ANATOMY

1.GOAL

The broad goal of the teaching of undergraduate students in Anatomy aims at providing comprehensive knowled structure and development of the human body to provide a basis for understanding the clinical correlation of orga anatomical basis for the disease presentations.

2.SPECIFIC LEARNING OBJECTIVES

2A. KNOWLEDGE:

At the end of the course the student shall be able to:

(a) describe the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of t

(b) identify and describe the microscopic structure and correlate elementary ultrastructure of various organs and t with the functions as a prerequisite for understanding the altered state in various disease processes;

(c) describe the basic structure and connections of the central nervous system to analyse the integrative and regul systems. The student shall be able to identify the site of gross lesions according to the deficits encountered.

(d) demonstrate knowledge of the basic principles and sequential development of the organs and systems, development and the effects of common teratogens. The student shall be able to explain the developmental ba abnormalities.

2B. SKILLS:

At the end of the course the student shall be able to;

(a) identify and locate describe all the structures of the body and mark the topography of the living anatomy.
(b) Identify and locate structures in gross Anatomy Sections.
(c) identify describe, depict normal appearance of the organs and tissues under the microscope;
(d) Describe the principles of karyotyping and identify the gross congenital anomalies;

(e) Describe the principles of newer imaging techniques like Ultra sound, MRI, Computerised Tomography Scan, In
X-rays.
(f) Describe the clinical basis of some common clinical procedures i.e. intra-muscular and intravenous injection, lum

2C. INTEGRATION:

From the integrated teaching of other basic sciences, student shall be able to describe the regulation and integration
systems in the body and interpret the anatomical basis of disease processes.

Horizontal integration can be done in common with basic science departments, and vertical integration can be done v
example, horizontal integration can be the study of liver along with Physiology and Biochemistry; and vertical integr
anatomical basis of varicose veins along with General Surgery.

A list of topics for Integration is given below.

3. A.TEACHING HOURS - One example of the duration for each of the Teaching-Learning Methods

For example: Embryology Lectures: Duration = 2 hours per week, each class lasting 45 - 60 minutes.

Lectures - hours	Practicals - hours	Group Discussions - hours	Demonstration - hours	Se - h
General Anatomy -9	General Histology-12	Osteology- (Total 26)	Abdomen-15	8
General Embryology-10	Upper Limb Dissection-35	Upper Limb-5	Neuroanatomy-23	
General Histology-10	Lower Limb dissection-40	Lower Limb-5	Genetics-2	
Upper Limb-30	Abdomen dissection-60	Thorax-3	Total-43	
Lower Limb-25	Abdomen Histology-14	Abdomen and Pelvis-3		
Abdomen Gross Anatomy-43	Thorax Dissection-30	Head and Neck-10		
Abdomen Embryology-7	Thorax Histology-4			
Abdomen Histology-14	Head and Neck Dissection-86	Radiology 1 each		

		(Total-5)		
Thorax Gross Antomy-15	Head and Neck Histology-8			
Thorax Histology-4	Neuroanatomy Histology-10	Surface Anatomy 1 each (Total 5)		
Thorax Embryology-4				
Head and Neck Gross Anatomy- 50				
Head and Neck Embryology-7				
Head and Neck Histology -8				
Neuroanatomy-20				
Genetics-3				
Total-259 hours	Total -299 hours	Total -36 hours	Total 43 hours	To hou

Grand Total=650 hours

3B.TEACHING METHODOLOGY

Theory (Teaching-Learning methods)

1. Interactive Lecture (include buzz groups, self-assessment questions, quizzes, MCQs. One minute paper)
2. Didactic Lecture- with a problem solving approach, with discussions of relevant clinical problems.
3. Seminar
4. Symposium
5. Role play and discussion on medical ethics topics
6. Self-directed learning

Practicals

1. Dissection
2. Small Group Discussion - Osteology, Surface marking, OSPE-Genetics, Radiology
3. Demonstrations - Histology slides, Embryology models
4. Case Discussion - Nerve Lesions, e.g. Facial Palsy, Radial Nerve Palsy

4.THEORY SYLLABUS & 5.PRACTICAL SYLLABUS

(1) GENERAL ANATOMY SYLLABUS (12 hours)

Topic and duration of study	Must Know 60%	Desirable to know 30%	Nice to know 10%
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 sesamoid bone	▪ Laws of ossification, including direction of nutrient foramen and the growing end of the bone ▪ Exceptions to the laws of ossification ▪	
Introduction to joints	▪ Definition ▪ Classification according to a. Structure- with subtypes and examples of fibrous, cartilaginous and synovial joints b. Mobility		Types of sutures (Unnecessary detail)

	c. Axes of movement ▪ Complex and compound joints ▪ Nerve supply of joints- Hilton's law ▪ Blood supply of joints		
Introduction to the muscular system	▪ Structural classification of muscle ▪ Parts of a skeletal muscle Differentiate tendon and aponeurosis ▪ General principles about how attachments of muscles affect the joints they cross ▪ Classification of muscle according to action (agonists, antagonists, synergists, fixators)	▪ Classification of muscle according to direction of muscle fibres and shape	Actions of musc as compared to systems of lever ▪ Shunt and sp muscles (Unnecessa detail) ▪ Classification skeletal musc according to type of contraction (Will be covered Physiology)
Introduction to the cardiovascular system	▪ Classification into blood vascular system ▪ Differentiate pulmonary and systemic circulation ▪ Layers of any blood vessel ▪ Types of blood vessels 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 a. Musculo-venous pumps b. Role of valves ▪ Definition and structure of a portal system ▪ Concept of anastomoses and	▪ Concepts of thrombosis, infarction, aneurysm ▪ Concept of lymphoedema and spread of tumors via lymphatics and venous system	

Lymphatic system	collateral circulation ▪ Significance of end-arteries ▪ ▪ Components and function of the lymphatic system a. Structure of lymph capillaries b. Concept that lymphatics accompany blood vessels c. Concept that lymph ultimately drains into the venous system d. Function of lymph nodes in the lymphatic system		

For the following regions (2) Upper limb and (3) Lower limb, (4) Thorax, (5) Abdomen and (6) Head & Neck- General concept of the parts 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 m 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)

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	▪ Muscle attachments	▪
Bones	Articulated hand: ▪ Identify and name the various bones in the articulated hand ▪ Prominent features of carpal bones o Tubercle of scaphoid o Crest of trapezium o Hook of hamate ▪ Parts of metacarpals and phalanges	▪ Scaphoid fractures and avascular necrosis ▪ Peculiarities of pisiform bone in its development, muscle attachment	▪
Pectoral Region	Muscles: ▪ Position, name of bones to which attached, nerve supply and actions of pectoralis major, pectoralis minor and Breast: ▪ Location, extent, deep relations ▪ Type of gland, structure ▪ Age changes ▪ Blood supply ▪ Lymphatic drainage ▪ Applied anatomy:	▪ Attachments of subclavius ▪	Clavipectoral fasci ▪ Position, exter structures piercing it

	○ Breast abscess ○ Breast cancer ○ Developmental anomalies		
Axilla	▪ Boundaries, contents ▪ <u>Axillary Artery:</u> ○ Origin, extent, course, parts, relations, branches ▪ <u>Axillary Vein:</u> ○ Formation, extent, course, relations, tributaries ▪ <u>Brachial plexus:</u> ○ formation, branches, relations, area of supply of branches, course and relations of terminal branches ▪ <u>Axillary lymph nodes:</u> ○ Anatomical groups and their areas of drainage	Brachial plexus: - Variations - Prefixed and postfixed plexuses - Injuries – Erb palsy and Klumpke paralysis - Anaesthetic block Enlargement of axillary lymph nodes	
Back **Shoulder Region**	- 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 Testing of serratus anterior • 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	Specific attachments of trapezius and latissimus dorsi muscles Arterial anastomosis around the scapula and collateral circulation Dislocation of glenohumeral joint	Triangle of auscultation
Free upper limb	▪ Fascia of upper limb and compartments ▪ Veins of upper limb - Superficial and deep • Lymphatic drainage		

	• Cutaneous nerves of upper limb • Dermatomes of upper limb		
Arm and cubital fossa	▪ Muscle groups of upper arm with emphasis on biceps and triceps ▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels Cubital fossa – boundaries, roof, floor, contents and relations of contents Venepuncture of cubital veins ▪ Saturday night paralysis	- Nerves liable to be involved in fracture of the humerus and clinical manifestations - Anastomosis around the elbow joint	Deep tendon reflex of biceps and tricep
Front of Forearm and Palm	▪ Muscle groups 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 • Palm and hand - thenar and hypothenar muscles, lumbricals and interossei - Ulnar and median claw hand - Movements of the thumb and muscles involved - Long flexor tendons, fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths - Course and branches of blood vessels and nerves in the hand	- Boundaries and contents of fascial compartments and spaces • Dupuytren contracture of palmar aponeurosis • Applied anatomy of fascial spaces • Tenosynovitis	
Back of forearm	▪ Muscle groups of forearm with attachments, nerve supply and actions of: extensor muscles of forearm	▪	

	▪ Origin, course, relations, branches (or tributaries), termination of nerves and vessels ▪ Wrist drop - Compartments deep to extensor retinaculum and contents of each one		
Dorsum of hand	▪ Extensor expansion - formation and muscles attached	▪ Anatomical "snuff box"	
Joints of upper limb	Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations movements, blood and nerve supply of: ▪ 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)	Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations movements, blood and nerve supply of: ▪ Sternoclavicular joint ▪ Acromioclavicular joint Dislocation of radial head	Carrying angle ▪ Intercarpal joi intermatacarpa joints ▪ Carpometacar joints,except f carpometacarp joint ▪ Metacarpopha geal joint ▪ Interphalangea joint
Radiology	▪ Anteroposterior and lateral views of bones and joints of upper limb		
Surface anatomy	▪ <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		▪
Embryology	▪ Basic concept of development of upper limb		

(10) GENERAL HISTOLOGY – SYLLABUS (40 hours)

Topic	Must Know	Desirable to know	Nice
	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
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	• Gastrulation		
Embryonic period	Definition, Neurulation – neural pores and the time of closure, Derivatives of each of the 3 germ layers, Somites	External appearance during 2nd month Induction and organogenesis	
Foetal membranes and Placenta	Structure, Placental circulation, Function, Placental barrier		Erythrob fetalis ar hydrops
Amnion and umbilical cord	Structure and function	Amniotic fluid- hydramnios and oligohydramnios	Umbilica anomali 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
Overview	Regions		

Bones ▪ Side determination (one feature for each of the opposite directions) ▪ Anatomical position ▪ Identification and description of features of each part ▪ Articulations ▪	▪ Hip bone ▪ Femur - ossification of lower end ▪ ▪ Patella ▪ Tibia -Ossification of upper end ▪ ▪ Fibula ▪ ▪ Articulated foot		▪ Nec angl
Fascia, veins, lymphatics cutaneous nerves of lower limb	▪ Fascia lata ▪ Intermuscular septa ▪ Venous drainage of lower limb ▪ Varicose veins and deep vein thrombosis ▪ Musculovenous pump ▪ Lymphatic drainage of lower limb including areas draining into inguinal lymph nodes ▪ Dermatomes of lower limb ▪ Cutaneous nerves of lower limb	▪ Enlarged inguinal lymph nodes ▪ Flexor, extensor and peroneal retinacula	
Front of thigh	▪ Muscle groups 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	▪ Psoas abscess ▪ Femoral hernia ▪ Palpation of femoral artery ▪ Knee jerk	▪
Medial side of thigh	▪ Muscle groups with their attachment, nerve supply and actions ▪ Adductor canal		▪
Gluteal region	▪ Muscle groups 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 - Liability of sciatic nerve to injury during gluteal intramuscular injections	- Trendelenburg sign - Pudendal block	▪
Back of thigh	▪ Muscle groups with their attachment, nerve		▪

	supply and actions ▪ ▪ 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	• Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the joint, • Fracture neck of femur	Dislocation of hip joint Surgical hip replacement	
Popliteal fossa	▪ 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**	▪ Muscle groups 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	▪	▪
Knee joint	• 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	▪ Anastomosis around the knee ▪ Knee joint injuries ▪ Bursitis in knee region ▪ Osteoarthritis	
Back of leg	▪ Muscle groups 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	▪ Ankle jerk	Rupture tendon

Sole of foot	▪ Basic organization ▪ ▪ Factors maintaining and importance of arches of the foot	▪ Flat foot, ▪ Club foot ▪ Plantar fasciitis	▪
Joints of lower limb	• Description of type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the: ▪ Tibiofibular joints ▪ Ankle joint	▪ Subtalar and transverse tarsal joints	
Radiology	• AP and Lateral views of bones and joints of lower limb: • Lateral view of the foot-identification of bones of the foot	▪ Shenton's line	
Surface Anatomy	▪ <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, ▪ great and small saphenous veins		▪ Nela ▪ Sho line ▪ Bry trian ▪
Embryology	▪ Basic concept of development of lower limb		

(5) ABDOMEN & PELVIS – SYLLABUS (135 hours)

Topic	Must Know	Desirable to know	Nice to kn
Abdominal wall	<u>Planes</u>		

Anterior abdominal wall Inguinal canal Male external genitalia Posterior abdominal wall Muscles of the back (intrinsic muscles)	Transpyloric, Transtubercular, 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 Superficial inguinal ring, Deep inguinal ring <u>Inguinal ligament</u> Attachment & modifications Extent, boundaries, contents 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 Muscles – Name, attachments, nerve supply and action Lumbar plexus – root value, formation & branches Position, nerve supply and action	Abdominal incisions Collateral routes for abdominopelvic venous blood Attachments of muscles of anterior abdominal wall <u>Clinical anatomy</u> Varicocoele <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 Thoracolumbar fascia <u>Clinical anatomy</u> Psoas abscess	
Peritoneal cavity	<u>Lesser sac</u> Boundaries and recesses, Epiploic foramen <u>Greater sac</u> Boundaries of subdiaphragmatic spaces Definition of ligaments, omentum and mesentery <u>The mesentery</u> Attachment and contents, Rectouterine pouch,	Duodenal recesses Caecal recesses <u>Clinical anatomy</u> Ascitis, Peritonitis	

	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 bilary 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 1st lumbar sympathetic ganglion in lumbar sympathectomy	
Diaphragm	Attachments, openings, nerve supply & action	Abnormal openings and diaphragmatic hernia	

Pelvis	Muscles: Levator ani & coccygeus (pelvic diaphragm), Obturator internus, Piriformis Viscera: Position, features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and Clinical aspects of-Urinary bladder & pelvic part of ureter, Rectum, Anal canal Prostate, age changes Seminal vesicle, Vas deferens, Ejaculatory ducts, Male urethra Uterus & its supports, Fallopian tube Ovary, Vagina, Female urethra Blood vessels: Origin, course, important relations and branches of - Internal iliac artery Nerves: Structures palpable during o Vaginal examination o Rectal examination Internal and external haemorrhoids Anal fistula	Clinical anatomy Anatomical basis of : o suprapubic cystotomy o Urinary obstruction in benign prostatic hypertrophy o Retroverted uterus o Prolapse uterus Neurological lesions of the bladder o Autonomous neurogenic bladder o Atonic bladder o Automatic bladder Lobes involved in benign prostatic hypertrophy & prostatic cancer, Vasectomy Tubal pregnancy, Tubal ligation Sacral plexus Branches Pelvic splanchnic nerve	
Perineum	Extent and Subdivisions of perineum Superficial perineal pouch - boundaries and contents Deep perineal pouch – boundaries and contents Perineal body, Perineal membrane Ischiorectal / ischioanal fossa, Perianal abscess and anal fissure	Clinical anatomy Perineal tear / episiotomy	
Joints	Curvatures of the vertebral column Type, articular ends, ligaments and movements of: Intervertebral joints, Sacroiliac joints, Pubic symphysis Lumbar puncture: Site, direction of the needle, structures pierced during the lumbar puncture	Scoliosis, lordosis, prolapsed disc, spondylolisthesis, spina bifida	
Cross-sectional anatomy	Cross-section at the level of L1 (transpyloric plane)	Cross-sectional anatomy of abdomen and pelvis	
Microanatomy	Gastro-intestinal system: Oesophagus, Fundus of stomach, Pylorus of stomach, Duodenum, Jejunum, Ileum, Large intestine, Appendix, Liver, Gall bladder, Pancreas, Suprarenal gland Urinary system: Kidney, Ureter, Urinary bladder Male Reproductive System: Testis, vas deferens,	Cardio-oesophageal junction	

	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, Hirchsprung 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 1st sacral vertebra	
Radiological anatomy	Plain x-ray abdomen <u>Contrast X-rays</u>: Barium swallow, Barium meal, Barium enema, Cholecystography Intravenous pyelography, Hysterosalphingography, Arteriography	Principles of USG, ERCP, CT abdomen, MRI	

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 k
Osteology	**Sternum** **Ribs** ▪ Definition of a true and false rib ▪ Features of a typical rib and 1st rib **Thoracic vertebra** ▪ Features of a typical thoracic vertebra	▪ 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		
Walls of thorax	**Muscles** Extent, attachments, direction of fibres, nerve supply and actions of external intercostal, internal intercostal, innermost intercostal, **Typical spinal nerve** ▪ Origin, course, relations and branches **Anterior and posterior intercostal arteries, veins and lymphatics** ▪ Origin, course, relations and branches or tributaries	**1st and 2nd intercostal nerves** ▪ Origin, course, relations and branches **Subcostal nerve** ▪ Origin, course, relations and branches	

	Internal thoracic artery ▪ Origin, course, relations and branches		
Pleural cavity	**Pleura** ▪ Parietal pleura and visceral pleura ▪ Suprapleural membrane ▪ Pleural recesses ▪ Blood supply, lymphatic drainage and nerve supply ▪ Applied anatomy · Pleuritis · Pneumothorax · Pleural effusion · Thoracocentesis **Lungs** ▪ 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 ▪ Applied anatomy · Lung abscess **Trachea** ▪ Extent, length, relations, blood supply, lymphatic drainage and nerve supply ▪ Applied anatomy · Tracheostomy **Bronchi** ▪ Relations, blood supply, lymphatic	Bronchial asthma Bronchogenic carcinoma · Lobe of azygos vein	

	drainage and nerve supply ▪ Applied anatomy · Bronchitis **Phrenic nerves** ▪ Origin, course, relations and area of supply ▪ Applied anatomy		
Mediastinum	▪ Subdivisions, boundaries and contents of superior, anterior, middle and posterior mediastina		
Middle mediastinum	**Pericardium** ▪ Subdivisions, sinuses in the pericardium, blood supply and nerve supply ▪ Applied anatomy · Pericardial effusion **Heart** ▪ External and internal features ▪ Description of the interior of each chamber ▪ **Conducting system of heart** ▪ Parts, position and arterial supply **Coronary arteries** ▪ Origin, course and branches ▪ Applied anatomy **Venous drainage of heart** Coronary sinus · Formation, course, tributaries and termination · Anterior cardiac veins · Venae cordis minimae **Nerve supply of heart** ▪ Position and components of superficial and deep cardiac plexuses ▪ **Blood vessels**		Fibrous skeleton o

Posterior mediastinum	**Oesophagus** ▪ External appearance, relations, blood supply, nerve supply and lymphatic drainage ▪ Applied anatomy · Oesophageal varices **Thoracic sympathetic chain** ▪ Location, extent and relations ▪ Splanchnic nerves **Thoracic duct and right lymphatic duct** ▪ Extent, external appearance, relations and tributaries **Venous drainage of posterior abdominal wall:** **Azygos vein** ▪ Origin, course, relations, tributaries and termination **Hemiazygos vein** ▪ Origin, course, relations, tributaries and termination **Accessory hemiazygos vein** ▪ Origin, course, relations, tributaries and termination **Descending thoracic aorta** ▪ Extent, branches and relations ▪ **Vagus nerve in thorax**		
Joints of thorax	▪ Type, articular surfaces, capsule, ligaments, nerve supply and movements of manubriosternal, sternocostal, costovertebral, costotransverse and xiphisternal joints ▪ Intervertebral joint ▪ Mechanics of respiration ▪ Types of respiration	Costochondral and interchondral joints	
Microscopic anatomy	▪ Trachea ▪ Lung		

Embryology	▪ Development of pleura ▪ Development of respiratory system **<u>Development of heart</u>** ▪ Development of the chambers, interatrial and interventricular septa **<u>Development of vascular system</u>** ▪ Aortic arch arteries ▪ Superior vena cava and inferior vena cava ▪ Coronary sinus ▪ <u>Clinical correlates</u> · Atrial septal defect · Ventricular septal defect · Fallot's tetralogy · Transposition of great vessels · Dextrocardia Patent ductus arteriosus · Coarctation of aorta ▪ **<u>Foetal circulation and changes at birth</u>** · Patent ductus arteriosus ▪ **Development of oesophagus**	Brachiocephalic veins	
Living Anatomy	· Internal thoracic artery · Parietal pleura · Lungs, root of lungs and fissures · Trachea · Heart · Apex beat · Arch of aorta · Oesophagus Surface projection of valves of heart		
Radiology	· Plain X-ray chest – PA view	CT and MRI of Thorax	

(6) HEAD AND NECK – SYLLABUS (135 hours)

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

	▪ Identification and locations of individual skull bones in an articulated skull ▪ Features seen in Normas frontalis, verticalis, occipitalis, lateralis and basalis ▪ Cranial cavity- subdivisions, foraminae and structures passing through them ▪ Details of Mandible and Maxilla, ▪ Features of typical and atypical cervical vertebrae	ossify in membranes and cartilage ▪ Frankfort Plane ▪ Parietal, Occipital, Frontal and Temporal bones ▪ Sphenoid,	
Scalp	▪ 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	▪ Muscles of facial expression Muscle groups acting upon the angle of the mouth - Attachments of the orbicularis oculi, orbicularis oris and buccinator muscles only ▪ Sensory innervation of the face	- Names of the superficial muscles in the face, with their actions and nerve supply	
Deep dissection of the face	▪ Facial artery: Origin, course and branches ▪ Facial vein: Formation, course and tributaries ▪ Facial nerve: Branches in the face ▪ Lymphatic drainage of the face ▪ Surgical importance of the deep facial vein ▪ Facial palsy		
Parotid Region	▪ Parts, borders, surfaces, contents, relations and nerve supply of parotid gland ▪ Course of parotid duct	▪ Parotitis (mumps) ▪ Parotid abscess ▪ Plane of dissection and main complication of superficial parotidectomy ▪ Frey's Syndrome	
The side of the neck Posterior Triangle	Boundaries and subdivisions of posterior triangle ▪ Boundaries and contents of the subclavian and occipital triangles ▪ Special emphasis on with nerve supply and actions ▪ Sternocleidomastoid with attachments and relations, Wry neck	▪ Erbs palsy ▪ Klumpke's palsy ▪ Injury to accessory nerve during lymph node biopsies ▪ inferior belly of omohyoid scalenus anterior, scalenus	

	Lymphatic drainage of head and neck	medius, levator scapulae	
Dissection of back	▪ Contents of the vertebral canal	▪ Suboccipital triangle: Boundaries and contents ▪ Position, direction of fibres, relations, nerve supply, actions of: Semispinalis capitis, Splenius capitis	
Cranial Cavity	▪ Cranial fossae: structures related and major foramina and structures passing through ▪ Pituitary gland ▪ Dural venous sinuses	▪ Clinical importance of dural venous sinuses	▪ Pituitary tumo
Orbit	▪ Attachments, nerve supply and actions of muscles of eyeball ▪ Nerves and vessels in the orbit ▪ Ciliary ganglion ▪ Horner's Syndrome	▪ Strabissmus	▪ Testing of ext muscles
Anterior Triangle	▪ Boundaries and subdivisions of the anterior triangle ▪ Boundaries and contents of the muscular, carotid, digastric and submental triangles		
Temporal and Infratemporal regions	▪ Extent, boundaries and contents of temporal and infratemporal fossae ▪ Attachments, direction of fibres, nerve supply and actions of muscles of mastication ▪ Temporomandibular joint	▪ Clinical significance of pterygoid venous plexus ▪ Dislocation of temporomandibular joint	
Submandibular region	▪ Parts, borders, surfaces, relations, nerve supply of submandibular gland ▪ Course and relations of submandibular duct ▪ Submandibular ganglion ▪ Position, relations and nerve supply of sublingual gland	▪ Submandibular stones ▪ Bidigital palpability of submandibular swellings	
Deep structures in the neck	▪ Thyroid gland- location, parts, borders, surfaces, relations, blood supply ▪ Parathyroid glands- location, blood supply ▪ Trachea, Tracheostomy- structures encountered ▪ Subclavian artery- Origin, parts, course,	▪ Thyroid swellings- anatomically relevant clinical features ▪ Awareness of liability of injury to external and recurrent laryngeal nerves during thyroidectomy	

	branches ▪ Vagus Nerve in the neck- Course and branches ▪ Accessory Nerve- Course and supply ▪ Cervical Sympathetic chain- Components, branches, area of supply ▪ Deep cervical fascia- parts, extent, attachments, modifications ▪ Deep cervical lymph nodes	▪ Compression of subclavian artery by cervical rib ▪ Fascial spaces of neck ▪ Thymus	
Mouth, Pharynx, Palate	▪ Subdivisions and contents ▪ Names, position, actions and nerve supply of muscles of palate and pharynx ▪ Palatine tonsil- Position, relations, blood supply ▪ Waldeyer's lymphatic ring- Components and their function ▪ Boundaries and clinical significance of pyriform fossa	▪ Tonsillitis and tonsillectomy ▪ Adenoids ▪ Paratonsillar abscess ▪	▪ Killian's dehis
Cavity of Nose	▪ Nasal septum ▪ Epistaxis- significance of Little's area ▪ Lateral wall of nasal cavity ▪ Paranasal sinuses concept of referred pain	▪ Maxillary sinus tumours ▪ Sinusitis	
Larynx	▪ Cartilages and ligaments ▪ Names, nerve supply and actions of intrinsic and extrinsic muscles of larynx ▪ Sensory innervation and blood supply of larynx	▪ Laryngitis ▪ Recurrent laryngeal nerve injury	
Tongue	▪ Names, nerve supply and actions of extrinsic and intrinsic muscles of tongue ▪ Nerve supply and lymphatic drainage of tongue	▪ Hypoglossal nerve palsy	
Organs of hearing and equilibrium	▪ 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	▪ 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	▪ Concept of prevertebral muscles ▪ Atlanto-occipital joint		

	▪ Atlantoaxial joint		
Microanatomy	▪ 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	▪ 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	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	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
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	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

	e) Upper and lower motor neurons f) Spinal segment and dermatome g) Blood supply h) Modifications of piamater		
Brainstem	External and interrnal 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,	Circumv 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 Basal nuclei	Association, commissural and projection fibres Components, basic connections and functions)	Anatomical basis of stroke 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 s parts an Connect limbic sy
Reticular formation and ARAS			Reticula and ARA arrangen basic co and func

Cranial nerve nuclei Optic and auditory pathways	Cranial nerve nuclei - location Optic and auditory pathways		Function
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 colluculi	Neuromuscular junction- Motor end plate	Differen between sensory Muscle s
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,	Develop function

(8) GENERAL EMBRYOLOGY – SYLLABUS (8 hours)

Topics	Must know	Desirable to know	Nice to kn
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	• Gastrulation		
Embryonic period	Definition, Neurulation – neural pores and the time of closure, Derivatives of each of the 3 germ layers, Somites	External appearance during 2nd month Induction and organogenesis	
Foetal membranes and Placenta	Structure, Placental circulation, Function, Placental barrier		Erythroblastosis fet hydrops
Amnion and umbilical cord	Structure and function	Amniotic fluid- hydramnios and oligohydramnios	Umbilical cord ano 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 kn

Chromosomes	▪ Structure of chromosomes ▪ Classification of chromosomes based on position of centromere		
Karyotyping	▪ Technique of preparing a Karyotype ▪ Types of banding ▪ Clinical applications of karyotyping ▪ Reading of karyotypes for normal male, female, Trisomies, Turner syndrome, Klinefelter syndrome		Fluorescent in situ hybridisation (FISH
Sex Chromatin	▪ Barr bodies and their clinical significance ▪ Lyon hypothesis		
Patterns of Inheritance and pedigree charts	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	Clinical features of the examples described: Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Hemophilia, Duchene's muscular dystrophy, Sickle cell anaemia	
Chromosomal Aberrations	Causes of chromosomal aberrations Structural aberrations- types and examples Numerical aberrations- types, examples and clinical features True and pseudohermaphroditism Mosaics and chimeras	Clinical features of other examples of chromosomal aberrations: Prader Willi syndrome, Edward syndrome, Patau syndrome	
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 V
2. Wheater's Functional Histology: A Text and Colour Atlas, 6th Edition by Barbara Young, Geraldine O'Dow
3. Textbook of Histology 2008 by GP Pal

Embryology

1. Langman's Medical Embryology13th 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, 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 embryolog

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 region
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 he
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. Sympethic 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 Card
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 - Pyramida
22. Medulla Oblongata -Sensory

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 stru
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 aske
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/
- Locate the common sites for v
  - Median cubital vein
  - Cephalic vein at the wr
  - Dorsal venous network

Lower limb:

Student must be able to demonstrate

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

- Femoral

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

Thorax:

Student must be able to demonstrate

- Relevant bony and soft surface landmarks
- Superior Mediastinum:
  - Right and left brachiocephalic veins
  - Superior Vena Cava
  - Arch of aorta
  - Trachea
- Events occurring at sternal ang
- Organs:
  - Heart borders and valv
  - Lung borders and fissu
  - Pleura
- Surface landmarks to locate th
  - Apex beat
  - Auscultatory areas for

Abdomen:

Students must be able to demonstrate:

- Relevant bony and soft surface
- Abdominal planes, abdominal each region
- Surface projection of the follo
  - Stomach
  - Liver
  - Spleen
  - Fundus of Gall bladder
  - Base of the appendix

- Morrison's parallelogram for posterior marking of the kidneys

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

Head and neck:

Students must be able to demonstrate:

- Relevant bony and soft surface landmarks
- Glands:
  - Parotid gland and duct
  - Submandibular gland
  - Thyroid gland
- Arteries:
  - Facial artery
  - Common, internal and
  - Internal and external ju
  - Subclavian artery and
- Nerves:
  - Spinal accessory nerve
  - Vagus
- Others:
  - Vertebral levels of surf
  - Pterion
  - Mastoid antrum
- Surface landmarks to palpate t
  - Frontal air sinus
  - Maxillary air Sinus
  - Carotid pulsation
  - Superficial temporal pu
  - 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
university on three occasions in one academic year. Based on all these marks the total internal assessment will be fi
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, di the central nervous system, myocardial infarction

Clinical Integration for Upper Limb

Topic	Clinical Speciality
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

Topic	Clinical Speciality
Nerve injuries	Orthopaedics & Medicine
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

Topic	**Clinical Speciality**
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/paediatric
Portal hypertension	General Surgery/Gastroente
Peptic ulcer	General Surgery/Gastroente
Assisted reproduction	Obstetrics and Gynecology

Clinical Integration for Thorax

Topic	**Clinical Speciality**
Superior mediastinum –thoracic inlet syndrome, scalenus anterior syndrome	General surgery
Pleural effusion, Pneumothorax, Pleural tapping	Medicine / Respiratory Med
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

Topic	**Clinical Speciality**
Facial nerve palsy	General Medicine
Cataract, Glaucoma, Eyelid infections	Ophthalmology
Surgical anatomy of ENT	ENT

Clinical Integration for Nervous System

Topic	Clinical Speciality
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

Topic	Clinical Speciality
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	Lower Limb
Typical spinal nerve	Femoral sheath
Lymphatic Drainage of breast	Adductor canal
Brachial Plexus	Cutaneous innervation of the dorsum of foot
Axillary Artery	Superior surface of the tibia
Anastomosis around the scapula	Anastomosis around the knee
Dermatomes of the upper limb	
Anastomosis around the Elbow	
Flexor Retinaculum of Wrist	
Fascial Spaces of Palm	
Extensor Retinaculum of wrist	

Thorax	**Abdomen**
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	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
Head and Neck	**CNS**
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	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

List of Histology slides to drawn by I MBBS students	
General Histology	
Epithelial Tissue	**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.