatomy 2nd edition Vishram Singh
4. Illustrated Textbook of Neuroanatomy 12th edition by GP Pal Histology
 1. Inderbir Singh's Textbook of Human Histology with Colour Atlas and Practical Guide 7th edition, 2014 by Vasudeva Neelam
 2. Wheater's Functional Histology: A Text and Colour Atlas, 6th Edition by Barbara Young, Geraldine O'Dowd, Phillip Woodford
 3. Textbook of Histology 2008 by GP Pal

Embryology

1. Langman's Medical Embryology 13th edition by T.W. Sadler,
2. Larsen's Human Embryology 5th Edition 2014 by Schoenwolf, Bleyl, Brauer and Francis-West

3. The Developing Human: Clinically Oriented Embryology 9th edition, 2012 by Keith L. Moore
4. Human Embryology 10th edition by IB Singh,
5. Essentials of Human Embryology 6th edition by AK Datta Genetics
 1. Human Genetics 3rd edition 2012 by Gangane SD

7.THEORY EXAMINATION

Total Marks per paper = 50 Marks

3 hours duration and 50 marks each for Paper1 and Paper 2

Paper 1: General Anatomy, General Histology, General Embryology, and Genetics Gross Anatomy of Upper Limb, Lower Limb, Abdomen, Pelvis and Perineum and special histology and special embryology relevant to these regions;

Paper 2: Gross Anatomy of Thorax, Head, Neck, Brain and Spinal Cord and special histology and special embryology relevant to these regions; Paper 1 and

Paper 2:

| | | |
|------------------|--------------|----------------------------|
| 1 . Essay | 1 x 10 Marks | = 10 marks |
| 2. Brief Answers | 5 x 4 Marks | = 20 marks |
| 3. Short Answers | 10 x 2 Marks | = 20 marks |
| Total | | ----- 50 Marks ----- |

Histology and Embryology may be included in theory as a part of the essay, short notes and short answers Marks will be allotted for relevant diagrams which may be part of the essay, short notes and short answers.

8.PRACTICAL EXAMINATION

List of Specimens for Gross Anatomy Practical

Upper Limb

1. Axilla
2. Scapular region
3. Front of arm
4. Back of arm

5. Front of forearm

6. Back of forearm
7. Hand
8. Shoulder joint
9. Elbow joint
10. Wrist joint

Lower Limb

1. Femoral triangle
2. Gluteal region
3. Front of thigh
4. Posterior and adductor compartment of thigh
5. Anterior and lateral compartments of leg
6. Back of leg
7. Sole of foot
8. Dorsum of foot
9. Knee joint
10. Ankle joint

Abdomen, Pelvis and Perineum

1. Anterior abdominal wall
2. Posterior abdominal wall
3. Male external genitalia
4. Inguinal canal
5. Liver and extrahepatic biliary apparatus
6. Stomach
7. Duodenum and pancreas
8. Small intestine and large intestine
9. Blood vessels of abdomen and pelvis
10. Diaphragm
11. Female reproductive system

Thorax

1. Thoracic cage
2. Superior mediastinum
3. Heart- external features

4. Heart- chambers
5. Heart – blood supply
6. Lungs
7. Posterior mediastinum
8. Pericardium

Head and Neck

1. Scalp
2. Face and parotid region
3. Posterior triangle
4. Cranial cavity
5. Orbit
6. Anterior triangle
7. Temporal and infratemporal regions
8. Deep structures of the neck
9. Mouth, pharynx and palate
10. Larynx
11. Nasal cavity
12. Dural venous sinuses

Nervous system

1. External surfaces of the cerebral hemisphere
2. Base of the brain
3. White fibres of the cerebrum
4. Ventricles of the brain
5. Coronal section of the cerebrum
6. Horizontal section of the cerebrum
7. Cerebellum
8. Brain stem

List of Slides for Histology Practical

*=Nice to Know

Part 1

General Histology

1. Hyaline cartilage
2. Elastic cartilage
3. White cartilage
4. Bone T.S.
5. Bone L.S.
6. Skeletal muscle
7. Smooth muscle
8. Cardiac muscle

9. Nerve - CS
10. Spinal ganglion
11. Sympathic ganglion
12. Elastic artery
13. Muscular artery
14. Large Veins
15. Medium sized veins
16. Lymph node
17. Skin- Hairy and Non-hairy

Systemic Histology

1. Cardio-oesophageal junction
2. Oesophagus
3. Stomach-Fundus
4. Stomach-Pylous
5. Duodenum
6. Jejunum
7. Ileum

8. Appendix
9. Colon

10. Liver
11. Pancreas
12. Gall Bladder
13. Spleen
14. Kidney
15. Urinary Gladder
16. Suprarenal gland
17. Penis
18. Testis

19. Epididymis

20. Vas deferens

21. Seminal Vesicle

22. Prostate

23. Ovary

24. Uterus

25. Uterine Tubes

26. Vagina

27. Cervix

28. Placenta

29. Umbilical Cord

30. Mammary gland

Part 2

1. Tongue-(Papillae * identification Nice to Know)

2. Salivary Gland –serous

3. Salivary Gland –Mucous

4. Salivary Gland –Mixed

5. Tonsil

6. Tooth*

7. Olfactory Epithelium*

8. Cornea

9. Retina

10. Sclero-Corneal Junction*

11. Cochlea*

12. Thyroid & Parathyroid
13. Pituitary Gland
14. Trachea
15. Thymus
16. Lung
17. Spinal Cord – Cervical
18. Spinal Cord – Thoracic
19. Spinal Cord - Lumbar
20. Spinal Cord - Sacral
21. Medulla Oblongata - Pyramidal decussation level
22. Medulla Oblongata -Sensory decussation level

23. Medulla Oblongata -Inferior Olivary Nuclear level

24. Pons – Upper

25. Pons - Lower

26. Midbrain – Superior colliculus

27. Midbrain – Inferior colliculus

28. Pineal Gland

29. Cerebrum

30. Cerebellum

Practical Examination

Anatomy:

Practical examination pattern modified as follows.

Spotters

Gross anatomy

---12 x1= 12 marks

Histology

---12x1= 12 marks

Discussion

Gross anatomy-

--2 x 3 = 6 marks

Histology

--2 x 3 = 6 marks

OSPE- *

--2 x 2 = 4 marks

Total

40 marks

SPOTTERS

Gross anatomy-

Upperlimb - 2

Lowerlimb - 2

Abdomen - 2

Pelvis -1

Thorax -2

Head and neck -2

Brain -1

Histology

General – 3

Paper 1 ---5

Paper -2 ---4

Discussion Gross anatomy

Paper -1 1 specimen

Paper –2 1 specimen

Histology

General 1 slide

Systemic 1 slide.

OSPE* - Two procedural skills stations with a:

(i) Specific Instruction (such as “describe aloud and mark with chalk on the surface of the cadaver the following structure....., and keep the surface of the cadaver ready for the next student”) and a

(ii) Checklist with the details of the steps used to practice surface marking and marks allotted such as:

a) Accuracy of the points marked - 0.5 marks

b) Method used to join the points - 0.5 marks

c) Description of the steps followed - 0.5 marks

d) Adequate cleaning of the surface - 0.5 marks

VIVA

Osteology – 5marks

Embryology- 5marks

Radiology- 5 marks Surface

anatomy- 5marks.

This will be implemented from August 2017 examination session onwards.

(For Clinical Anatomy and Genetics charts - the anatomical relevance to common clinical conditions should be asked. The number of charts to be made available should be at least 70:

- Paper I - 30 charts
- Paper II - 30 charts
- Genetics - 10 charts

The clinical anatomy charts should include relevant Gross Anatomy, Embryology and Radiology

List of Surface Markings learnt

Upper limb:

Student must be able to demonstrate

- Relevant bony and soft surface landmarks
- Arteries:
 - Axillary
 - Brachial
 - Radial
 - Ulnar
 - Superficial palmar arch
 - Deep palmar arch
- Nerves:
 - Median
 - Ulnar
 - Radial
 - Axillary
- Others:
 - Flexor retinaculum
 - Extensor retinaculum
- Surface landmarks to palpate the following on the surface:

- Brachial pulsations
- Radial pulsations
- Ulnar pulsations
- Ulnar nerve
- Anatomical snuff box/ scaphoid

- Locate the common sites for venipuncture in the upper limb:
 - Median cubital vein
 - Cephalic vein at the wrist
 - Dorsal venous network

Lower limb:

Student must be able to demonstrate

- Relevant bony and soft surface landmarks
- Arteries:
 - Femoral
 - Popliteal
 - Anterior tibial
 - Posterior tibial
 - Dorsalis pedis
- Veins:
 - Great saphenous

- o Femoral
- Nerves:
 - o Femoral
 - o Sciatic
 - o Common peroneal
- Others:
 - o Inguinal ligament
 - o Saphenous opening
 - o Bryant's triangle
- Surface landmarks to palpate the following on the surface:
 - o Femoral pulse
 - o Popliteal pulse
 - o Posterior tibial pulse
 - o Dorsalis pedis pulse

Thorax:

Student must be able to demonstrate

- Relevant bony and soft surface landmarks
- Superior Mediastinum:
 - o Right and left brachiocephalic veins
 - o Superior Vena Cava
 - o Arch of aorta

- o Trachea
- Events occurring at sternal angle
- Organs:
 - o Heart borders and valves
 - o Lung borders and fissures
 - o Pleura
- Surface landmarks to locate the following on the surface:
 - o Apex beat
 - o Auscultatory areas for the heart valves

Abdomen:

Students must be able to demonstrate:

- Relevant bony and soft surface landmarks
- Abdominal planes, abdominal regions and organs located in each region
- Surface projection of the following organs:
 - o Stomach
 - o Liver
 - o Spleen
 - o Fundus of Gall bladder
 - o Base of the appendix

- o Morrison's parallelogram for posterior marking of the kidneys
- Blood vessels: Abdominal aorta and Inferior Vena Cava
- Others:
 - o Superficial and deep inguinal rings
 - o Mc Burney's point
 - o Vertebral levels of main events occurring in the abdomen
 - o Events occurring at the transpyloric plane
 - o Root of mesentery

Head and neck:

Students must be able to demonstrate:

- Relevant bony and soft surface landmarks
- Glands:
 - o Parotid gland and duct
 - o Submandibular gland
 - o Thyroid gland
- Arteries:

- o Facial artery
- o Common, internal and external carotid arteries
- o Internal and external jugular veins
- o Subclavian artery and vein
- Nerves:
 - o Spinal accessory nerve
 - o Vagus
- Others:
 - o Vertebral levels of surface landmarks in the neck
 - o Pterion
 - o Mastoid antrum
- Surface landmarks to palpate the following on the surface:
 - o Frontal air sinus
 - o Maxillary air Sinus
 - o Carotid pulsation
 - o Superficial temporal pulsation
 - o Subclavian pulsation

10. FORMATIVE ASSESSMENT

- Quarterly (marks need to be submitted three times to the university) Students

should be given feedback on their performance after each of the following **eight units**.

- 1) General Anatomy and Upper Limb
- 2) Lower Limb
- 3) General Histology and General Embryology
- 4) Thorax
- 5) Abdomen
- 6) Head and Neck,
- 7) Brain and
- 8) Genetics

11. INTERNAL ASSESSMENT TEST - UNIT WISE

Each student should be shown as having a mark for each of the eight units mentioned above. These marks should be grouped together and sent to the university on three occasions in one academic year. Based on all these marks the total internal assessment will be finally calculated as Theory and Practical marks which will be the average of the 8 Internal Assessment unit tests:

| | |
|-------------------|----------------|
| Theory | 20 marks |
| Practical | 15 marks |
| Records 2.5 x 2 = | 5 marks |
| TOTAL | 40marks |

- Gross Anatomy Record and Histology Record
- Record books with pre-drawn sketches should not be used

12. MEDICAL ETHICS -

- 1) Respect of the cadaver

2) Privacy and confidentiality

3) Cultural sensitivity

- 4) Consent
- 5) Autonomy
- 6) Source of cadavers
- 7) Eugenics
- 8) Genetic counselling

13. INTEGRATED TEACHING

- 1) **Vertical Integration-** with the help of clinicians and hospital visits wherever possible
- 2) **Horizontal Integration-** may be considered for topics such as peptic ulcer, diseases of liver and biliary tract, diseases of the kidney, diseases of the central nervous system, myocardial infarction

Clinical Integration for Upper Limb

| <u>Topic</u> | <u>Clinical Speciality</u> |
|--|-----------------------------------|
| Brachial plexus and peripheral nerve injuries | Orthopaedics |
| Peripheral Pulsations | General surgery/Medicine |
| Concept of Common fractures and dislocations | Orthopaedics |
| Concept of growing end of the upper limb bones | Orthopaedics |
| Surgical approaches for orthopaedic surgery | Orthopaedics |
| Breast | General surgery |

Clinical Integration for Lower Limb

| <u>Topic</u> | <u>Clinical Speciality</u> |
|---------------------|--------------------------------------|
| Nerve injuries | Orthopaedics & Medicine or Neurology |
| Varicose veins | General surgery |
| Elephantiasis | General surgery |

| | |
|--|-----------------|
| Peripheral pulsations in relation to living anatomy Demonstration of pulses | General surgery |
| Surgical anatomy of joints of the lower limb | Orthopaedics |

Clinical Integration for Abdomen Pelvis and Perineum

| <u>Topic</u> | <u>Clinical Speciality</u> |
|--|-----------------------------------|
| Appearance of abdominal viscera in USG, CT and MRI | Radiology |
| Inguinal region | General Surgery |
| Contraception in the male and female | Community medicine/OG |
| Congenital malformations | Paediatric surgery/paediatrics |
| Portal hypertension | General Surgery/Gastroenterology |
| Peptic ulcer | General Surgery/Gastroenterology |
| Assisted reproduction | Obstetrics and Gynecology |

Clinical Integration for Thorax

| <u>Topic</u> | <u>Clinical Speciality</u> |
|---|-----------------------------------|
| Superior mediastinum –thoracic inlet syndrome, scalenus anterior syndrome | General surgery |
| Pleural effusion, Pneumothorax, Pleural tapping | Medicine / Respiratory Medicine |
| Pericardial pain, referred pain from heart | Medicine |
| Tracheo-oesophageal fistula | Paediatric surgery |
| Appearance of thorax in CT and MRI | Radiology |

Clinical Integration for Head and Neck

| <u>Topic</u> | <u>Clinical Speciality</u> |
|---------------------|-----------------------------------|
| Facial nerve palsy | General Medicine |

| | |
|---------------------------------------|---------------|
| Cataract, Glaucoma, Eyelid infections | Ophthalmology |
| Surgical anatomy of ENT | ENT |

Clinical Integration for Nervous System

| <u>Topic</u> | <u>Clinical Speciality</u> |
|---------------------------------------|-----------------------------------|
| Upper and Lower motor neuron | General Medicine |
| Hemiplegia | General Medicine |
| Cerebellar lesions | General Medicine |
| Appearance of the brain in CT and MRI | Radiology |

Clinical Integration for Genetics

| <u>Topic</u> | <u>Clinical Speciality</u> |
|---------------------|-----------------------------------|
| Prenatal diagnosis | OG |

14.RECORDS

Gross Anatomy Record and Histology Record

Records with Pre-drawn sketches should not be used. List of Gross Anatomy diagrams.

Upper Limb

Typical spinal nerve

Lymphatic Drainage of breast

Brachial Plexus

Axillary Artery

Anastomosis around the scapula

Dermatomes of the upper limb

Anastomosis around the Elbow

Flexor Retinaculum of Wrist

Fascial Spaces of Palm Extensor

Retinaculum of wrist

Lower Limb

Femoral sheath

Adductor canal

Cutaneous innervation of the dorsum of foot

Superior surface of the tibia

Anastomosis around the knee

| | |
|--|---|
| <p><u>Thorax</u> Subdivisions of mediastinum T.S. of thorax at T3 level T.S. of thorax at T4 level Arterial supply of heart Venous drainage of heart Medial surface of lungs Bronchi and bronchopulmonary segments</p> | <p><u>Abdomen</u> Regions of abdomen Superficial veins of anterior abdominal wall Lymphatic drainage of skin of abdominal wall Rectus sheath Lesser sac Blood supply, Nerves supply of stomach Lymphatic drainage of stomach Thoracolumbar fascia Anterior & posterior relations of kidney Portosystemic anastomosis Peritoneal reflection in male Peritoneal reflection in female</p> |
| <p><u>Head and Neck</u> Layers of the scalp Vessels & nerves of the scalp Muscles of facial expression Cutaneous innervation of head and neck Posterior triangle Cavernous sinus Superior orbital fissure and common tendinous ring Ciliary ganglion and its connections Carotid triangle - boundaries Carotid arteries and nerves in the neck Structures related to hyoglossus Nasal septum Arteries & nerves of nasal cavity</p> | <p><u>CNS</u> Internal structure of spinal cord showing position of tracts Interpeduncular fossa and attachment of cranial nerves to the anterior surface of the brain stem Arteries on the base of the brain Floor of fourth ventricle Functional areas of cerebrum Blood supply of cerebrum</p> |

List of Histology slides to drawn by I MBBS students

General Histology

| | |
|---|-----------------------------------|
| <u>Epithelial Tissue</u> | Blood vessels |
| - Simple squamous epithelium | - Elastic artery |
| - Simple cuboidal epithelium | - Medium sized artery and vein |
| - Simple columnar epithelium | - Large vein |
| - Pseudostratified cil. columnar epithelium | Glands |
| - Stratified squamous epithelium | - Unicellular gland (Goblet cell) |
| - Transitional epithelium | - Simple tubular gland |
| Connective Tissue | - Serous gland |
| - Areolar tissue | - Mucous gland |
| - Adipose tissue | - Mixed gland |
| - Tendon L.S | -Sebaceous and sweat gland |
| Cartilage | -Mammary gland |
| - Hyaline cartilage | Lymphoid Tissue |
| - Elastic cartilage | - Lymph node |
| - Fibro cartilage | - Spleen |
| Bone | - Thymus |
| - Compact bone L.S. | - Tonsil |
| - Compact bone C.S. | Nervous Tissue |
| - Spongy bone | - Nerve C.S |
| - Developing bone | - Nerve L.S (Osmicatted) |
| Muscle | - Spinal ganglion |

| | |
|-----------------------|-----------------------------|
| -Skeletal muscle L.S. | - Sympathetic ganglion |
| -Skeletal muscle C.S. | Integumentary System |

| | |
|--------------------------------|---|
| - Smooth muscle | - Hairy skin |
| - Cardiac muscle | - Nonhairy skin |
| | - Nail |
| Special Histology | |
| Gastrointestinal system | - Cornea |
| - Oesophagus | - Iridio-corneal junction |
| - Cardio-oesophageal junction | - Retina |
| - Stomach - fundus | - Optic nerve |
| - Stomach - pylorus | - Macula |
| - Duodenum | - Crista |
| - Jejunum | - Organ of Corti |
| - Ileum | - Pituitary gland |
| - Large intestine | - Pineal gland |
| - Appendix | - Thyroid gland |
| - Liver | - Parathyroid gland |
| - Gall bladder | - Tongue – fungiform and filiform papillae |
| - Pancreas | - Tongue – circumvallate papilla |
| Genitourinary system | - Epiglottis |
| - Kidney | - Olfactory epithelium |
| - Ureter | CNS |
| - Urinary bladder | Nerve Endings |
| - Adrenal gland | - Motor end plate |
| - Testis | - Muscle spindle |
| - Epididymis | - Meissner’s corpuscle and Pacinian corpuscle |
| - Vas deferens | |

| | |
|------------------|-------------------------|
| -Seminal vesicle | -Spinal cord - cervical |
| -Prostate | -Spinal cord - Thoracic |

| | |
|--------------------------------|----------------------------------|
| -Ovary | -Spinal cord - Lumbar |
| -Fallopian tube | -Spinal cord - Sacral |
| -Uterus | - Medulla - Motor Decussation |
| -Cervix | - Medulla - Sensory Decussation |
| -Placenta | - Medulla - Mid Olivary Level |
| -Umbilical cord | -Pons – lower pons |
| Respiratory System | - Pons - upper Pons |
| -Trachea | - Midbrain – inferior colliculus |
| - Lung | - Midbrain - Superior Colliculus |
| Head & Neck | - Cerebrum – Typical Cortex |
| - Eyelid | - Cerebellum |
| - Lip | |
| - Adult tooth | |
| - Developing tooth –Bell stage | |

Record should be followed as recommended by the University.