



**JSS Academy of Higher Education & Research
JSS Medical College**

**Competency based
Undergraduate Curriculum in
Pre-clinical Subjects - Volume - II
Reference: The Regulations on
Graduate Medical Education, 1997
Amendment Notification: 2019
2018**

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Preamble

The new Graduate Medical Education Regulations attempts to stand on the shoulder of the contributions and the efforts of resource persons, teachers and students (past and present). It intends to take the learner to provide health care to the evolving needs of the nation and the world.

More than twenty years have passed since the existing Regulations on Graduate Medical Education, 1997 was notified, necessitating a relook at all aspects of the various components in the existing regulations and adapt them to the changing demography, socio-economic context, perceptions, values and expectations of stakeholders. Emerging health care issues particularly in the context of emerging diseases, impact of advances in science and technology and shorter distances on diseases and their management also need consideration. The strong and forward looking fundamentals enshrined in the Regulations on Graduate Medical Education, 1997 has made this job easier. A comparison between the 1997 Regulations and proposed Graduate Medical Education Regulations, 2018 will reveal that the 2018 Regulations have evolved from several key principles enshrined in the 1997 Regulations.

The thrust in the new regulations is continuation and evolution of thought in medical education making it more learner-centric, patient-centric, gender sensitive, outcome -oriented and environment appropriate. The result is an outcome driven curriculum which conforms to global trends. Emphasis is made on alignment and integration of subjects both horizontally and vertically while respecting the strengths and necessity of subject-based instruction and assessment. This has necessitated a deviation from using "broad competencies"; instead, the reports have written end of phase subject (sub) competencies.

These "sub-competencies" can be mapped to the global competencies in the Graduate Medical Education Regulations.

A significant attempt has been made in the outcome driven undergraduate curriculum to provide the orientation and the skills necessary for life-long learning to enable proper care of the patient. In particular, the curriculum provides for early clinical exposure, electives and longitudinal care. Skill acquisition is an indispensable component of the learning process in medicine. The curriculum reinforces this aspect by necessitating certification of certain essential skills. The experts and the writing group have factored in patient availability, access, consent, number of students in a class etc. in suggesting skill acquisition and assessment methods; use of skills labs, simulated and guided environments are encouraged. In the pre-internship years,- the highest level of skill acquisition is a show how (SH) in a simulated or guided environment; few skills require independent performance and certification - these are marked with P (for performance). Opportunity to 'perform' these skills will be available during internship.

The importance of ethical values, responsiveness to the needs of the patient and acquisition of communication skills is underscored by providing dedicated curriculum time in the form of a longitudinal program based on Attitude, Ethics and Communication (AETCOM) competencies. Great emphasis has been placed on collaborative and inter-disciplinary teamwork, professionalism, altruism and

respect in professional relationships with due sensitivity to differences in thought, social and economic position and gender.

In addition to the above, an attempt has been made to allow students from diverse educational streams and backgrounds to transition appropriately through a Foundation Course. Dedicated time has been allotted for self directed learning and co-curricular activities.

Formative and internal assessments have been streamlined to achieve the objectives of the curriculum. Minor tweaks to the summative assessment have been made to reflect evolving thought and regulatory requirements. Curricular governance and support have been strengthened, increasing the involvement of Curriculum Committee and Medical Education Departments/Units.

The curriculum document in conjunction with the new Graduate Medical Education Regulations (GMR), when notified, must be seen as a "living document" that should evolve as stakeholder requirements and aspirations change. We hope that the current GMR does just that. The Medical Council of India is grateful to all the teachers, subject experts, process experts, patients, students and trainees who have contributed through invaluable inputs, intellectual feedbacks and valuable time spent to make this possible. This document would not have been possible without the dedicated and unstinting intellectual, mental and time-consuming efforts of the members of the Reconciliation Board of the Council and the Academic Cell of MCI.

Topics & outcomes in Pre-clinical subjects

Subjects	Number of topics	Number of outcomes
Human Anatomy	82	409
Physiology	11	137
Biochemistry	11	89

Course content

ANATOMY

I. GOAL:

The broad goal of teaching of undergraduate in Anatomy aims at providing comprehensive knowledge of macroscopic, microscopic and embryological anatomy and correlates it with clinical application.

II. OBJECTIVES:

A. Knowledge

At the end of course, the learner shall be able to:

1. Describe the general anatomy of structures and organ systems of the human body.
2. Describe the normal disposition, interrelationships, innervations, vascular supply and functional anatomy of clinically relevant structures and organs of the human body.
3. Correlate the normal microscopic structure of various organs with their functions (as a prerequisite for understanding the altered state in commonly encountered disease processes).
4. Explain basic principles and sequential development of the organ systems
5. Explain the embryologic basis of the major developmental abnormalities and variations.
6. Explain the basics of medical genetics with respect to common genetic syndromes.
7. Explain the anatomical basis of contraception.

B. Skills

1. Identify all the major structures, organs & viscera of the body.
2. Demonstrate normal movements at various joints.
3. Demonstrate how to test the functioning of different muscles or muscle groups.
4. Mark/draw the surface anatomy of all the major structures and organs of the body on a cadaver or a volunteer.
5. Locate and palpate arterial pulsations, and identify structures against which arteries can be compressed to stop bleeding.
6. Locate ideal sites for venepuncture.
7. Locate the site for emergency tracheostomy.
8. Locate subcutaneous positions of large nerves.
9. Locate ideal sites for lumbar and sternal puncture, pericardial, intercostal and peritoneal tapping, and biopsies of liver, kidney and spleen.
10. Interpret the cross-sectional anatomy of the human body
11. Identify normal anatomical structures, organs and viscera in radiographs, ultrasound images, computerized tomograms, magnetic resonance images and the endoscopic views.
12. Identify the organs and tissues in sections under the microscope
13. Identify the critical stages in the embryonic development and interpret the

effects of common teratogens, genetic mutations and environmental hazards on development

14. Identify and interpret normal karyograms, abnormal karyograms and clinical features of common genetic disorders.

C. Affective

1. Demonstrate self-awareness and personal development in routine conduct.
2. Practice selflessness, integrity, responsibility, accountability and respect.
3. Communicate effectively with peers, students and teachers in various teaching learning activities in a manner that encourages participation and shared decision-making.
4. Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with body donors and their relatives.
5. Demonstrate
 - Due respect and follows the correct procedure while handling human body parts, cadavers during dissection & other biological tissues.
 - Humane touch while demonstrating living surface marking in subject/patient.

III. Course Outcome

At the end of course, the learner shall be able to:

1. Understanding of the gross and microscopic structure and development of human body
2. Comprehension of the normal regulation and integration of the functions of the organs and systems on basis of the structure and genetic pattern,
3. Understanding of the clinical correlation of the organs and structures involved and interpret the anatomical basis of the disease presentations.

IV. SYLLABUS:

A. Number of teaching hour:

Teaching method	Hours
Lecture	220
Small group teaching	415
Self-directed learning	40
Early clinical exposure	30
Total	705

Distribution of teaching hours for theory and practicals/ Small group teaching is as follows:

Sl no	Topic	Lecture	Practical/ small group teaching
1	General Anatomy	10	10
2	Upper limb	17	60
3	Lower limb	17	60
4	Thorax	17	30

5	Abdomen & Pelvis	35	80
6	Head & Neck	30	40
7	Central Nervous system	16	30
8	Histology	35	80
9	Embryology	35	20
10	Genetics	08	05

B. Syllabus at a glance for MBBS Phase I Course

Sl no	Topic	Description
1	General Anatomy	Basic tissues of the body Terminology and Nomenclature, History of Anatomy (AN1.1 to AN7.8)
2	Regional Anatomy with related osteology, surface anatomy, sectional anatomy, Applied Anatomy & Radiology	Upper limb (AN8.1 to AN13.8) Lower limb (AN14.1 to AN20.10) Thorax-including diaphragm (AN21.1 to AN 25.9) Abdomen including Pelvis (AN44.1 to AN 51.2) Head and Neck (AN26.1 to AN43.9) Brain & Spinal cord (AN56.1 to AN63.2)
3	General Embryology	Development from 1 st week to 8 th week of development (AN 76.1 to AN81.3)
4	Systemic embryology	Development of individual organs and systems (AN25.2-AN25.6, AN43.4, AN 52.4 to 52.8, AN64.2-AN64.3)
5	Histology	General Histology (AN65.1- to AN 72.1) Microanatomy of individual organs and systems (AN25.1, AN43.2-AN43.3, AN52.1-AN52.3)
6	Human Genetics	Principles of Human Genetics (AN73.1to AN75.5)
7	Ethics	Ethics in anatomy (AN 82.1)

THEORY

1. General Anatomy

- Brief history of anatomy as related to medicine
- Subdivisions of anatomy: cadaver, anatomical position, other positions used in clinical practice, terms of position, terms of movement, colours used in anatomical drawings.
- Structures met with during dissection: skin, superficial fascia - including contents, deep fascia - including its modifications
- Muscles - parts, origin, insertion, tendon, aponeurosis, bursa, synovial sheath; ligament, artery, vein, lymphatics, lymph node, peripheral nerves.
- Integumentary system: skin and its appendages, superficial fascia, deep fascia,

development and microscopic structure of skin and applied anatomy.

- Lymphatic system: Gross anatomy of major groups of lymph nodes of body & their drainage areas. Gross anatomy of major lymphatics, specially thoracic duct, jugular, subclavian and mediastinal lymph trunks. Microscopic anatomy of lymph nodes and applied anatomy. Gross anatomy, development, blood supply and applied anatomy of thymus, spleen & palatine tonsil.
- Bone: Name of bones of the body and their positions; classification of bones with examples; general features; general pattern of blood supply; particular features; relations of blood vessels and nerves to bones. Microscopic anatomy of bone, common sites of fractures, general pattern of blood supply, ossification of bones of limbs for age determination and applied anatomy. Desirable to know - Determination of age (Ossification).
- Arthology: General features of different types of joints & Classification of joints with examples. Applied importance of different types of joints.
- Myology: Classification and identification of the muscles of the body; main attachments, nerve supply and actions; Actions of muscle groups on functional basis with reference to joints. Mechanism of movement caused by muscle/ muscles & various forces exerted by them & nerve terminations.

2. Upper Extremity

- Identification, attachments and clinical importance of bones
- Blood supply, Nerve supply and lymphatic drainage of upper limb
- Pectoral region: Contents, Mammary gland with surgical importance
- Axilla: Boundaries, contents and surgical importance
- Back: Deltoid region, Muscular spaces & clinical importance
- The shoulder: Contents & the shoulder joint with surgical importance
- The arm: Contents & clinical importance of anterior & Posterior compartment of arm
- The forearm and hand: Palmer aponeurosis, superficial palmar arch, Flexor retinaculum & Flexor tendons. The arteries, nerves & Muscles of the flexor compartment of the forearm. Muscles & Fascial compartments of the palm. The extensor compartment of the forearm and the hand & Extensor tendons of the fingers.
- Joints of the upper limb: elbow joint, wrist joint, radio ulnar joints, intercarpal-carpometacarpal & Intermetacarpal joints with clinical importance

3. Lower Extremity

- Identification, attachments and clinical importance of bones
- Blood supply, Nerve supply and lymphatic drainage of lower limb
- Gluteal region: Contents, Clinical importance
- Thigh: Front of thigh , adductor canal & medial side of thigh, popliteal fossa, Back of thigh, Hip joint
- Leg & Dorsum of foot: Contents & clinical importance of anterior compartment of leg, lateral compartment of leg & back of leg.
- Sole: Layers of the foot, contents, Arches of foot and applied anatomy
- Joints: Knee joint, Ankle joint, Tibio-fibular and other joints with applied importance

4. Thorax

- Thoracic cage: Identification of ribs, vertebrae, attachments and clinical importance of bones
- Blood supply, Nerve supply and lymphatic drainage of upper limb
- Thoracic wall: Intercostal spaces with contents and clinical importance
- Mediastinum: Divisions, contents and applied importance
- Heart: Pericardium, pericardial cavity and applied anatomy, Position and parts of the Heart, Chambers of heart, conducting system, blood supply and nerve supply of heart, blood vessels and their distribution in the body. Clinical importance of heart.
- Pleura: Blood supply, lymphatic drainage and nerve supply of pleura, extent of pleura and describe the pleural recesses and their applied anatomy
- Lungs: External features and relations of structures which form root of lung & bronchial tree and their clinical correlate - position, parts, relations, blood supply and nerve supply & emphasis on Bronchopulmonary segments.
- Describe the extent, length, relations, blood supply, lymphatic drainage and nerve supply of trachea
- Diaphragm - Attachment with nerve supply and action

5. Abdomen & Pelvis:

- Peritoneum: General disposition - horizontal and vertical, peritoneal cavity, fossae & folds with surgical importance
- Viscerae: Position, parts, relations, blood supply, nerve supply, lymphatic drainage of abdominal organs with applied importance
- Pelvic Organs: Parts, position, relations, blood supply and nerve supply with applied importance
- Urinary system: Parts, position, relations, blood supply, nerve supply, lymphatic drainage of kidney, urinary bladder, normal sites of constrictions in the urinary passage. Prostate gland, Skene's tubules and applied anatomy
- Perineum- Boundaries, divisions, perineal body, ischioanal fossa, pudendal canal, perineal spaces and membrane with surgical importance

6. Head & Neck:

- Skull - All external and interior of skull, foetal skull, mandible, identification of individual skull bones & Cervical vertebrae with clinical importance
- The scalp: Layers, Nerves and vessels of scalp with surgical importance
- Face: Muscles, Nerves & blood vessels of the face, Structures in the cheek and lips, The eyelids. Applied importance of contents of face.
- Parotid region: Boundaries & contents, Parotid gland with its applied importance
- Side of the Neck: Deepfascia of the neck, Sternocleidomastoid muscle, Boundaries, contents divisions with applied importance of posterior triangle of neck & anterior triangle of neck.
- The midline structures of neck, Thyroid gland- Parts, relations, blood supply and surgical importance
- Sub occipital triangle: Boundaries & contents with surgical importance
- The cranial cavity: Anterior cranial fossa, middle cranial fossa, posterior cranial fossa. Orbit - The lacrimal apparatus, eyeball & The structures in the orbits, Dural folds & dural venous sinuses with clinical importance and Pituitary gland
- The temporal and infratemporal region: Infratemporal fossa boundaries & contents, Temporal fascia, Masticatory muscles, Temporomandibular joint,

- Submandibular region: Submandibular gland, Mylohyoid muscle, hyoglossus & stylohyoid muscles.
- Oral Cavity: The mouth, tongue, palatine tonsil, palate and pharynx with applied importance
- The cavity of the nose with paranasal air sinuses & clinical importance
- The larynx: Cartilages, Divisions, Muscles, Nerve supply, blood supply, lymphatic drainage and applied anatomy
- The organs of hearing and equilibrium
- The contents of the vertebral canal & the joints of the neck.

7. Central Nervous System

- Parts of nervous system & coverings of brain, motor and sensory pathways, cranial nerves
- Ventricles: Divisions, CSF, Relations and clinical importance
- Cerebrum: External features, Functional areas, Sulci & Gyri, blood supply with clinical importance
- White matter: Types, parts, connections and applied importance
- Formation & branches of circle of willis
- Spinal cord: General features, Coverings, connections, blood supply & clinical importance
- Cerebellum: External feature, nuclei, connections , blood supply & clinical importance
- External features, blood supply and clinical importance of medulla oblongata, pons & midbrain
- Section of Medulla: At Pyramidal decussation, Sensory decussation and Open part of Medulla
- Section of Pons: At Lower pons & Upperpons
- Section of Midbrain: At Inferior colliculus & Superior colliculus
- Section of Cerebrum: Mid Saggital section, Horizontal section at interventricular foramen, Coronal section at anterior commissure, Coronal section at mammillary body
- Parts & major connections of basal ganglia & limbic system
- Boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus
- Anatomical basis of common neurological disorders: case studies and demonstration
- Autonomic Nervous system: Sympathetic, parasympathetic systems, cortical control, peripheral plexuses, common associated disorders and syndromes.

8. Embryology

A. General embryology

- General principles of embryology
- Gestation period, subdivisions, spermatogenesis, structure of sperm, oogenesis, structure of ovum, growth & rupture of the ovarian follicles. Sperm in the male and female genital tracts, activation & capacitation of sperms in the female genital tract
- First week of development
- Second week of development
- Third week of development
- Third to tenth month of development: Maturation of tissues & organs & rapid

growth of body. Estimation of age, horizons of development

- Placenta: Formation of placenta & chorionic villi, decidua basalis, features & functions of placenta, placental circulation, abnormalities, placental barrier, types of placenta.
- Umbilical cord: Formation of umbilical cord, features of umbilical cord.
- Amniotic cavity
- Formation and types of twins
- Arrangement of fetal membranes
- Teratology: Genetic & environmental factors as causative factors for congenital malformations. Mode of actions of teratogens & critical periods

B. Systemic embryology

- Development of cardiovascular system with congenital anomalies:
- Development of respiratory system with its anomalies
- Development of gastrointestinal system, development of liver, pancreas, spleen, biliary system and its anomalies
- Development of genitourinary system with its anomalies
- Development of face with its congenital anomalies
- Development of central nervous system, eye, ear & congenital anomalies
- Development of vertebrae, upper limb, lower limb, body wall, mammary gland, diaphragm and its anomalies

9. Histology

A. General histology

- Introduction including importance of studying histology in patient care, epithelium, surface specializations & Basement membrane with junctional complexes.
- Connective tissue: Definition, cells, fibres, ground substance, classification and features of different types of connective tissues, cartilage & bone
- Muscular tissue, nerve tissue, Blood vessels & Lymphatic tissue with clinical correlation
- Glands: Types, classification and serous salivary gland
- Skin: Thin & thick skin with examples & its clinical correlation
- Structure of placenta & umbilical cord

B. Systemic histology

- Microscopic structure of respiratory system with Blood air barrier & cell population in the respiratory tract.
- Microscopic structure of Gastrointestinal system with emphasis on Peptic ulcer & Payer's patches
- Microscopic structure of liver with special mention on lobules, gall bladder & pancreas
- Microscopic structure of Excretory system with special mention on JG apparatus
- Microscopic structure of genital system
- Microscopic structure of endocrine system with special mention on hypothalamo hypophysial portal system
- Structure of brain, spinal cord & cerebellum
- Microscopic structure special senses: Tongue, cornea, retina, eyelid, Sclerocorneal junction & organ of Corti

10. Medical Genetics

- Chromosomes: The structure of chromosomes with classification, technique of karyotyping with its applications and the Lyon's hypothesis,
- Patterns of Inheritance: The various modes of inheritance with examples, Draw pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance, multifactorial inheritance with examples, The genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Haemophilia, Duchene's muscular dystrophy & Sickle cell anaemia
- Principle of Human Genetics, Chromosomal Aberrations & Clinical Genetics: The structural and numerical chromosomal aberrations, mosaics and chimeras with example, The genetic basis & clinical features of Prader Willi syndrome, Edward syndrome & Patau syndrome, Genetic basis of variation of polymorphism and mutation. The principles of genetic counseling.

11. Imaging Anatomy:

- Identification of normal anatomical features in some commonly used skiagrams (plain & contrast)
- CT scan, ultrasound, MRI and endoscopy images

12. Surface Anatomy:

- Surface marking of those structures, organs and viscera of the body which are commonly affected in various disease processes

13. Sectional Anatomy:

- Gross / sagittal / coronal sections of thorax, abdomen, pelvis, limbs, head & neck and brain to understand interrelations of organs and interpret CTs & MRIs.

PRACTICAL

A. Gross Anatomy: Dissection of the whole body at least once or prosected part demonstration or skill lab with CD of dissection stages

Upper limb: Demonstration of structures in the:

- Bones of upper limb
- Pectoral & scapular regions
- Shoulder region
- Axilla
- Arm & forearm
- Hand: palm & dorsum
- Joints of upper limb

Lower limb: Demonstration of structures in the:

- Bones of lower limb
- Gluteal region
- Thigh: anterior, medial, posterior compartments
- Popliteal fossa
- Leg: anterior, lateral and posterior compartments
- Foot: dorsum, sole
- Joints of lower limb.

Thorax: Demonstration of:

- Thoracic cage
- Chest wall

- Diaphragm
- Mediastinum
- Lungs & pleura
- Heart & sinuses

Abdomen: Demonstration of:

- Lumbar vertebra
- Anterior abdominal wall
- Inguinal region
- Organs / viscera with blood vessels and nerves: GIT, Excretory system, Suprarenal
- Posterior abdominal wall.

Pelvis: Demonstration of:

- Bony Pelvis
- Pelvic viscera with blood vessels and nerves.
- Perineum: external genitalia, perineal pouches and anal triangle including ischioanal fossa.

Head & Neck: Demonstration of structures in the:

- Skull
- Scalp
- Superficial & deep structures of face & neck
- Parotid region
- Cranial cavity
- Contents of orbit
- Triangles of neck
- Introduction to the eyeball
- Submandibular region
- Temporal & infratemporal fossa
- Oral cavity: Tongue, Palatine tonsil, Palate
- Nasal cavity
- Pharynx
- Larynx
- Ear
- Thyroid & parathyroid gland
- Oesophagus
- Trachea,
- Blood vessels and cranial nerves,
- Vertebral canal and contents.

Brain: Demonstration of:

- Sections & prosected specimens of brain to demonstrate meninges, blood supply, functional cortical areas, ventricles, visual pathways, auditory pathways, basal ganglia, corpus striatum, cerebellum and sections of the brain stem.

Demonstrations: Sectional anatomy

Radiology: Demonstration of normal anatomical features in some commonly used skiagrams (plain & contrast), CT scan, ultrasound, MRI and endoscopy

B Histology

- Demonstration of stained slides of all the clinically relevant tissues, organs and viscera.

C. Developmental Anatomy:

- Demonstrate various stages of fertilization, implantation, formation of embryo, development of fetus and development of various organs & systems, Commonly encountered congenital defects in models, charts & videos.

D. Medical Genetics:

- Demonstration of normal karyotype, Clinical picture, features and karyotype of the common genetic conditions.

INTEGRATION: Annexure I

EARLY CLINICAL EXPOSURE

- The clinical training would start in the first year, focusing on communication, basic clinical skills and professionalism.
- There would be sufficient clinical exposure at the primary care level and this would be integrated with the learning of basic and laboratory sciences.
- Introduction of case scenarios for classroom discussion/case-based learning would be emphasized.
- It will be done as a coordinated effort by the pre-clinical, para-clinical and clinical faculty.
- Providing a clinical context and ensuring patient centricity of instructions are the key principles underlying early clinical exposure.
- The ECE provides for three key elements - basic science correlation, clinical skills including authentic patient contact and an introduction to humanities in medicine.

Suggested topics for early clinical exposure

Sl No	Topics	Integration departments
Upper Limb		
1	Clinical importance of Brachial plexus & its injury	Anaesthesia, surgery, paediatrics & Orthopaedics
2	Fractures of bones & dislocations of joints	Orthopaedics
3	Mammary gland and its clinical importance	Surgery
4	Median nerve injury	Medicine & Orthopaedics
5	Ulnar nerve injury	Medicine & Orthopaedics
6	Radial nerve injury	Medicine & Orthopaedics
7	Clinical importance of Venous drainage of upper limb	Surgery
8	Surgical importance of Palmar spaces:	Surgery & Plastic surgery

Lower limb		
9	Clinical importance of Venous drainage of lower limb(Varicose veins)	Surgery
10	Fracture of neck of femur & avascular necrosis of head of femur	Orthopaedics
11	Compartment syndrome	Surgery & Plastic surgery
12	Peripheral pulsation & its clinical application	Surgery
13	Nerve injuries(Sciatica & Foot drop)	Orthopaedics
14	Medicolegal importance of lower end of femur	Radiology, forensic medicine
15	Clinical importance of arches of foot	Orthopaedics
Thorax		
16	Clinical importance of mediastinum(Thoracic inlet syndrome etc):	Medicine & Surgery
17	Clinical importance of broncho pulmonary segments	Pulmonology, Medicine, Cardiothoracic surgery
18	Surgical importance of Intercostal spaces	Medicine, Surgery
19	Clinical importance of pleura	Medicine
20	Clinical importance of curvatures of vertebral column	Orthopaedics, Medicine
21	Clinical importance of blood supply of heart	Medicine, Cardiology
22	X-ray of thoracic cavity	Radiology, Pulmonology, Medicine
Abdomen & Pelvis		
23	Surgical importance of inguinal canal	Surgery
24	Clinical importance of peritoneum	Medicine & Surgery
25	Liver & Extrabiliary apparatus & its clinical importance	Medicine, Surgery, Gastroenterology
26	Appendicitis	Surgery
27	Surgical importance of rectum & anal canal	Surgery
28	Surgical importance of Pelvic floor	OBG
29	Clinical importance of genital system	OBG, Surgery

30	Surgical importance of excretory system(Renal stone & Constriction of ureter)	Urology
Head & Neck		
31	Surgical importance of scalp	Surgery
32	Facial nerve injury & its clinical importance	Medicine, Neurology
33	Clinical importance of parotid gland & its duct	Surgery, Medicine
34	Clinical importance of lymphatic drainage of head & Neck	Surgery, ENT
35	Cranial nerve & its applied importance	Neurology, ophthalmology, Medicine, ENT
36	Paranasal air sinuses & its clinical importance	ENT
37	Surgical importance of thyroid gland	Surgery
38	Radiology of head & neck	Radiology, ENT
Brain & Spinal cord		
39	Meninges & its applied importance	Neurosurgery
40	Blood supply of brain & its applied importance	Medicine, Neurosurgery
41	Radiology of brain	Radiology, Neurosurgery
42	Spinal cord & Its surgical importance	Neurosurgery, orthopaedics
Embryology & Genetics		
43	Abnormal implantation	OBG, Radiology
44	Twinning & Teratogens	OBG, Paediatrics, Pharmacology, Radiology
45	Congenital anomalies of face	Paediatrics, Plastic surgery
46	Congenital anomalies of GIT	Paediatric surgery
47	Congenital anomalies of Urogenital system	Paediatrics, paediatric surgery
48	Developmental anomalies of CVS & RS	Cardiothoracic surgery
49	Developmental anomalies of Branchial apparatus	Paediatric surgeon, Surgery
50	Numerical & structural abnormalities of chromosomes	Genetics, Paediatrics, radiology
51	Basis of genetic investigation & Procedure	Genetics, Biochemistry, Radiology

ASSESSMENT

A. Formative assessment

- Assessment of students shall be based day-to-day assessment pertaining to their performance with respect to assignments, preparation for seminar, involvement in discussion in small group teaching & other academic activities
- Minimum of three examinations shall be conducted & average of three is taken into consideration.
- Theory: 100 marks (Theory:70 & Continuous assessment:30)
- Practical: 100 Marks (Practical:70 & Continuous assessment:30)

Formative assessment marks distribution pattern

Theory (100)		Practical (100)	
Internal assessment (70)	Continuous assessment (30)	Internal assessment(70)	Continuous assessment (30)
<ul style="list-style-type: none"> • MCQ's 01*20= 20 • Long essay (Case based) 1*10 = 10 • Short essay 3*5= 15 • Short answers 5*3 = 15 	Unit test/ table test = 20 Early Clinical Exposure = 10	<ul style="list-style-type: none"> • OSPE = 20 • Practical = 50 • (Gross anatomy= 30, Histology=20) 	<ul style="list-style-type: none"> • Records (Gross anatomy= 10& Histology=10) • Professionalism & Ethics (Punctuality & involvement, reflections, seminar, Research, extra-curricular activities etc) = 10

B. University Examinations

1. Theory: 200 marks

Two papers of 100 marks each and duration of each paper will be 3 hours. Each paper candidate has to score 40% and aggregate of 2 papers is 50% to pass. Distribution of chapters for paper I and II with weightage of marks in Anatomy for University Examination

Paper – I		Paper - II	
Topics	Marks	Topics	Marks
Head and Neck	25	Abdomen	30
Brain, Spinal cord	10	Pelvis & Perineum	20
Upper limb	20	Lower limb	20
Thorax including diaphragm	20	Systemic Histology	10

General Anatomy	05	Genetics	10
General Embryology	10	Systemic Embryology	10
General Histology	10	Total	100
Total	100		

Theory question paper pattern:

Sl no	Type of question	No of questions	Marks allotted per question	Marks
1	MCQ's	20	01	20
2	Long essay (Case based)	2	10	20
3	Short essay	6	05	30
4	Short answers	10	03	30
Total				100

2. Practical examination pattern: 80 marks

Candidate has to score 50% to pass.

Practical exam pattern:

Gross anatomy – 50 marks		Histology – 30 marks	
Discription	Marks	Discription	Marks
OSPE stations: 2* 5 marks	10	Spotters: 10*1 (Including one genetic chart)	10
Spotters: 1*1mark (Soft parts - 7no, Em- bryology models- 1 no, Bones- 1 no, X-Ray-1 no)	10	One General histology Slide discussion	10
Specimen discussion: 2*10 marks (one specimen above di- aphragm & one specimen below diaphragm)	20	One systemic histology Slide discussion	10
Surface marking 1*10marks	10	Total	30
Total	50		

3. Viva- Voce: 20 marks and it will be added to practical exam marks.

- 4 stations * 05 marks = 20 marks
- Stations:
 - Radiology
 - Embryology models/ charts
 - Above diaphragm (Ostology)
 - Below diaphragm (Osteology)

LEARNING RESOURCE MATERIALS

Recommended books: Recent Editions.

I. Gross Anatomy

- Dissection manual with regional & applied anatomy by Mercy navis (3 volumes)
- Cunningham's Manual of Practical Anatomy by G.J.Romanes. Vol I, II & III, Published by Oxford University Press
- Grants Atlas of Anatomy by A.Agur, published by M.Lec
- Clinical Anatomy by Regions by R.S.Snell, published by Little brown & Company, Boston
- Text book of Anatomy by IB Singh (3volumes), published by Jaypee
- Text book of Anatomy by BD Chaurasia (3volumes), published by CBS
- Text book of Anatomy by Vishram Singh (3volumes), published by Elsevier
- Gray's Anatomy for Students, published by Elsevier

II. Histology

- Difiore's - Atlas of Histology with functional correlation, published by Lippincott Williams and Wilkins
- Text book of Human Histology by I.B.Singh, published by Jaypee brothers
- Text book of Histology by Gunasegaran, published by Elsevier

III. Developmental Anatomy/Embryology

- Langman's medical Embyology, published by Lippincott Williams and Wilkins
- Text book of Embryology by I.B.Singh published by Jaypee brothers
- Text book of Embryology by Vishram Singh, published by Elsevier

IV. Neuroanatomy

- Text book of Neuroanatomy by I.B.Singh, published by Jaypee brothers
- Text book of Neuroanatomy by Vishram Singh, published by Elsevier

V. Osteology

- Text book of osteology by Poddar, Published by Scientific Book Company
- Text book of osteology by I.B.Singh, published by Jaypee brothers

VI. Surface and Radiological Anatomy

- Surface and Radiological Anatomy-A. Halim & A.C.Das, published by CBS

VII. Genetics

- Text book of Genetics by S.D.Gangane, published by Elsevier

VIII. General Anatomy

- Hand book of General Anatomy by B.D.Chaurasia, published by CBS
- General Anatomy by Shoba Rawalani, published by Jaypee brothers

IX. Reference books, Recent Editions. I Gross Anatomy

- Gray's Anatomy by Susan Standring
- Clinical Anatomy by Keith Moore, published by Lippincott Williams and Wilkins
- Text book of Anatomy by R.J.Last, published by Churchill Livingstone

X. Histology

- Histology; A text & Atlas By M.H. Ross, published by W. Pawalina Lippincott Williams & Williams
- Basic Histology by Luiz.C.Janqueira, published by Mc Graw Hill
- Wheaters Functional Anatomy, published by Elsevier

XI. Developmental Anatomy/Embryology

- The Developing Human by Moore & Persaud, published by Lippincott Willams and Wilkins
- Human Embryology by William J. Larsen, published by Elsevier
- Essentials of Human Embryology by A.K.Datta published by Current books international

XII. Neuroanatomy

- Clinical Neuroanatomy by Richard S.Snell, published by Lippincott Williams & Wilkins
- Human Neuroanatomy by Malcolm B Carpenter, published by Williams & Wilkins
- Essentials of Neuroanatomy by A.K.Datta, published by Current books international

XIII. Genetics

- Essential Medical Genetics by J.M. Connor, published by Blackwell Science Inc
- Oxford text book of Medical Genetics.

XIV. CDs & Internet:

- A.D.A.M. (Animated Dissection of Anatomy for Medicine) Comprehensive for Windows. Publisher: A.D.A.M. Software Inc.
- A.D.A.M. Interactive Anatomy, Publisher: A.D.A.M. Software Inc.
- Cardioviewer 3D: CD-ROM, ISBN: 0-8151-3106-2, publication date: 1996 Imprint: MOSBY (Marketed by Elsevier)
- Histology/pathology slides: <http://www.virtualslides.psu.edu/listSlides.jsp>
- Collection of Links to Anatomical resources on the internet: <http://www.west.asu.edu/jbuenke/medicine/anatomy.html>

XV.Suggested topics for e-learning in Anatomy (Recommended to assist and supplement teaching)

- Fertilization
- Cleavage
- Implantation
- Post Natal Growth and Development
- Development of Pharyngeal arches, clefts, pouches.
- Descending tracts of Central Nervous System
- Ascending tracts of Central Nervous system
- Medical Genetics - common syndromes
- Visual pathways and visual areas
- Major Joints & Movements

Competencies & Specific Learning Objectives with, Integration, Teaching learning & Assessment methods

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching-Learning Methods	Assessment Methods	Integration
AN1.1	Demonstrate normal anatomical position, various planes, relation, comparison, laterality & movement in our body	K/S	SH	Y	Lecture: 1 Hr Demonstration and tutorials (small groups) – 1hr	Assessment methods: MCQ's Viva-voce	
Sub competency / SLO	<ol style="list-style-type: none"> 1. Discuss normal anatomical position of the human body 2. Discuss other anatomical positions in clinical practice 3. Discuss the three fundamental anatomical planes of the body 4. Discuss anatomical terms to understand the relationship between body parts and structures 5. Discuss the anatomical terms in limbs 6. Discuss the terms to describe joint movements 7. Demonstrate the various movements of the synovial joint 						
AN 1.2	Describe composition of bone and bone marrow	K	KH	Y	Lecture :1hr	Short answer, MCQ's	
Sub competency / SLO	<ol style="list-style-type: none"> 1. Describe the classification of bones with examples 2. Discuss the periosteum – definition, structure and functions 3. Describe the composition of bone – cells and matrix 4. Describe the Haversian system 5. Discuss the bone marrow – types, location and clinical importance 						
General features of bones & Joints							
AN2.1	Describe parts, blood and nerve supply of a long bone	K	KH	Y	Lecture – 1hr Demonstration (small groups) – 1hr	Short answer, MCQ's	
Sub competency / SLO	<ol style="list-style-type: none"> 1. Describe the parts of developing long bone 2. Describe the types of epiphysis 3. Describe the blood supply of long bone 4. Discuss the nerve supply of long bone 5. Describe the clinical significance of blood supply of 						

AN2.2 Sub competen cy / SLO	long bone	K	KH	N	Lecture – 1hr Small group discussion-1hr	Short answer, MCQ's	
	Enumerate laws of ossification 1. Definition of ossification 2. Describe the types of ossification 3. Discuss the steps in intramembranous and endochondral ossification 4. Discuss the ossification centres 5. Describe the laws of ossification 6. Discuss the growth of a long bone – Appositional and endochondral 7. Describe the structure of epiphyseal plate of cartilage 8. Describe the anatomical significance in the repair of a fractured bone						
AN2.3 Sub competen cy / SLO	Enumerate special features of a sesamoid bone 1. Define sesamoid bone 2. Discuss the location of sesamoid bones in the body 3. Describe the special features of sesamoid bones 4. enumerate the functions of sesamoid bones	K	KH	N	Lecture Small groups discussion	Short answer, MCQ's Spotters	
	AN2.4 Sub competen cy / SLO	Describe various types of cartilage with its structure & distribution in body 1. Discuss the characteristic features of cartilage 2. Discuss the types of cartilage 3. Discuss the structure of hyaline, elastic and white fibro cartilage with examples 4. Describe the location of different types of cartilages with anatomical significance 5. Discuss the growth of cartilage 6. Identify the slide of hyaline, elastic and white fibro cartilage correctly	K	KH	Y	Lecture – 1hr Demonstration histology slides (small groups) – 2hr	Short essay Short answer, MCQ's Spotters Slide discussion
AN2.5	Describe various joints with subtypes and examples	K	KH	Y	Lecture: 1hr	Short essay	Orthopedics

Sub competency / SLO	<ol style="list-style-type: none"> Describe the classification of joints according to their structure and function Define the fibrous joints Describe the types of fibrous joints with examples Define the cartilaginous joints Describe the types of cartilaginous joints with examples Describe the structure of a typical synovial joint Describe the anatomical importance of the components of synovial joints Describe the classification of synovial joint with examples Describe & demonstrate the various movements of synovial joints Describe the axis of movements 					Small groups: 2hr	Short answer, MCQ's Viva voce	
AN2.6	Explain the concept of nerve supply of joints & Hilton's law	K	KH	Y		Lecture	Short answer, MCQ's Viva-Voce	
Sub competency / SLO	<ol style="list-style-type: none"> Discuss the articular nerves supplying synovial joint Discuss the sensory nerves and proprioceptive fibres supplying synovial joint Describe the Hilton's law 							

Topic: General features of Muscle								
AN3.1	Classify muscle tissue according to structure & action	K	KH	Y		Lecture – 1hr	Short essay, Short answer, MCQ's	Physiology
Sub competency / SLO	<ol style="list-style-type: none"> Classify the muscles based on structure Describe origin & insertion of muscle Classify the skeletal muscle based on direction of the muscle fibers with examples Describe spiral & cruciate muscle with examples Describe the actions of skeletal muscle 							
AN3.2	Enumerate parts of skeletal muscle and differentiate between tendons and aponeuroses with examples	K	KH	Y		Lecture	Short answers,	

Sub competency / SLO	1. Discuss the parts of skeletal muscle 2. Describe the difference between tendons and aponeuroses with examples 3. Discuss the functions of tendon & aponeuroses Explain Shunt and spurt muscles	K	KH	N	Lecture	MCQ's MCQ's Viva-Voce	
Topic: General features of skin and fascia							
AN4.1	Describe different types of skin & dermatomes in body 1. Describe the types of skin 2. Describe the surface irregularities of skin 3. Discuss the nerve supply to skin 4. Define the dermatome and describe its clinical importance	K	KH	N	Lecture	Short answers, MCQ's	
AN4.2	Describe structure & function of skin with its appendages 1. Describe the microscopic structure of thick skin 2. Describe the microscopic structure of thin skin 3. Discuss the functions of skin 4. Describe the appendages of skin 5. Describe the structure of hair follicle 6. Describe the types and structure of sweat gland 7. Describe the structure of sebaceous gland 8. Describe the structure of nail 9. Identify the slide of thick & thin skin correctly 10. Draw a neat labelled diagram of thick & thin skin accurately	K	KH	Y	Lecture – 1hr Histology slide demonstration & discussion – 2hrs	Short essay, Short answer, MCQ's OSPE	Dermatology , Venereology & Leprosy

AN4.3	Describe superficial fascia along with fat distribution in body 1. Describe the characteristic features of superficial fascia 2. Discuss the functions of superficial fascia 3. Describe the features of adipose tissue 4. Describe the types of adipose tissues 5. Discuss the functions of adipose tissue 6. Describe the distribution of adipose tissue with clinical significance	K	KH	Y	Lecture – 1hr	Short answer, MCQ's Viva-Voce	
AN4.4	Describe modifications of deep fascia with its functions 1. Describe the characteristic features of deep fascia 2. Describe the functions of deep fascia 3. Describe the modifications & location of deep fascia with its anatomical significance	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short essay, Short answer, MCQ's Viva-Voce	Dermatology, Venereology & Leprosy
AN4.5	Explain principles of skin incisions 1. Describe the surface patterns of skin 2. Discuss the surgical significance of Langer's lines 3. Describe the principles of skin incision	K	KH	N	Lecture	Short answer, MCQ's	Dermatology, Venereology & Leprosy
General features of the cardiovascular system							
AN5.1	Differentiate between blood vascular and lymphatic system 1. Define lymphatic system 2. Differentiate between blood vascular and lymphatic system	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	Physiology
AN5.2	Differentiate between pulmonary and systemic circulation 1. Discuss the types of circulation 2. Describe the pulmonary circulation 3. Describe the systemic circulation 4. Describe the difference between pulmonary & systemic circulation	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	Physiology
AN5.3	List general differences between arteries & veins 1. Enumerate the components of cardiovascular system 2. Describe the classification of blood vessels 3. Enumerate the difference between arteries & veins	K	KH	Y	Lecture	Short answer, MCQ's Viva-Voce	
AN5.4	Explain functional difference between elastic, muscular arteries and arterioles	K	KH	Y	Lecture	Short answer,	

	<ol style="list-style-type: none"> Describe the types of arteries with its functions Describe the functions of elastic, muscular arteries & arterioles Discuss the resistance function of arterioles Describe the functional difference between elastic, muscular arteries & arterioles 						MCQ's Viva-Voce	
AN5.5	<p>Describe portal system giving examples</p> <ol style="list-style-type: none"> Define the portal system with examples Describe the hepatic portal circulation Describe the hypothalamo-hypophyseal portal circulation Describe the renal portal circulation 	K	KH	Y	Lecture	Short answer, MCQ's Viva-Voce		
AN5.6	<p>Describe the concept of anastomoses and collateral circulation with significance of end-arteries</p> <ol style="list-style-type: none"> Define anastomoses Discuss the types of anastomoses with anatomical significance Describe the arterial anastomosis Describe the actual and potential types of arterial anastomosis Describe the arterio-venous anastomosis with its functional significance Discuss the end arteries and its importance 	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	General Medicine Physiology	
AN5.7	<p>Explain function of meta-arterioles, precapillary sphincters, arterio-venous anastomoses</p> <ol style="list-style-type: none"> Describe the meta-arterioles with its functional significance Describe the precapillary sphincters with its functional significance Describe the capillaries with its functional significance Describe the types of capillaries Describe arterio-venous anastomoses with its functional significance 	K	KH	N	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	Physiology	
AN5.8	<p>Define thrombosis, infarction & aneurysm</p> <ol style="list-style-type: none"> Define thrombosis with clinical significance Define infarction with clinical significance 	K	KH	N	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	Pathology Physiology	

	3. Define aneurysm with clinical significance								
Topic: General Features of lymphatic system									
AN6.1	List the components and functions of the lymphatic system 1. Discuss the components of lymphatic system 2. Discuss the formation of lymph 3. Discuss the formation of lymph vessels and ducts 4. Discuss the functions of lymphatic system 5. Enumerate the primary and secondary lymphoid organs 6. Describe the types of lymphocytes	K	KH	N	Lecture – 1hr Histology slide discussion – 2hrs	Short answer, MCQ's Viva-Voce			
AN6.2	Describe structure of lymph capillaries & mechanism of lymph circulation 1. Discuss the structure of lymph capillaries 2. Define the factors helping the tissue fluid to enter the lymph capillaries 3. Discuss the formation of lymph vessels and ducts 4. Discuss the factors responsible for the drainage of lymph	K	KH	N	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's			
AN6.3	Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system 1. Describe lymphoedema with its clinical significance 2. Describe the concept of spread of tumors via lymphatics 3. Describe the concept of spread of tumors via venous system	K	KH	N	Lecture Case based discussion Tutorials	Short answer, MCQ's Viva-Voce			General Surgery
Topic: Introduction to the nervous system									
AN7.1	Describe general plan of nervous system with components of central, peripheral & autonomic nervous systems	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's			

	<ol style="list-style-type: none"> 1. Discuss the division of nervous system 2. Discuss the components of central nervous system 3. Discuss the location and extent of spinal cord 4. Discuss the components of peripheral nervous system 5. Differentiate between the cranial nerves and spinal nerves 6. Describe the components of autonomic nervous system 7. Differentiate between the sympathetic and parasympathetic nervous systems 						Viva-Voce	
AN7.2	<p>List components of nervous tissue and their functions</p> <ol style="list-style-type: none"> 1. Discuss the components of nervous tissue 2. Name the components of non-excitabile cells (neuroglia) of nervous tissue 3. Describe the types of neuroglial cells and their functions 	K	KH	Y	Lecture	Short answer, MCQ's Viva-Voce	Physiology	
AN7.3	<p>Describe parts of a neuron and classify them based on number of neurites, size & function</p> <ol style="list-style-type: none"> 1. Enumerate the parts of neuron 2. Describe the features of cell body, axon and dendrites 3. Describe the formation of myelin sheath in CNS & PNS 4. Classify the neurons based on the number of neuritis with example 5. Classify the neurons based on the size of neurons with example 6. Classify the neurons based on the function of neurons with example 	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	Physiology	
AN7.4	<p>Describe structure of a typical spinal nerve</p> <ol style="list-style-type: none"> 1. Define the spinal nerve and discuss the number of spinal nerves 2. Describe the structure of a typical spinal nerve 3. Describe the formation of spinal nerve 	K	KH	Y	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce		
AN7.5	<p>Describe principles of sensory and motor innervation of muscles</p> <ol style="list-style-type: none"> 1. Describe the principle of motor nerve supply of extrafusal & intrafusal fibers 2. Describe the principle of sensory nerve supply of muscle fiber 	K	KH	N	Lecture – 1hr Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	General Medicine Physiology	

	3. Describe the neuro muscular junction												
AN7.6	Describe concept of loss of innervation of a muscle with its applied anatomy 1. Define of upper motor neuron 2. Define of lower motor neuron 3. Discuss the nerve supply to skeletal muscle from ventral rami of spinal nerve 4. Discuss the UMN lesion 5. Discuss the LMN lesion 6. Discuss the differences between the spastic and flaccid paralysis	K	KH	Y	Lecture – 1hr Case based discussion Tutorials – 2hrs	Short answer, MCQ's Viva-Voce	General Medicine						
AN7.7	Describe various type of synapse 1. Define the synapse 2. Describe the structure of synapse 3. Discuss the types of synapses 4. Describe the properties of synapse	K	KH	N	Lecture – 1hr	MCQ's Viva-Voce	Physiology						
AN7.8	Describe differences between sympathetic and spinal ganglia 1. Define ganglia 2. Differentiate between sympathetic & spinal ganglia	K	KH	N	Lecture – 1hr	Short answer, MCQ's							
Topic: Features of individual bones (Upper Limb)													
AN8.1	Identify the given bone, its side, important features & keep it in anatomical position 1. Identify clavicle and its side correctly 2. Hold the clavicle in anatomical position correctly 3. Demonstrate the parts of clavicle correctly 4. Identify scapula and its side correctly 5. Hold the scapula in anatomical position correctly 6. Identify & demonstrate the parts of scapula 7. Identify humerus and its side correctly 8. Hold humerus in anatomical position 9. Describe the events at middle of shaft of humerus 10. Identify ulna and its side correctly 11. Hold ulna in anatomical position 12. Demonstrate the parts of ulna correctly 13. Identify radius and its side 14. Hold radius in anatomical position	K/S	SH	Y	Small group discussion, DOAP,	Knowledge: Short answers, MCQ's Skill: Spotters, OSPE Viva-Voce							

	15. Demonstrate the parts of radius correctly							
AN8.2	Identify & describe joints formed by the given bone 1. Describe the joints formed by the given bone of upper limb 2. Identify & demonstrate the joints formed by the given bone of upper limb correctly	K/S	SH	Y	Small group discussion, DOAP,	Short answers, MCQ's OSPE Viva - Voce		
AN8.3	Enumerate peculiarities of clavicle	K	KH	Y	Lecture DOAP	Knowledge: Short answers, MCQ's Skill: Spotters Viva-Voce		
AN8.4	Demonstrate important muscle attachment on the given bone 1. Demonstrate the structures attached to clavicle accurately 2. Demonstrate the structures attached to scapula accurately 3. Demonstrate the structures attached to humerus accurately 4. Demonstrate the structures attached to the ulna accurately 5. Demonstrate the structures attached to radius accurately 6. Demonstrate the structures attached to the bones in articulated hand	K/S	SH	Y	Small group discussion, DOAP,	Knowledge: Short answers, MCQ's Skill: Spotters, OSPE Viva - Voce		Orthopedics
AN8.5	Identify and name various bones in articulated hand, Specify the parts of metacarpals and phalanges and enumerate the peculiarities of pisiform 1. Identify the carpal, Metacarpal & phalanges in articulated hand 2. Name the carpal bones in order 3. Demonstrate the parts of metacarpals & phalanges correctly 4. Enumerate the peculiarities of pisiform 5. Describe the structures attached to bones of hand	K/S	SH	Y	Small group discussion, DOAP,	Knowledge: Short answers, MCQ's Skill: Spotters, OSPE Viva - Voce		
AN8.6	Describe scaphoid fracture and explain the anatomical basis of avascular necrosis 1. Describe the causes for scaphoid fracture 2. Describe the blood supply of scaphoid bone 3. Enumerate the complications of scaphoid fracture 4. Describe the anatomical basis of avascular necrosis	K	KH	N	Case based discussion Video demonstration	MCQ,S Viva – Voce		Orthopedics

Topic: Pectoral region						
AN9.1	Describe attachment, nerve supply & action of pectoralis major and pectoralis minor	K	KH	Y	Lecture Dissection demonstration	Knowledge: Short essay, short answers, MCQ,s Skill: Spotters, Specimen discussion, OSPE Viva-Voce
	<ol style="list-style-type: none"> 1. Identify pectoralis major and pectoralis minor correctly 2. Describe and demonstrate the attachments of pectoralis major and pectoralis minor accurately 3. Describe the relations of pectoralis major and pectoralis minor 4. Describe the actions of Muscles 5. Describe the nerve supply of the muscle 6. Demonstrate the relations of pectoralis major and pectoralis minor precisely 7. Demonstrate the actions of pectoralis major & minor accurately 8. Demonstrate the arteries and nerves innervating the pectoralis major and pectoralis minor accurately 9. Discuss the anatomical basis of Poland's anomaly 					
AN9.2	Breast: Describe the location, extent, deep relations, structure, age changes, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast	K	KH	Y	Lecture Dissection demonstration	Knowledge: Long essay, Short essay, short answers,
						General Surgery

	<ol style="list-style-type: none"> 1. Discuss and demonstrate the location and extent of Mammary gland 2. Describe & demonstrate the relations of mammary gland correctly 3. Describe the clinical importance of retro-mammary space 4. Describe the age related changes in the Mammary Gland 5. Describe the blood supply of Mammary gland 6. Describe the lymphatic drainage of the gland 7. Identify & demonstrate the blood vessels supplying the mammary gland precisely 8. Describe the anatomical significance of signs & symptoms of carcinoma of breast- 'peau d'orange sign, edema, retraction of skin etc 9. Describe the anatomical basis of spread of malignancy of breast to other parts through lymphatic and venous route 10. Discuss the investigation of choice in case of Carcinoma of Breast 11. Discuss the microscopic structure of mammary gland 12. Enumerate the parenchyma of mammary gland 13. Discuss the hormonal changes on mammary gland. 14. Identify and draw a neat labelled diagram of the microscopic structure of mammary gland correctly 			<p>CQ's</p> <p>Skill: Spotters, Slide discussion with identification of structures OSPE</p> <p>Viva-Voce</p>	
AN9.3	<p>Describe development of breast</p> <ol style="list-style-type: none"> 1. Describe the various stages involvement in the development of Mammary gland 2. Discuss the developmental anomalies of Mammary gland 	N	Lecture, video demonstration	<p>MCQ's</p> <p>Viva-voce</p>	
AN9.4	<p>Describe and demonstrate the clavipectoral fascia</p> <ol style="list-style-type: none"> 1. Describe the attachments of clavipectoral fascia 2. Demonstrate the structures piercing the clavipectoral fascia correctly 	Y	Lecture, Dissection demonstration,	<p>Knowledge: Short answers, MCQ's</p> <p>Skill: Spotters</p>	

Topic: Axilla, Shoulder and Scapular region						
AN10.1	Identify & describe boundaries and contents of axilla	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: specimen discussion, spotters, Viva-Voce
	<ol style="list-style-type: none"> Describe the location & boundaries of Axilla Identify and demonstrate the boundaries of Axilla correctly Describe the contents of Axilla Identify and demonstrate the contents of Axilla accurately 					
AN10.2	<p>Identify, describe and demonstrate the origin, extent, course, parts, relations and branches of axillary artery & tributaries of vein</p> <ol style="list-style-type: none"> Identify and describe the origin and extent of Axillary artery Identify and describe the course and parts of Axillary artery Identify and describe the relations of 3 parts of Axillary artery Demonstrate the relations of 3 parts of Axillary artery correctly Identify and demonstrate the branches of Axillary artery Describe the formation, course & tributaries of Axillary Vein Identify & demonstrate the tributaries of Axillary Vein precisely Describe Axillary vein thrombosis 	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: specimen discussion, spotters, Viva-Voce
AN10.3	<p>Describe, identify and demonstrate formation, branches, relations, area of supply of branches, course and relations of terminal branches of brachial plexus</p> <ol style="list-style-type: none"> Describe the location and formation of Brachial plexus Identify the formation of Brachial plexus correctly Describe the branches of Brachial plexus Identify & demonstrate the branches of Brachial plexus correctly Describe the area supplied by the branches of Brachial plexus 	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce
AN10.4	Describe the anatomical groups of axillary lymph nodes	K	KH	Y	Lecture, dissection	Knowledge;, Viva-Voce
						General

	and specify their areas of drainage				demonstration, Video demonstration	short essay, short answers, MCQ's Viva-Voce	Surgery
	<ol style="list-style-type: none"> List the axillary group of lymph node Describe the location of axillary group of lymph nodes Describe the areas drained by individual group of lymph nodes. Discuss the clinical importance of Axillary Lymphadenopathy 	K	KH	Y	Lecture	MCQ's Vive-Voce	
AN10.5	Explain variations in formation of brachial plexus						
	<ol style="list-style-type: none"> Describe the pre fixed formation of Brachial plexus Describe the post fixed formation of Brachial plexus Discuss the clinical implications of these variations 						
AN10.6	Explain the anatomical basis of clinical features of Erb's palsy and Klumpke's paralysis	K	KH	N	Lecture Video demonstration	Short answers, MCQ'S OSPE Viva-Voce	General Surgery
	<ol style="list-style-type: none"> Describe the anatomical basis of clinical features Erb's paralysis Describe the causes for Erb's paralysis Describe the position of upper limb in Erb's paralysis Discuss the muscles & nerve involved in Erb's paralysis Describe the anatomical basis of clinical features of Klumpke's paralysis Describe the causes for Klumpke's paralysis Describe the position of upper limb in Klumpke's paralysis Discuss the muscles & nerve involved in Klumpke's paralysis 						
AN10.7	Explain anatomical basis of enlarged axillary lymph nodes	K	KH	N	Lecture	MCQ'S OSPE Viva-Voce	General Surgery
	<ol style="list-style-type: none"> Describe the anatomical basis of Axillary lymph node enlargement. Demonstrate the methods of palpation of Axillary lymph nodes. 						
AN10.8	Describe, identify and demonstrate the position, attachment, nerve supply and actions of trapezius and latissimus dorsi	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short	

	<ol style="list-style-type: none"> 1. Identify the Trapezius & Latissimus dorsi correctly 2. Describe the attachments of Trapezius & Latissimus dorsi. 3. Describe the nerve supply and actions of trapezius and Latissimus dorsi 4. Demonstrate the attachments of Trapezius & Latissimus dorsi accurately 5. Demonstrate the actions of Trapezius & Latissimus dorsi correctly 	
		<p>answers, MCQ's</p> <p>Skill: specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>

<p>AN10.9</p> <p>Describe the arterial anastomosis around the scapula and mention the boundaries of triangle of auscultation</p> <ol style="list-style-type: none"> 1. Describe the anastomosis around the scapula 2. Identify and demonstrate the arteries involved in the anastomosis around scapula 3. Discuss the clinical importance of the anastomotic channels 4. Describe the boundaries of triangle of Auscultation 5. Identify and demonstrate the boundaries of triangle of Auscultation 6. Discuss the clinical significance of triangle of Auscultation 	<p>K/S</p>	<p>KH</p>
<p>N</p>	<p>Lecture, dissection demonstration</p>	<p>Short essay, short answers, MCQ's</p>

AN10.10	<p>Describe and identify the deltoid and rotator cuff muscles</p> <ol style="list-style-type: none"> Describe the attachments of deltoid muscle Identify and demonstrate the attachments of Deltoid muscle accurately Describe the actions of deltoid muscle Demonstrate the actions of deltoid muscle correctly Describe the nerve supply of Deltoid muscle Identify the nerve supplying the Deltoid muscle Describe the structures undercover of deltoid muscle Demonstrate the structures undercover of deltoid muscle Discuss the site of injection on deltoid muscle. Describe the anatomical significance of IM injection to deltoid muscle List the components of rotator cuff muscle Describe the attachments, actions & nerve supply of subscapularis Describe the attachments, actions & nerve supply of supraspinatus Describe the attachments, actions & nerve supply of infraspinatus Describe the attachments, actions & nerve supply of teres minor Identify & demonstrate the rotator cuff muscles correctly Describe the rotator cuff injuries and its clinical implications 	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce
AN10.11	<p>Describe & demonstrate attachment of serratus anterior with its action</p> <ol style="list-style-type: none"> Describe the attachments & actions of serratus anterior muscle Demonstrate the attachments & actions of serratus anterior muscle correctly Describe the nerve supply of serratus anterior muscle Identify & demonstrate the nerve supply of serratus anterior muscle correctly Describe the winging of scapula 	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce

	6. Demonstrate the clinical testing of serratus anterior muscle correctly								
AN10.12	Describe and demonstrate shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy 1. Name the type and bones forming the shoulder joint 2. Identify and demonstrate the articular surfaces of Shoulder joint correctly 3. Describe the relations of Shoulder joint 4. Demonstrate the relations of shoulder joint 5. Describe the factors maintaining the stability of shoulder joint 6. Describe the ligaments of shoulder joint 7. Identify and demonstrate the ligaments of shoulder joint accurately 8. Describe the movements of Shoulder joint. 9. Demonstrate the movements of Shoulder joint correctly 10. Discuss the blood and nerve supply of shoulder joint 11. Describe the bursae related to the shoulder joint 12. Describe shoulder dislocation and its clinical & anatomical significance 13. Describe and discuss frozen shoulder	K/S	SH	Y	Lecture, dissection demonstration, Video demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	Orthopedics		
AN10.13	Explain anatomical basis of Injury to axillary nerve during intramuscular injections 1. Identify and demonstrate the axillary nerve. 2. Describe the origin, course and branches of Axillary nerve. 3. Demonstrate the branches of axillary nerve correctly 4. Describe the structures innervated by axillary nerve 5. Describe the reasons for Axillary nerve injury 6. Explain the anatomical basis of injury to Axillary nerve during intramuscular injection.	K	KH	N	Lecture, video demonstration	MCQ's Viva-Voce			
AN10.14	Describe & demonstrate attachment of teres major with its action and nerve supply	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short answers,			

	<ol style="list-style-type: none"> Describe the attachments & actions of teres major muscle Demonstrate the attachments & actions of teres major muscle correctly Describe the nerve supply of teres major muscle Identify & demonstrate the nerve supply of teres major muscle correctly 							MCQ's Skill: specimen discussion, spotters, Viva-Voce	
AN10.15	Describe & demonstrate the boundaries and structures passing through subscapular spaces	K/S	SH	Y			Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, Viva-Voce	
	<ol style="list-style-type: none"> Describe the boundaries & structures passing through quadrangular space Identify and demonstrate the boundaries and structures passing through quadrangular space correctly Describe the boundaries & structures passing through upper triangular space Identify and demonstrate the boundaries and structures passing through upper triangular space correctly Describe the boundaries & structures passing through lower triangular space Identify and demonstrate the boundaries and structures passing through lower triangular space correctly 								
Topic: Arm & Cubital fossa									
AN11.1	Describe and demonstrate muscle groups of upper arm with emphasis on biceps and triceps brachii	K/S	SH	Y			Lecture, dissection	Knowledge: short essay,	

<p>N11.2</p>	<ol style="list-style-type: none"> 1. Describe the compartments of arm 2. Describe the attachments, actions & nerve supply of biceps brachii 3. Identify & demonstrate the attachments, actions & nerve supply of biceps brachii accurately 4. Demonstrate the biceps jerk accurately 5. Describe the attachments, actions & nerve supply of brachialis 6. Identify & demonstrate the attachments, actions & nerve supply of brachialis accurately 7. Describe the attachments, actions & nerve supply of coracobrachialis 8. Identify & demonstrate the attachments, actions & nerve supply of coracobrachialis accurately 9. Describe the attachments, actions & nerve supply of triceps brachii 10. Identify & demonstrate the attachments, actions & nerve supply of triceps brachii accurately 11. Describe the clinical significance of nerve supply of triceps brachii 	<p>K/S</p>	<p>SH</p>	<p>Y</p>	<p>demonstration</p>	<p>short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce</p>	
<ol style="list-style-type: none"> 1. Describe the origin & course of musculocutaneous nerve 2. Describe the branches & distribution of musculocutaneous nerve 3. Demonstrate the origin, course & branches of musculocutaneous nerve correctly 4. Describe the origin, course, termination, relations & branches of brachial artery 5. Identify & demonstrate the course, relations & branches of brachial artery accurately 6. Describe the anatomical significance of brachial artery pulse 7. Describe the clinical significance of brachial artery 8. Describe the formation, course & relations of median nerve in arm 9. Describe the branches & distribution of median nerve in arm 	<p>Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels in arm</p>	<p>K/S</p>	<p>SH</p>	<p>Y</p>	<p>Lecture, dissection demonstration, Video demonstration</p>	<p>Knowledge: long essay, short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce</p>	

	<p>10. Identify & demonstrate the formation, relations & branches of median nerve in arm accurately</p> <p>11. Describe the origin, course & relations of ulnar nerve in arm</p> <p>12. Identify & demonstrate the relations of ulnar nerve in arm correctly</p> <p>13. Describe the origin, course & relations of radial nerve in arm</p> <p>14. Describe the branches & distribution of radial nerve in arm</p> <p>15. Identify & demonstrate the relations & branches of radial nerve in arm correctly</p> <p>16. Describe the formation & tributaries of dorsal venous arch</p> <p>17. Identify & demonstrate the dorsal venous arch correctly</p> <p>18. Describe the formation, course & termination of cephalic vein</p> <p>19. Identify & demonstrate the cephalic vein correctly</p> <p>20. Describe the formation, course & termination of basilic vein</p> <p>21. Identify & demonstrate the basilic vein accurately</p> <p>22. Describe the anatomical significance of basilic vein in cardiac catheterization</p> <p>23. Describe the course and branches of profunda brachii artery</p> <p>24. Identify the branches of profunda brachii artery correctly</p>					
AN11.3	Describe the anatomical basis of Venepuncture of cubital veins	K	KH	Y	Lecture, video demonstration	General surgery
	<p>1. Describe the location of median cubital vein</p> <p>2. Explain the anatomical basis of choosing median cubital vein for venepuncture and intra venous injections</p>				MCQ'S, OSPE Viva-Voce	Short answers,
AN11.4	Describe the anatomical basis of Saturday night paralysis	K/S	KH/SH	Y	Lecture, Small	Orthopaedics

	<ol style="list-style-type: none"> Describe the boundaries & content of radial groove Demonstrate the boundaries of radial groove correctly Identify the contents of radial groove correctly Describe the anatomical basis of Saturday night palsy 					group discussion, DOAP	MCQ's, OSPE	
AN11.5	<p>Identify & describe boundaries and contents of cubital fossa</p> <ol style="list-style-type: none"> Describe the location of cubital fossa Describe boundaries & contents of cubital fossa Identify and demonstrate the boundaries and contents of cubital fossa accurately Discuss the anatomical significance of cubital fossa 	K/S	SH	Y		Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	
AN11.6	<p>Describe the anastomosis around the elbow joint</p> <ol style="list-style-type: none"> Describe the arteries taking part in anastomoses around elbow Describe the arteries taking part in anastomoses in front of medial epicondyle Describe the arteries taking part in anastomoses behind medial epicondyle 	K	KH	N		Lecture	Short answers, MCQ's Viva-Voce	
Topic: Forearm & hand								
AN12.1	<p>Describe and demonstrate important muscle groups of ventral forearm with attachments, nerve supply and actions</p> <ol style="list-style-type: none"> List the superficial & deep group muscles of front of forearm Describe the attachments & actions of superficial & deep muscles of front of forearm Describe the nerve supply & blood supply of superficial & deep muscles of front of forearm Identify the muscles of front of forearm Demonstrate the attachments & actions of superficial & deep muscles of front of forearm correctly Demonstrate the nerve supplying the muscles of front of forearm correctly Demonstrate the clinical testing of muscles of forearm accurately 	K/S	SH	Y		Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	

AN12.2	<p>Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of forearm</p> <ol style="list-style-type: none"> 1. Describe the origin, course & relations of median nerve in forearm 2. Describe the branches & distribution of median nerve in forearm 3. Identify & demonstrate the relations & branches of median nerve in forearm accurately 4. Describe the origin, course & relations of ulnar nerve in forearm 5. Describe the branches & distribution of ulnar nerve in forearm 6. Identify & demonstrate the relations & branches of ulnar nerve in forearm correctly 7. Describe the origin, course & relations of ulnar artery in forearm 8. Describe the branches and area of distribution of ulnar artery in forearm 9. Identify & demonstrate the course & branches of ulnar artery correctly 10. Describe the origin, course & relations of radial artery in forearm 11. Describe the branches and area of distribution of radial artery in forearm 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: long essay, short essay, short answers, MCQ's</p> <p>Skill: specimen discussion, spotters, OSPE Viva-Voce</p>	
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	<p>12. Identify & demonstrate the course & branches of radial artery correctly</p> <p>13. Describe the anatomical significance of radial pulse</p> <p>14. Demonstrate the radial pulse accurately</p> <p>15. Describe the anatomical significance of variations in the origin, course & branching pattern of ulnar & brachial artery</p> <p>16. Describe the anatomical significance of Volkmann's ischemic contracture</p>						
AN12.3	Identify & describe flexor retinaculum with its attachments	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: specimen discussion, spotters, Viva-Voce</p>	
	<ol style="list-style-type: none"> 1. Describe the location & attachments of flexor retinaculum of hand 2. Describe the relations of flexor retinaculum of hand 3. Describe structures passing deep to flexor retinaculum of hand 4. Discuss the anatomical importance of flexor retinaculum 5. Identify the flexor retinaculum correctly 6. Demonstrate the structures passing deep to flexor retinaculum of hand correctly 7. Describe the formation and attachments of palmar aponeurosis 8. Describe the features/ parts of palmar aponeurosis 9. Describe the functions of palmar aponeurosis 						

	10. Identify & demonstrate the parts of palmar aponeurosis 11. Describe the anatomical significance of Dupuytren's contracture							
AN12.4	Explain anatomical basis of carpal tunnel syndrome 1. Demonstrate the location & formation of carpal tunnel 2. Describe the anatomical basis of carpal tunnel syndrome. 3. Describe the clinical features of carpal tunnel syndrome	K	KH	Y	lecture, video demonstration	short answers, MCQ's, OSPE		
AN12.5	Identify & describe small muscles of hand.	K/S	SH	Y	Lecture, dissection	Knowledge:		

	<ol style="list-style-type: none"> 1. Describe the clinical importance of flexor creases of palm 2. List the thenar muscles 3. Describe the attachment, action & nerve supply of palmaris brevis 4. Describe the attachments and actions of thenar muscles 5. Describe the nerve supply of thenar muscles 6. Identify the thenar muscles 7. Demonstrate the actions of thenar muscles 8. List the hypothenar muscles 9. Describe the attachments and actions of hypothenar muscles 10. Describe the nerve supply of hypothenar muscles 11. Identify the hypothenar muscles 12. Demonstrate the actions of hypothenar muscles 13. Describe the attachment, action & nerve supply of adductor pollicis muscle 14. Demonstrate the clinical testing of adductor pollicis muscle 15. List the lumbrical muscles 16. Describe the attachments and actions of lumbrical muscles 17. Describe the nerve supply of lumbrical muscles 18. Identify the lumbrical muscles 19. Demonstrate the actions of lumbrical muscles 20. List the palmar & dorsal interossei muscles 21. Describe the attachments and actions of palmar & dorsal interossei muscles 22. Describe the nerve supply of palmar & dorsal interossei muscles 23. Identify the palmar & dorsal interossei muscles 24. Demonstrate the actions of palmar & dorsal interossei muscles 25. Demonstrate the clinical testing of palmar interossei muscles 			<p>demonstration</p>	<p>long essay, short essay, short answers, MCQ's</p> <p>Skill: specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>
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AN12.6	Describe & demonstrate movements of thumb and muscles involved		K/S	SH	Y	DOAP, Small group discussion	Short answers, MCQ's, OSPE	
	<ol style="list-style-type: none"> 1. Describe the various movements of thumb along with the joints involved 2. Describe the muscles involved in various movements of thumb 3. Demonstrate the various movements of thumb 							
AN12.7	Identify & describe course and branches of important blood vessels and nerves in hand		K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	
	<ol style="list-style-type: none"> 1. Describe the course & relations of median nerve in hand 2. Describe the branches & distribution of median nerve in hand 3. Identify & demonstrate the relations & branches of median nerve in hand accurately 4. Describe the course & relations of ulnar nerve in hand 5. Describe the branches & distribution of ulnar nerve in hand 6. Identify & demonstrate the relations & branches of ulnar nerve in hand correctly 7. Describe the location of Guyon's tunnel 8. Describe the cause & clinical feature of Guyon's tunnel syndrome 9. Describe the various injuries of ulnar & median nerve 10. Describe the location, formation of superficial palmar arch 11. Describe the branches of superficial palmar arch 12. Identify & demonstrate the branches of superficial palmar arch 13. Describe the location & formation of deep palmar arch 14. Describe the branches of deep palmar arch 15. Identify & demonstrate the branches of deep palmar arch 16. Describe the clinical significance of palmar arterial arches 							

AN12.8	Describe anatomical basis of Claw hand 1. Describe the anatomical basis of claw hand 2. Discuss the position of hand in this condition 3. Describe the types of claw hand with the nerves involved 4. Demonstrate the claw hand	K	KH	Y	Small group discussion	Short answers, MCQ's, OSPE	General Surgery
AN12.9	Identify & describe fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths 1. Describe the attachments and functions of fibrous flexor sheaths 2. Describe the clinical significance of fibrous flexor sheath 3. Describe the location, extent and communication of ulnar bursa 4. Describe the location, extent and communication of radial bursa 5. Describe the location, extent and communication of digital synovial sheaths 6. Describe the anatomical significance of ulnar & radial bursa and digital synovial sheaths 7. Identify the fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths 8. Describe vincula longa & vincula brevia 9. Identify vincula longa & vincula brevia	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	
AN12.10	Explain infection of fascial spaces of palm 1. List the various spaces of palm 2. Describe the boundaries and communications of midpalmar space 3. Describe the boundaries and communications of thenar space 4. Describe the clinical importance of thenar & midpalmar space 5. Describe the boundaries & features of pulp spaces of digits 6. Describe the clinical significance of pulp spaces of digits 7. Describe the boundaries & clinical importance of space of Parona	K	KH	N	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	General Surgery

AN12.11	Identify, describe and demonstrate important muscle groups of dorsal forearm with attachments, nerve supply and actions	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters, OSPE Viva-Voce	General Surgery
	<ol style="list-style-type: none"> List the superficial & deep group muscles of back of forearm Describe the attachments & actions of superficial & deep muscles of back of forearm Describe the nerve & blood supply of superficial & deep muscles of back of forearm Identify the muscles of back of forearm Demonstrate the attachments & actions of superficial & deep muscles of back of forearm correctly Demonstrate the nerve supplying the muscles of back of forearm correctly 						
AN12.12	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of forearm	K/S	SH	Y			General Surgery
	<ol style="list-style-type: none"> Describe the origin, course & relations of posterior interosseous nerve Describe the branches & distribution of posterior interosseous nerve Describe the origin, course & relations of posterior interosseous artery Describe the branches & distribution of posterior interosseous artery 						
AN12.13	Describe the anatomical basis of Wrist drop	K	KH	Y	Lecture, Small group discussion	Short answers, MCQ's, OSPE, Viva-voce	General Surgery
	<ol style="list-style-type: none"> Describe the causes of wrist drop Describe the anatomical basis of wrist drop Demonstrate wrist drop 						
AN12.14	Identify & describe compartments deep to extensor retinaculum	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: specimen discussion, spotters,	General Surgery
	<ol style="list-style-type: none"> Describe the attachments of extensor retinaculum Describe the compartments of extensor retinaculum Describe the functions of extensor retinaculum Identify & demonstrate extensor retinaculum Identify compartments deep to extensor retinaculum List the structures passing through the extensor retinaculum compartments 						

							Viva-Voce	
AN12.15	Identify & describe extensor expansion formation	K/S	SH	Y	Lecture, DOAP	Knowledge: short answers, MCQ's Skill:Spotters Viva-Voce		
	<ol style="list-style-type: none"> Describe the formation & functions of extensor digital expansion Name the tendons attached to the extensor expansion Identify & demonstrate extensor digital expansion Describe the mallet finger Describe the button hole deformity 							
Topic: General Features, Joints, radiographs & surface marking								
AN13.1	Describe and explain Fascia of upper limb and compartments, veins of upper limb and its lymphatic drainage	K	KH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: spotters, OSPE Viva-Voce		
	<ol style="list-style-type: none"> Discuss the fascial compartments of upper limb Describe the venous drainage of upper limb. Describe the lymphatic drainage of upper limb. 							
AN13.2	Describe dermatomes of upper limb	K	KH	N	Small group discussion	MCQ'S, Viva-Voce		
AN13.3	Identify & describe the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, blood and nerve supply of elbow joint, proximal and distal radio-ulnar joints, wrist joint & first carpometacarpal joint	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's		

	<ol style="list-style-type: none"> 1. Describe the type & articular surfaces of Elbow joint 2. Describe the attachments of ligaments of Elbow joint 3. Describe the relations, blood supply and nerve supply of elbow joint 4. Describe the movements with the muscle of elbow joint 5. Identify the articulating surface and ligaments of elbow joint 6. Demonstrate the movements of elbow joint 7. Describe the clinical significance of carrying angle 8. Describe the clinical significance of elbow joint 9. Describe the type & articular surfaces of proximal radio ulnar joint 10. Describe the attachments of ligaments of proximal radio ulnar joint 11. Describe the relations, blood supply and nerve supply of proximal radio ulnar joint 12. Describe the movements with the muscle of proximal radio ulnar joint 13. Identify the articulating surface and ligaments of proximal radio ulnar joint 14. Describe the type & articular surfaces of distal radio ulnar joint 15. Describe the attachments of ligaments of distal radio ulnar joint 16. Describe the relations, blood supply and nerve supply of distal radio ulnar joint 17. Describe the movements with the muscle of distal radio ulnar joint 18. Identify the articulating surface and ligaments of proximal radio ulnar joint 19. Define supination & pronation 20. Describe the muscles producing supination & pronation 21. Demonstrate supination & pronation 22. Describe the type & articular surfaces wrist joint 23. Describe the attachments of ligaments of wrist joint 24. Describe the relations, blood supply and nerve supply 			<p>Skill: spotters, OSPE</p> <p>Viva-Voce</p>	
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	of wrist joint 25. Describe the movements with the muscle of wrist joint 26. Identify the articulating surface and ligaments of wrist joint 27. Describe the type & articular surfaces of first carpometacarpal joint 28. Describe the ligaments, nerve supply and blood supply of first carpometacarpal joint							
AN13.4	Describe Sternoclavicular joint, Acromioclavicular joint, Carpometacarpal joints & Metacarpophalangeal joint 1. Describe the type, articular surfaces, ligaments, relations, movements with muscles of sterno-clavicular joint 2. Describe the type, articular surfaces, ligaments, relations, movements with muscles of acromioclavicular joint 3. Describe the type, articular surfaces, ligaments, relations, movements with muscles of carpometacarpal joint 4. Describe the type, articular surfaces, ligaments, relations, movements with muscles of metacarpophalangeal joint	K	KH	N	Small group discussion	MCQ's, Spotters		
AN13.5	Identify the bones and joints of upper limb seen in anteroposterior and lateral view radiographs of shoulder region, arm, elbow, forearm and hand 1. Discuss the principals of x –rays. 2. Discuss the various views of plain skiagram. 3. Identify the bones seen in AP & Lateral views of Shoulder, arm, elbow, wrist and hand region X-rays 4. Identify the joints seen in AP & Lateral views of Shoulder, arm, elbow, wrist and hand region X-rays	K/S	SH	Y	Small group discussion & demonstration	Spotters, OSPE Viva-Voce	Radiodiagnosis	
AN13.6	Identify & demonstrate important bony landmarks of upper limb: Jugular notch, sternal angle, acromial angle, spine of the scapula, vertebral level of the medial end, Inferior angle of the scapula	K/S	SH	Y	Small group discussion & demonstration	Spotters, OSPE Viva-Voce		

	<ol style="list-style-type: none"> Describe the important land marks of the arm Demonstrate the important land marks of the arm correctly Demonstrate the surface landmarks of hand Describe the surface landmarks of forearm Demonstrate the surface landmarks of forearm correctly Identify jugular notch correctly Describe the contents of jugular notch Identify sternal angle correctly Describe the important events at jugular notch Identify acromian angle, spine of scapula, vertebral level of the medial end, Inferior angle of the scapula correctly 							
AN13.7	<p>Identify & demonstrate surface projection of: Cephalic and basilic vein, Palpation of Brachial artery, Radial artery, Testing of muscles: Trapezius, pectoralis major, serratus anterior, latissimus dorsi, deltoid, biceps brachii, Brachioradialis</p> <ol style="list-style-type: none"> Identify surface projection of Cephalic and basilic vein Mark median, radial & ulnar nerve on the surface of given cadaver Mark brachial, radial & ulnar artery on the surface of given cadaver Mark flexor & extensor retinaculum on the surface of given cadaver Mark superficial & deep palmar arch on the surface of given cadaver Demonstrate palpation of brachial and radial artery Demonstrate clinical testing of Trapezius, Pectoralis major, Serratus anterior, Latissimus dorsi, Deltoid, Biceps brachii, Triceps brachii & Brachioradialis muscles 	K/S	SH	Y	Small group discussion & demonstration	OSPE		
AN13.8	<p>Describe development of upper limb</p> <ol style="list-style-type: none"> Describe the stages in development of upper limb Describe the development of arteries of upper 	K	KH	N	Lecture, Video demonstration	MCQ's, Viva-Voce		

AN13.9	Describe & demonstrate anatomical snuff box	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: spotters, OSPE Viva-Voce	
AN13.10	Describe & demonstrate the vessels and nerves of dorsum of hand	K/S	SH	N	Small group discussion & demonstration	Spotters, MCQ's, Viva-Voce	
AN13.9	1. Describe the location and boundaries of anatomical snuff box 2. Describe the contents of anatomical snuff box 3. Demonstrate the boundaries of anatomical snuff box accurately 4. Identify the contents of anatomical snuff box correctly 5. Describe the clinical significance of anatomical snuff box						
AN13.10	1. Describe course and termination of radial artery 2. Demonstrate the radial artery in dorsum of hand accurately 3. Describe the dorsal carpal arch and dorsal digital artery 4. Describe the course & distribution of superficial radial nerve in dorsum of hand 5. Identify superficial radial nerve in dorsum of hand correctly 6. Describe the sensory innervation of palmar & dorsal aspect of hand						
AN14.1	Identify the given bone, its side, important features & keep it in anatomical position	K/S	SH	Y	Small group	Knowledge:	
Topic: features of individual bones of lower limb							

	<ol style="list-style-type: none"> 1. Identify the hip bone and its side correctly 2. Hold the hip bone in anatomical position correctly 3. Identify the parts of hipbone correctly 4. Demonstrate important features of hip bone accurately 5. Demonstrate attachments of the hip bone accurately 6. Demonstrate the structures attached to the iliac crest accurately 7. Demonstrate the structures attached to ischial tuberosity correctly 8. Describe the ossification of the hip bone 9. Identify the Femur and its side correctly 10. Hold femur in Anatomical Position correctly 11. Demonstrate important features of Femur accurately 12. Demonstrate attachments of the Femur bone accurately 13. Describe the ossification of the Femur bone 14. Identify the side of Tibia 15. Hold tibia in Anatomical Position correctly 16. Demonstrate important features of Tibia accurately 17. Demonstrate attachments of the Tibia correctly 18. Describe the ossification of the Tibia 19. Identify the Fibula and its side correctly 20. Hold fibula in Anatomical Position 21. Describe important features of Fibula 22. Demonstrate important features of Fibula correctly 23. Describe attachments of the Fibula. 24. Demonstrate attachments of the Fibula accurately 25. Describe the ossification of the bone Fibula 26. Identify patella and its side correctly 27. Demonstrate the structures attached to patella accurately 			<p>Short answers, MCQ's, Skill: Spotters, OSPE Viva-Voce</p>			
<p>AN 14.2</p>	<p>Identify and describe joints formed by given bone</p> <ol style="list-style-type: none"> 1. Name the joints formed by hip bone, femur, tibia, patella and fibula 2. Identify the joints formed by hip bone, femur, tibia, patella and fibula correctly 	<p>K/S</p>	<p>SH</p>	<p>Y</p>	<p>Small group discussion & demonstration</p>	<p>Spotters Viva-Voce</p>	

AN14.3	Describe the importance of ossification of lower end of femur and upper end of tibia	K	KH	Y	Small group discussion	Spotters, OSPE, Viva-Voce	Forensic Medicine
AN14.4	Describe the importance of ossification of lower end of femur 1. Describe the ossification of lower end of femur 2. Describe the ossification of upper end of tibia 3. Describe clinical importance of lower end of femur and upper end of tibia	K/S	SH	N	Small group discussion & demonstration	MCQ's, Spotters, Viva-Voce	
AN14.4	Identify and name various bones in the articulated foot with individual muscle attachment						
	1. Name the Tarsal bones 2. Identify the tarsal bones correctly 3. Identify the Metatarsals and Phalanges correctly 4. Demonstrate the structures attached to the tarsal, metatarsal and phalanges bones accurately 5. Name the joints formed by tarsal bones 6. Identify the joints formed by tarsal bones correctly						
Topic: Front & Medial side of thigh							
AN15.1	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior thigh	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: spotters, OSPE Viva-Voce	
	1. Describe origin and course of cutaneous nerves front of thigh 2. Identify the course of cutaneous nerves of front of thigh correctly 3. Describe meralgia paresthetica 4. Describe patellar plexus 5. Describe the origin and course and area of distribution of cutaneous arteries of thigh 6. Identify the cutaneous arteries of thigh correctly 7. Describe the formation, course and termination of long saphenous vein 8. Describe the relations of long saphenous vein 9. Demonstrate the course of long saphenous vein accurately 10. Describe tributaries & communication of long saphenous vein 11. Demonstrate the tributaries & communication of long saphenous vein correctly						

AN15.2	<p>12. Describe the location of valves in long saphenous vein</p> <p>13. Identify the location of long saphenous vein correctly</p> <p>14. Describe the anatomical importance of long saphenous vein in venesection</p> <p>15. Describe the anatomical importance of long saphenous in vein graft</p> <p>16. Describe origin, course and relations of femoral nerve</p> <p>17. Describe the branches and distribution of femoral nerve</p> <p>18. Identify the femoral nerve correctly</p> <p>19. Identify & demonstrate the branches of femoral nerve accurately</p> <p>20. Describe the effects of femoral nerve injury</p> <p>21. Describe origin, course and relations of femoral artery</p> <p>22. Describe the superficial branches and distribution of femoral artery</p> <p>23. Describe the deep branches and distribution of femoral artery</p> <p>24. Identify the femoral artery correctly</p> <p>25. Identify & demonstrate the branches of femoral artery accurately</p> <p>26. Describe the clinical significance of femoral artery</p> <p>27. Describe origin, termination, course and relations of femoral vein</p> <p>28. Describe the tributaries and area of drainage of femoral vein</p> <p>29. Identify the femoral vein correctly</p> <p>30. Identify & demonstrate the tributaries of femoral vein accurately</p> <p>31. Describe the clinical significance of femoral vein</p> <p>32. Describe the origin, course, relations and branches of obturator nerve</p> <p>33. Identify & demonstrate the branches & termination of obturator nerve</p> <p>34. Describe the anatomical significance of obturator nerve</p> <p>Describe and demonstrate major muscles with their attachments, nerve supply and actions</p>	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay,	
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	<ol style="list-style-type: none"> 1. List the muscles of front of thigh 2. Describe the attachments of Muscles of front of thigh 3. Demonstrate attachments of Muscles of anterior compartment of thigh correctly 4. Describe nerve supply, action of Muscles of anterior compartment of thigh 5. Identify the muscles of front of thigh correctly 6. Demonstrate action of Muscles of anterior compartment of thigh correctly 7. List the muscles present in medial compartment of thigh 8. Identify the muscles present in medial compartment of thigh correctly 9. Describe the attachments of Muscles of medial compartment of thigh 10. Demonstrate attachments of Muscles of medial compartment of thigh correctly 11. Describe nerve supply, action of Muscles of medial compartment of thigh 12. Demonstrate action of Muscles of medial compartment of thigh correctly 				<p>short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	
<p>AN15.3</p>	<p>Describe and demonstrate boundaries, floor, roof and contents of femoral triangle</p> <ol style="list-style-type: none"> 1. Describe medial border, lateral border, apex and base of femoral triangle 2. Demonstrate medial & lateral boundaries of femoral triangle correctly 3. Describe floor and roof of femoral triangle 4. Demonstrate floor and roof of femoral triangle accurately 5. Name the contents of femoral triangle 6. Identify the contents of femoral triangle correctly 7. Describe femoral sheath formation 8. Describe the compartments and contents of femoral sheath 9. Demonstrate the contents of femoral sheath correctly 	K/S	SH	Y	<p>Lecture, dissection demonstration</p>	<p>General surgery</p>
					<p>Knowledge: short essay, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	

	10. Describe the boundaries and contents of femoral canal 11. Demonstrate contents of femoral canal correctly 12. Describe the clinical significance of femoral canal								
AN15.4	Explain the anatomical basis of Psoas abscess and femoral hernia 1. Explain the anatomical basis of Psoas abscess 2. Explain the anatomical basis of Femoral hernia	K	KH	N	Small group discussion	MCQ's, OSPE	General surgery		
AN15.5	Describe and demonstrate adductor canal with its content 1. Describe boundaries of adductor canal 2. Demonstrate boundaries of adductor canal correctly 3. Describe contents of adductor canal 4. Identify & demonstrate contents of adductor canal correctly 5. Describe the clinical significance of adductor canal	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce			
AN16.1	Describe and demonstrate origin, course, relation, branches, termination of important nerves and vessels of gluteal region 1. Describe cutaneous nerves of gluteal region 2. Identify cutaneous nerves of gluteal region correctly 3. Describe origin & course of superior gluteal artery 4. Describe the branches and area of distribution of superior gluteal artery 5. Identify and demonstrate the branches of superior gluteal artery accurately 6. Describe origin & course of inferior gluteal artery 7. Describe the branches and area of distribution of inferior gluteal artery 8. Identify and demonstrate the branches of inferior gluteal artery accurately 9. Describe origin and course of superior gluteal nerve 10. Describe branches and distribution of superior gluteal	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce			

AN16.2	<p>nerve</p> <ol style="list-style-type: none"> 11. Identify & demonstrate the branches of superior gluteal nerve correctly 12. Describe origin and course of inferior gluteal nerve 13. Describe branches and distribution of inferior gluteal nerve 14. Identify & demonstrate the branches of inferior gluteal nerve correctly 15. Describe origin and course of sciatic nerve 16. Describe the relations of sciatic nerve 17. Demonstrate the relations of sciatic nerve accurately 18. Describe branches and distribution of sciatic nerve 19. Identify & demonstrate the branches of sciatic nerve correctly 20. Describe anatomical significance of sleeping foot <p>Describe the anatomical basis of sciatic nerve injury during gluteal intra muscular injection</p>	K	KH	Y	Video demonstration	MCQ'S, OSPE	General Surgery
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AN16.2a	<p>Describe and demonstrate muscle of gluteal region</p> <ol style="list-style-type: none"> 1. Name the major muscles of gluteal region. 2. Name the minor muscles of gluteal region. 3. Identify all the muscle of gluteal region correctly 4. Describe the attachment, nerve supply and action of gluteus maximus muscle 5. Demonstrate the attachment of gluteus maximus muscle correctly 6. Demonstrate the nerve supplying the gluteus maximus muscle correctly 7. Describe the structures present below the gluteus maximus 8. Describe the anatomical significance of giving IM injection to gluteus maximus 9. Identify & demonstrate the structures present below the gluteus maximus 10. Describe the attachment, nerve supply and action of gluteus medius 11. Identify & demonstrate attachment of gluteus medius correctly 12. Describe the attachment, nerve supply and action of gluteus minimus 13. Identify & demonstrate attachment of gluteus minimus 14. Describe the attachment, nerve supply and action of minor muscles of gluteal region 15. Identify & demonstrate attachment of minor muscles of gluteal region 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	
AN16.3	<p>Explain anatomical basis of trendelenberg sign</p> <ol style="list-style-type: none"> 1. Describe Trendelenburg sign. 2. Name the nerve injured in trendelenberg sign 3. Name the muscles supplied by injured nerve 4. Describe the lurching gait 5. Describe the anatomical basis of trendelenberg sign 	K	KH	Y	Small group discussion, Video demonstration	<p>Short answers, MCQ's, OSPE</p> <p>Viva-Voce</p>	General surgery

AN16.4	Describe and demonstrate the hamstrings group of muscles with their attachment, nerve supply and actions	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce	
AN16.5	<ol style="list-style-type: none"> 1. Name the hamstring muscles 2. Identify hamstring muscles correctly 3. Describe the characteristic features of hamstring muscles 4. Describe the attachments, nerve supply and actions of hamstring muscles 5. Demonstrate the attachments & nerve supply of hamstring muscles correctly 6. Demonstrate the actions of hamstring muscles Describe and demonstrate the origin, course, relations, branches, termination of important nerves and vessels on the back of thigh	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce	
AN16.6	Describe and demonstrate the boundaries, roof, floor, contents and relations of popliteal fossa	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce	

	<ol style="list-style-type: none"> 1. Describe the location & boundaries of popliteal fossa 2. Demonstrate the boundaries of popliteal fossa 3. Describe roof and floor of popliteal fossa 4. Demonstrate roof and floor of popliteal fossa 5. Name the contents of popliteal fossa 6. Identify the contents correctly 7. Describe the relation of contents in the popliteal fossa 8. Identify the contents correctly 9. Describe origin, course, termination and relations of popliteal artery 10. Describe the branches and area of supply of popliteal artery 11. Demonstrate branches of popliteal artery 12. Describe genicular anastomoses 13. Describe formation, course and termination of popliteal vein 14. Describe the tributaries of popliteal vein 15. Demonstrate the relations and tributaries of popliteal vein accurately 16. Describe origin, course, relations and termination of tibial nerve 17. Describe the branches of tibial nerve 18. Identify & demonstrate the branches of tibial nerve 19. Describe course and branches of common peroneal nerve 20. Demonstrate branches of common peroneal nerve 21. Describe the popliteal lymph nodes 22. Describe the clinical significance of popliteal fossa 				<p>short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	
Topic: Hip joint						
AN17.1	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood supply and nerve supply, bursae around hip joint	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers,

	<ol style="list-style-type: none"> 1. Name the type of joint and articular surfaces of hip joint 2. Demonstrate articular surfaces of hip joint correctly 3. Describe the capsule & synovial membrane of hip joint 4. Demonstrate capsule & synovial membrane of hip joint correctly 5. List the ligaments of hip joint 6. Describe the attachments and functions of ligaments of hip joint 7. Demonstrate the ligaments of hip joint accurately 8. Describe the relations of hip joint 9. Demonstrate relations of hip joint correctly 10. Describe the factors provide the stability to hip joint 11. Describe movements and muscles involved of hip joint 12. Demonstrate the movements of hip joint correctly 13. Describe bursae around hip joint 14. Demonstrate bursae around hip joint accurately 15. Describe blood & nerve supply of hip joint 16. Describe the dislocation of hip joint 			<p>MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE Viva-Voce</p>	
AN17.2	<p>Describe anatomical basis of complications of fracture neck of femur</p> <ol style="list-style-type: none"> 1. Name the types of fracture neck of femur 2. Describe the anatomical significance of fracture neck of femur 3. Describe the formation and anatomical significance of Shenton's line 	K	KH	N	Orthopedics
AN17.3	<p>Describe dislocation of hip joint and surgical hip replacement</p> <ol style="list-style-type: none"> 1. Name the types of dislocation 2. Describe the anatomical significance of dislocation of hip joint 3. Name the commonest type of dislocation 4. Describe anatomical importance of surgical hip replacement 	K	KH	N	Orthopedics

Topic: Knee joint, Anterior compartment of leg & dorsum of foot

AN18.1	<p>Describe and demonstrate major muscles of anterior compartment of leg with their attachment, nerve supply and actions</p> <ol style="list-style-type: none"> 1. Name the muscles of anterior compartment of leg 2. Identify the muscle of anterior compartment of leg 3. Describe attachments & actions of muscles of anterior compartment of leg 4. Demonstrate the attachments and action of muscles of anterior compartment of leg 5. Identify the nerve supplying the muscles of anterior compartment of leg 6. Demonstrate the clinical testing of tibialis anterior muscle 7. Describe the cause and features of anterior tibial compartment/ fresher's syndrome 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>
AN18.2	<p>Describe and demonstrate origin, course, relations, branches, termination of important nerves and vessels of anterior compartment of leg</p> <ol style="list-style-type: none"> 1. Describe cutaneous innervations of anterior compartment of leg 2. Identify the cutaneous nerves of anterior compartment of leg correctly 3. Describe origin, course & relations of Anterior tibial artery 4. Describe the branches and area of distribution of Anterior tibial artery 5. Identify & demonstrate the branches of Anterior tibial artery correctly 6. Describe the variations of anterior tibial artery 7. Describe origin, course & relations of Deep peroneal nerve. 8. Demonstrate relations of Deep peroneal nerve accurately 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>

	9. Describe branches, distribution and termination of Deep peroneal nerve 10. Demonstrate branches of Deep peroneal nerve correctly								
AN18.3	Explain the anatomical basis of foot drop 1. Name the nerve involved in foot drop 2. Name the muscles paralysed 3. Describe the deformity 4. Describe the causes of nerve injury	K	KH	Y	Lecture, small group discussion, video demonstration	Short answers, MCQ's OSPE Viva-Voce	General surgery		
AN18.4	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood supply and nerve supply, bursae around knee joint 1. Name the type and articular surfaces of knee joint 2. Demonstrate the articular surfaces of knee joint 3. Describe the factors maintaining the stability of knee joint 4. List the ligaments of knee joint 5. Identify all the ligaments of knee joint correctly 6. Describe location & attachment of capsular ligament 7. Describe the location and extension of synovial membrane 8. Describe the location & attachments of ligaments of knee joint 9. Demonstrate ligaments of knee joint 10. Describe location, parts, functions & attachments of Menisci of Knee joint 11. Identify & demonstrate Menisci of Knee joint correctly 12. Describe the anatomical significance of menisci of knee joint 13. Describe relations of the knee joint 14. Demonstrate relations of the knee joint correctly 15. Describe movements and muscles producing them in knee joint 16. Demonstrate movements and muscles producing them correctly	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce			

	17. Describe bursae around the Knee joint 18. Demonstrate the bursae around knee joint accurately 19. Describe blood supply & nerve supply of Knee joint 20. Demonstrate blood supply & nerve supply of Knee joint correctly 21. Describe the anatomical significance of menisci of knee joint 22. Describe the clinical significance of bursae around knee joint	K	KH	Y	Lecture, small group discussion, video demonstration	Short answers, MCQ's, OSPE, Viva-Voce	Orthopaedics
AN18.5	Explain the anatomical basis of locking and unlocking of knee joint 1. Describe the mechanism of locking of the knee 2. Describe the mechanism of unlocking of the knee 3. Describe the differences between locking and unlocking of knee 4. Name the muscles involved in locking of knee 5. Name the muscles involved in unlocking of knee	K	KH	N	Small group discussion, Video demonstration	MCQ's, OSPE, Viva-Voce	Orthopaedics
AN18.6	Describe knee joint injuries with its applied anatomy 1. Describe the anatomical basis of miniscal tears. 2. Describe the anatomical basis of injuries to cruciate ligament. 3. Describe the anatomical basis of housemaid's knee. 4. Describe the anatomical basis of clergyman's knee	K	KH	N	Small group discussion	MCQ's, Viva-Voce	Orthopaedics
AN18.7	Explain anatomical basis of osteoarthritis 1. Define osteoarthritis 2. Explain the anatomical basis of Osteoarthritis	K	KH	N	Lecture, dissection demonstration	Knowledge: Short answers, MCQ's Skill: spotters, Viva-Voce	Orthopaedics
AN18.8	Describe the muscles, vessels and nerves of dorsum of foot 1. List the muscle present in dorsum of foot 2. Identify the muscles & tendon present in dorsum of foot correctly 3. Describe the attachments, nerve supply & actions of extensor digitorum brevis 4. Demonstrate the attachments and actions of extensor digitorum brevis correctly 5. Describe the origin, course, relations & branches of	K/S	SH	Y			

	dorsalis pedis artery 6. Identify & demonstrate the branches of dorsalis pedis artery accurately 7. Demonstrate the pulse of dorsalis pedis artery accurately 8. Describe the sensory innervation of dorsum of foot								
Topic: Back of Leg, lateral side of leg & Sole									
AN19.1	Describe and demonstrate the major muscles of back of leg with their attachment, nerve supply, action	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce			
	<ol style="list-style-type: none"> 1. Name the muscles of back of leg 2. Describe the attachments & actions of superficial muscles of back of leg 3. Demonstrate the attachments & actions of superficial muscles of back of leg correctly 4. Describe the attachments & actions of deep muscles of back of leg 5. Demonstrate the attachments & actions of deep muscles of back of leg correctly 6. Describe the nerve supply of muscles of back of leg 7. Describe the tennis injury 8. Describe the components & attachments of tendocalcaneus 9. Identify & demonstrate the attachments of tendocalcaneus 10. Describe the clinical testing of triceps surae 								

AN19.1a	<p>Describe and demonstrate the major muscles of lateral side of leg with their attachment, nerve supply, action</p> <ol style="list-style-type: none"> 1. Name the muscles of lateral side of leg 2. Describe the attachments & actions of superficial muscles of lateral side of leg 3. Demonstrate the attachments & actions of superficial muscles of lateral side of leg correctly 4. Describe the attachments & actions of deep muscles of medial side of leg 5. Demonstrate the attachments & actions of deep muscles of lateral side of leg correctly 6. Describe the nerve supply of muscles of lateral side of leg 7. Describe the clinical testing of peroneus longus & brevis 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	
AN19.2	<p>Describe and demonstrate origin, course, relations, branches termination of important nerves and vessels of back of leg</p> <ol style="list-style-type: none"> 1. Describe cutaneous nerves of back of leg 2. Identify the cutaneous nerves of back of leg correctly 3. Describe formation, course & termination of short saphenous vein 4. Demonstrate short saphenous vein with its termination correctly 5. Describe the tributaries of short saphenous vein 6. Describe origin, course, relations and branches of posterior tibial artery 7. Demonstrate relations of posterior tibial artery 8. Demonstrate branches and termination of posterior tibial artery correctly 9. Describe origin, course, relations & branches of Peroneal artery 10. Demonstrate relations & branches of Peroneal artery correctly 11. Describe termination of peroneal artery. 12. Describe the variation & clinical significance of variation of peroneal artery 	K/S	SH	Y	Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	

	13. Describe origin, course & branches of Tibial nerve 14. Demonstrate branches and termination of Tibial nerve correctly							
AN19.2	Describe and demonstrate origin, course,relations, branches termination of superficial peroneal nerve 1. Identify the superficial peroneal nerve 2. Describe the origin, course, relations & branches of superficial peroneal nerve 3. Demonstrate the course, relations & branches of superficial peroneal nerve correctly 4. Describe the clinical significance of injury of superficial peroneal nerve	K/S	SH	Y	Lecture, dissection demonstration, small group discussion	Knowledge: Short answers, MCQ's Skill:Spotters, Viva-Voce		
AN19.3	Explain the concept of peripheral heart 1. Name the muscle forming Peripheral heart 2. Explain the reason why it is called peripheral heart	K	KH	Y	Small group discussion	MCQ's OSPE Viva-Voce	General surgery	
AN19.4	Explain the anatomical basis of rupture of calcaneal tendon 1. Describe the attachment of calcaneal tendon 2. Explain the Anatomical basis of rupture of calcaneal tendon	K	KH	N	Small group discussion, video demonstration	MCQ's, Viva-Voce	Orthopaedics	
AN19.5	Describe factors maintaining important arches of the foot with its importance. 1. Define arches of foot 2. Name the types of Arches of foot 3. Describe the factors maintaining arches of foot 4. Describe the formation, pillars, summit and joints of medial longitudinal arch 5. Describe the formation, pillars, summit and joints of lateral longitudinal arch 6. Describe the factors maintaining the medial longitudinal arch 7. Describe the factors maintaining the lateral longitudinal arch 8. Describe the factors maintaining the transverse arch 9. Describe the functions of Arches of foot	K	KH	Y	Lecture, video demonstration	Knowledge: long essay, short essay, short answers, MCQ's Skill: Specimen discussion, spotters, OSPE Viva-Voce		
AN19.6	Explain anatomical basis of flat foot and club foot	K	KH	N	Case based/Small	MCQ's, Viva-	Orthopaedics	

	<ol style="list-style-type: none"> Describe the anatomical basis of flat foot Describe the effects of flat foot Name the types of club foot Describe the anatomical basis of club foot Describe the deformity in each type of club foot. 					group discussion	Voce	
AN19.7	<p>Explain the anatomical basis of metatarsalgia and plantar fasciitis</p> <ol style="list-style-type: none"> Explain the anatomical basis of Metatarsalgia. Explain the cause of Plantar fasciitis. Describe the clinical features of Plantar fasciitis. Mention the complication of Plantar fasciitis. 	K	KH	N		Small group discussion	MCQ,S, Viva-Voce	Orthopaedics
AN19.8	<p>Describe & demonstrate the fascia, muscles, vessels & nerves of sole</p> <ol style="list-style-type: none"> Describe the plantar fascia Describe the features, attachments and functions of plantar aponeurosis Demonstrate the attachments and parts of plantar aponeurosis correctly Describe the layers of sole List the muscle present in each layer of sole Identify the muscles of sole correctly Describe the attachments, actions & nerve supply of muscle of sole Demonstrate the attachments of muscles of sole correctly List the tendons present in 2nd & 4th layer of sole Identify the tendons present in 2nd & 4th layer of sole correctly Describe the origin & course of medial plantar nerve Describe the branches & distribution of medial plantar nerve Demonstrate branches of medial plantar nerve correctly Describe joggers foot Describe the origin & course of lateral plantar nerve Describe the branches & distribution of lateral plantar nerve 	K/S	SH	Y		Lecture, dissection demonstration	<p>Knowledge: short essay, short answers, MCQ's</p> <p>Skill: Specimen discussion, spotters, OSPE</p> <p>Viva-Voce</p>	

	<p>17. Demonstrate branches of lateral plantar nerve correctly</p> <p>18. Describe the origin & course of medial plantar artery</p> <p>19. Describe the branches & distribution of medial plantar artery</p> <p>20. Demonstrate branches of medial plantar artery correctly</p> <p>21. Describe the origin & course of lateral plantar artery</p> <p>22. Describe the branches & distribution of lateral plantar artery</p> <p>23. Demonstrate branches of lateral plantar artery correctly</p> <p>24. Describe the formation, location and branches of plantar arterial arch</p> <p>25. Identify the plantar arterial arch correctly</p> <p>26. Demonstrate the branches of plantar arterial arch accurately</p>						
Topic: General Features, Joints, radiographs & surface marking							
AN20.1	Describe and demonstrate type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood supply, nerve supply of tibiofibular and ankle joint	K/S	SH	Y			

<ol style="list-style-type: none"> 1. Name the type & articular surfaces of tibiofibular joint 2. Demonstrate articular surfaces of tibiofibular joint correctly 3. List the ligament of tibiofibular joint 4. Describe the attachment, relations and location of tibiofibular joint 5. Demonstrate the ligament & relations of tibiofibular joint correctly 6. Describe the movements and muscles producing them of tibiofibular joint 7. Demonstrate the movements and muscles producing them of tibiofibular joint correctly 8. Describe the blood & nerve supply of tibiofibular joint. 9. Name the type & articular surfaces of ankle joint 10. Demonstrate articular surfaces of ankle joint correctly 11. List the ligament of ankle joint 12. Describe the attachment, relations and location of ankle joint 13. Demonstrate the ligament & relations of ankle joint correctly 14. Describe the movements and muscles producing them of ankle joint 15. Demonstrate the movements and muscles producing them of ankle joint correctly 16. Describe the blood & nerve supply of ankle joint. 17. Describe the factors maintaining stability of the ankle joint 18. Describe the clinical importance of tibiofibular & ankle joint 								

AN20.2	Describe the subtalar and transverse tarsal joints	K	KH	N	Lecture, Small group discussion	Short answers, MCQ'S, Viva-Voce	
	<ol style="list-style-type: none"> 1. Name the type & articular surfaces of subtalar joint 2. Demonstrate articular surfaces of subtalar joint correctly 3. List the ligament of subtalar joint 4. Describe the attachment, relations and location of subtalar joint 5. Demonstrate the ligament & relations of subtalar joint correctly 6. Describe the movements and muscles producing them of subtalar joint 7. Demonstrate the movements and muscles producing them of subtalar joint correctly 8. Describe the blood & nerve supply of subtalar joint. 9. Name the type & articular surfaces of subtalar joint 10. Demonstrate articular surfaces of subtalar joint correctly 11. List the ligament of tarsal joint 12. Describe the attachment, relations and location of tarsal joint 13. Demonstrate the ligament & relations of tarsal joint correctly 14. Describe the movements and muscles producing them of tarsal joint 15. Demonstrate the movements and muscles producing them of tarsal joint correctly 16. Describe the blood supply & nerve supply of tarsal joint. 						
AN20.3	Describe and demonstrate fascia lata, venous drainage, lymphatic drainage, retinacula, and dermatomes of lower limb	K/S	SH	Y	Lecture, dissection demonstration	Knowledge: short essay, short answers, MCQ's Skill: Specimen discussion,	
	<ol style="list-style-type: none"> 1. Describe the attachments & functions of fascia lata 2. Describe the clinical significance of fascia lata 3. Demonstrate the attachments of fascia lata correctly 4. Describe fascial compartments of the thigh 5. Name the modifications in the deep fascia of thigh 						

	<ol style="list-style-type: none"> 6. Describe the attachment of ilio tibial tract 7. Demonstrate the attachment of ilio tibial tract correctly 8. Describe the functional significance of ilio tibial tract. 9. Describe location & formation of Saphenous opening. 10. Identify the Saphenous opening 11. Name the structures passing through Saphenous opening. 12. Describe the factors helping the venous drainage of lower limb. 13. Classify the veins of lower limb 14. Name the superficial vein of lower limb 15. Identify the superficial vein of lower limb 16. Describe the formation, course, relations and termination of small saphenous vein 17. Describe the variations in the termination of small saphenous vein 18. Define perforators 19. Classify the perforating veins 20. Describe the location of perforators 21. Describe the clinical importance of perforators 22. Name the deep veins and its location 23. Describe the features of deep vein 24. Identify the deep veins accurately 25. Classify the lymph nodes of lower limb 26. Describe the location, area of drainage of all the groups of superficial inguinal lymph nodes 27. Describe the location, area of drainage of all the groups of deep inguinal lymph nodes 28. Describe the location, afferents of popliteal lymph nodes 29. Describe the location, afferents of anterior tibial lymph nodes 30. Identify the superficial, deep inguinal, popliteal & anterior lymph nodes accurately 31. Describe superficial & deep lymphatics 32. Describe the anatomical significance of elephantiasis
<p>spotters, OSPE</p> <p>Viva-Voce</p>	

<p>AN20.4</p>	<p>33. Describe attachment, functions and relations of superior extensor retinaculum</p> <p>34. Demonstrate attachment & relations of superior extensor retinaculum correctly</p> <p>35. Name the structures passing deep to the superior extensor retinaculum</p> <p>36. Identify the structures passing deep to the superior extensor retinaculum correctly</p> <p>37. Describe attachment, functions and relations of inferior extensor retinaculum</p> <p>38. Demonstrate attachment & relations of inferior extensor retinaculum correctly</p> <p>39. Name the structures passing deep to the inferior extensor retinaculum</p> <p>40. Identify the structures passing deep to the inferior extensor retinaculum correctly</p> <p>41. Describe attachment & functions of flexor extensor retinaculum</p> <p>42. Demonstrate attachment of flexor extensor retinaculum correctly</p> <p>43. Name the structures passing deep to the flexor extensor retinaculum</p> <p>44. Identify the structures passing deep to the flexor extensor retinaculum in order from medial to lateral</p> <p>45. Describe the clinical importance of flexor retinaculum</p> <p>46. Describe the attachments and relations of peroneal retinaculum</p> <p>47. Identify and demonstrate relations of peroneal retinaculum correctly</p> <p>48. Describe the dermatomes of lower limb</p> <p>49. Describe the cutaneous nerves supplying the lower limb with root value</p> <p>Explain the anatomical basis of enlarged inguinal lymph nodes</p> <p>1. Describe the area drained by inguinal lymph nodes</p> <p>2. Describe the anatomical significance of enlarged inguinal lymph nodes</p>	<p>K</p>	<p>KH</p>	<p>N</p>	<p>Small group/ Case based discussion, Video demonstration</p>	<p>Short answers, MCQ's, OSPE Viva-Voce</p>	<p>General surgery</p>
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AN20.5	<p>Explain the anatomical basis of varicose veins and deep vein thrombosis</p> <ol style="list-style-type: none"> Define varicose veins Describe the causes for varicose veins Describe the anatomical basis for varicose veins Demonstrate the sites of incompetent valves accurately Perform trendelenberg test and torniquet test precisely Define deep vein thrombosis Explain the anatomical basis of deep vein thrombosis 	K	KH	Y	Small group/ Case based discussion, Video demonstration	Short essay, Short answers, MCQ's, OSPE Viva-Voce	General surgery
AN20.6	<p>Identify the bones and joints of lower limb seen in anteroposterior and radiographs of various regions of lower limb</p> <ol style="list-style-type: none"> Identify the bones of lower limb seen in anteroposterior view and lateral view of plain X rays Identify the joints of lower limb seen in lateral view and anteroposterior view of plain X rays 	K/S	SH	Y	Small group demonstration	OSPE, Spotters, Viva-Voce	Radiodiagnosis
AN20.7	<p>Identify and demonstrate important bony landmarks of lower limb, vertebral levels of highest point of iliac crest, posterior superior iliac spine, iliac tubercle, ischial tuberosity, adductor tubercle, tibial tuberosity, head of fibula, medial and lateral malleoli, condyles of femur and tibia, sustentaculum tali, tuberosity of 5th metatarsal, tuberosity of navicular</p>	K/S	SH	Y	Small group demonstration	Spotters, Surface markings	

	<ol style="list-style-type: none"> 1. Identify the important bony landmarks in front of thigh region 2. Identify the important bony landmarks in gluteal region 3. Identify important bony landmarks in leg 4. Identify and demonstrate vertebral levels of highest point of iliac crest. 5. Identify and demonstrate posterior superior iliac spine. 6. Identify and demonstrate iliac tubercle. 7. Identify and demonstrate pubic tubercle. 8. Identify and demonstrate ischial tuberosity. 9. Identify and demonstrate adductor tubercle. 10. Identify and demonstrate tibial tuberosity. 11. Identify and demonstrate head of fibula. 12. Identify and demonstrate medial and lateral malleoli. 13. Identify and demonstrate condyles of femur and tibia. 14. Identify and demonstrate sustentaculum tali. 15. Identify and demonstrate tuberosity of 5th metatarsal. 16. Identify and demonstrate tuberosity of the navicular 	K/S	SH	Y	Mannequin/ Video demonstration	OPSE	General medicine
AN20.8	<p>Identify and demonstrate palpation of femoral, popliteal, posterior tibial, anterior tibial, dorsalis pedis blood vessels in a simulated environment</p> <ol style="list-style-type: none"> 1. Identify and demonstrate palpation of femoral artery in a simulated environment 2. Identify and demonstrate palpation of popliteal artery in a simulated environment 3. Identify and demonstrate palpation of anterior tibial artery in a simulated environment 4. Identify and demonstrate palpation of dorsalis pedis artery in a simulated environment 	K/S	SH	Y	Small group demonstration	OSPE	General medicine, General surgery
AN20.9	<p>Identify and demonstrate surface projection of vessels (femoral, popliteal, dorsalis pedis, posterior tibial), mid inguinal point, surface projection of femoral nerve, saphenous opening, sciatic, tibial, common peroneal and deep peroneal nerve, great and small saphenous veins</p>	K/S	SH	Y	Small group demonstration	OSPE	General medicine, General surgery

	<ol style="list-style-type: none"> 1. Mark femoral, popliteal, dorsalis pedis and posterior tibial artery on the surface of given cadaver 2. Mark femoral, sciatic, tibial, common peroneal and deep peroneal nerve on the surface of given cadaver 3. Mark saphenous opening on the surface of given cadaver 4. Mark midinguinal point on the surface of given cadaver 5. Mark great saphenous & small saphenous vein on the surface of given cadaver 											
AN20.10	<p>Describe basic concept of development of lower limb</p> <ol style="list-style-type: none"> 1. Describe the stages in development of lower limb 2. Describe the development of arteries of lower limb 3. List the developmental anomalies 	K	KH	N	Lecture	MCQ's, Viva- Voce						
Topic: Thoracic Cage												
AN21.1:	<p>Identify and describe the salient features of sternum, typical rib, 1st rib and typical thoracic vertebra.</p> <ol style="list-style-type: none"> 1. Describe the components (parts) of sternum 2. Describe the features and attachment of different parts of sternum 3. Name the joints formed by the sternum and its functional importance. 4. Name the features of interest at the sternal angle. 5. Describe the appearance of ossification centres and their fusion for different parts of sternum 6. Discuss the anatomical basis of sternum in sternal puncture and mid sternotomy. 7. Explain the anatomical basis of sternum in funnel chest, pigeon chest and sternal fracture 8. Identify and demonstrate the parts of sternum correctly 9. Demonstrates the features and attachment of different parts of sternum 10. Demonstrates the anatomical position of sternum correctly 11. Describe the arrangement and general outline of the ribs 	K/S	SH	Y	Lecture and Demonstration(S mall group)- 1 hr	Knowledge: MCQ's Short essay Skill : Spotters Viva - voce						

	<p>12. Describe the classification of the ribs according to the features, relation with sternum and articulation</p> <p>13. Describe the characteristic features of the typical ribs</p> <p>14. Describe the parts of the rib.</p> <p>15. Describe the features and attachment of different parts of the rib.</p> <p>16. Name the joints formed by the rib.</p> <p>17. Describe the appearance of ossification centres and their fusion for different parts of ribs.</p> <p>18. Identify and demonstrates the parts of rib correctly</p> <p>19. Demonstrate the features and attachment of different parts of rib accurately</p> <p>20. Demonstrate the anatomical position of the rib accurately</p> <p>21. Demonstrate the articulation of the rib with sternum and vertebra correctly</p> <p>22. Describe the number, arrangement and general outline of the vertebrae</p> <p>23. Describe the classification of the thoracic vertebrae according to the features.</p> <p>24. Describe the characteristic features of the typical vertebrae.</p> <p>25. Describe the parts of the vertebrae</p> <p>26. Describe the features and attachment of different parts of the vertebrae</p> <p>27. Name the joints formed by the bodies and articular processes of the vertebrae.</p> <p>28. Describe the appearance of ossification centres and their fusion for different parts of vertebrae</p> <p>29. Identify and demonstrates the parts of vertebrae.</p> <p>30. Demonstrate the features and attachment of different parts of vertebrae accurately</p> <p>31. Demonstrate the anatomical position of the vertebrae correctly</p> <p>32. Demonstrate the articulation of the vertebrae with ribs and vertebrae correctly</p>					
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AN21.2:	<p>Identify and describe the features of 2nd 11th and 12th ribs, 1st 11th and 12th thoracic vertebrae</p> <ol style="list-style-type: none"> Describe the atypical features and attachments of 2nd rib Describe the atypical features and attachment of 11th rib. Describe the atypical features and attachment of 12th rib Describe the atypical features and attachment of 2nd rib Describe the atypical features and attachment of 11th rib Describe the atypical features and attachment of 12th rib Identify 2nd, 11th and 12th ribs accurately in the given set of bones Demonstrate atypical features and attachment of 1st thoracic vertebrae Describe the atypical features and attachment of 11th thoracic vertebrae Describe the atypical features and attachment of 12th thoracic vertebrae Identify atypical features of 1st, 11th & 12th vertebrae accurately. 	K/S	SH	N	Small group demonstration	Knowledge: short answers, MCQ's Skill:spotters Viva-Voce	
AN21.3	<p>Describe and demonstrate the boundaries of thoracic inlet, cavity and outlet</p> <ol style="list-style-type: none"> Describe the formation of thoracic cage. Describe the shape, dimensions and boundaries of thoracic inlet. Describe the attachments, relation and functions of suprapleural membrane. Describe the structures passing through thoracic inlet. Describe the thoracic inlet syndrome Describe the boundaries of thoracic outlet. Describe the origin of muscle of diaphragm, crura, arcuate ligaments and insertion of diaphragm. Describe the surfaces and relations of diaphragm Describe the opening of the diaphragm Describe the action of the diaphragm. Describe the arterial supply, venous and lymphatic drainage of diaphragm. 	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE	

	12. Describe the applied aspect of the diaphragm. 13. Identify and demonstrate the boundaries and structures passing through the thoracic inlet accurately 14. Demonstrate the attachment of diaphragm correctly 15. Demonstrate the openings and structures passing through the diaphragm accurately								
AN21.4	Describe and demonstrate extent, attachments, direction of fibres, nerve Supply and actions of intercostal muscles 1. Describe the arrangement of intercostal muscles 2. Describe the extent, origin, insertion, direction of fibres, nerve supply and action of external intercostal muscle 3. Describe the extent, origin, insertion, direction of fibres, nerve supply and action of internal intercostal muscle 4. Describe the extent, origin, insertion, direction of fibres, nerve supply and action of transverses thoracis muscle	K/S	SH	Y	Lecture and Demonstration (Small group)- 2 hrs	Knowledge: MCQ's Long question Short essay Viva - voce Skill : Spotters Discussion OSPE			
AN21.5	Describe and demonstrate origin, course, relations and branches of typical intercostal nerve 1. Describe the course and relations of typical intercostal nerve 2. Describe the branches and distribution of typical intercostal nerves 3. Describe the applied aspect of intercostal nerves 4. Demonstrate the course and branches of typical intercostal nerves	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Long question Short essay Viva - voce Skill : Spotters Discussion OSPE			
AN21.6:	Mention origin, course and branches/ tributaries of 1) anterior and posterior intercostal vessels 2) internal thoracic vessels 1. Describe the origin, course, relation and termination of anterior intercostal artery. 2. Describe the branches and supply of anterior intercostal artery. 3. Describe the origin, course, relation and termination of posterior intercostal artery. 4. Describe the branches and supply of posterior intercostal	K	KH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill assessment: Spotters Discussion			

	<p>artery.</p> <ol style="list-style-type: none"> 5. Describe the applied aspect of posterior intercostal artery 6. Describe the tributaries, drainage and termination of anterior intercostal vein. 7. Describe the tributaries, drainage and termination of posterior intercostal vein 8. Describe the origin, course and termination of internal thoracic artery 9. Describe the relations of the internal thoracic artery. 10. Describe the branches and supply of internal thoracic artery. 11. Describe the applied anatomy of internal thoracic artery 12. Identify and demonstrate origin, course, relation and branches of anterior and posterior intercostal artery correctly 13. Identify and demonstrate termination of anterior and posterior intercostal veins correctly 14. Identify and demonstrate the origin, course and branches of internal thoracic artery correctly 				OSPE	
AN21.7	<p>Mention origin, course, relations and branches of</p> <ol style="list-style-type: none"> 1) atypical intercostal nerve 2) Superior intercostal artery and subcostal artery. 	K	KH	N	<p>Lecture and Demonstration(Small group)- 2 hrs</p>	<p>Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE</p>
	<ol style="list-style-type: none"> 1. Describe the origin, course and relations of the atypical intercostal nerves 2. Describe the branches and distribution of the atypical intercostal nerves. 3. Describe the applied aspect of intercostal nerves 4. Describe the origin, course and branches of superior intercostal artery. 5. Describe the origin, course and branches of subcostal artery 6. Identify and demonstrate the superior intercostal artery and subcostal artery correctly 					

AN21.8	<p>Describe and demonstrate type, articular surfaces & movements of manubriosternal, costovertebral, costotransverse and xiphisternal joints</p> <ol style="list-style-type: none"> Describe the type of joint and bones forming the joint Describe the ligaments of the joint Describe the relations of the joint Describe the movements and muscle producing the movement of the joint Describe the blood supply and nerve supply of the joint Describe the applied aspect of the joint Identify the bones and ligaments of the joint correctly Demonstrate the movements of the joint accurately 	K/S	SH	Y	<p>Lecture and Demonstration(S mall group)- 2 hrs</p>	<p>Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE</p>	
AN21.9	<p>Describe and demonstrate mechanics and types of respiration</p> <ol style="list-style-type: none"> Describe the mechanism and factors responsible for inspiration Describe the process of expiration Describe the three types of respiration and the muscle acting during different types of respiration Describe the anatomical basis of posture of patient during asthmatic attack Demonstration of mechanism of respiration correctly 	K/S	SH	Y	<p>Lecture and Demonstration(S mall group)- 2 hrs</p>	<p>Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE</p>	Physiology
AN21.10	<p>Describe costochondral and interchondral joints</p> <ol style="list-style-type: none"> Describe the type of joint and bones forming the joint. Describe the ligaments of the joint Describe the relations of the joint Describe the movements and muscle producing the movement of the joint Describe the blood supply and nerve supply of the joint Describe the applied aspect of the joint Identify the bones and ligaments of the joint correctly Demonstrate the movements of the joint accurately 	K	KH	N	<p>Lecture and Demonstration(S mall group)- 2 hrs</p>	<p>Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE</p>	

AN21.11	Mention boundaries and contents of the superior, anterior, middle and posterior mediastinum	K	KH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE
	<ol style="list-style-type: none"> Define and describe the location and divisions of the mediastinum Describe the boundaries and contents of superior mediastinum Describe the boundaries and contents of anterior mediastinum Describe the boundaries and contents of middle mediastinum Describe the boundaries and contents of posterior mediastinum Describe the applied anatomy of mediastinum Demonstrate the boundaries and contents of superior, anterior, middle and posterior mediastinum accurately 					
TOPIC : HEART & PERICARDIUM						
AN22.1	Describe and demonstrate subdivisions, sinuses in pericardium, blood supply and nerve supply of pericardium	K/S	SH	Y	Lecture and Demonstration(Small group)- 2hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE
	<ol style="list-style-type: none"> Define pericardium Describe the component parts of pericardium. Describe the position of heart within the pericardium Describe the attachments of the pericardium, above, below and in front. Describe the relation of the pericardium, anterior, posterior, on each side and inferiorly Describe the parietal and visceral layer of serous pericardium Describe the pericardial sac of pericardium, normal and abnormal amount of fluid in the pericardial sac Explain clinical significance of abnormal level of fluid in the pericardial sac, pericardial tamponade and routes of aspiration of pericardial fluid Describe the structures covered by the visceral layer. Describe the reflections and layer of pericardium lining the transverse sinus. 					

AN22.2	Describe & demonstrate external and internal features of each chamber of heart	K/S	SH	Y	Lecture and Demonstration(S)	Knowledge: MCQ's	Physiology
	<p>11. Describe the boundaries of transverse sinus in front, behind, above and below.</p> <p>12. Describe the clinical importance of transverse sinus during cardiac surgery</p> <p>13. Describe the reflections and layer of pericardium lining the oblique sinus</p> <p>14. Describe the boundaries of oblique sinus in front, behind, above, right and left side</p> <p>15. Describe the location of the transverse and oblique sinus</p> <p>16. Describe the fold of Marshall.</p> <p>17. Describe the arteries supplying the fibrous pericardium, parietal and visceral layer of serous pericardium</p> <p>18. Describe the venous drainage of the fibrous pericardium, parietal and visceral layer of serous pericardium</p> <p>19. Describe the nerve supply of the fibrous pericardium, parietal and visceral layer of serous pericardium</p> <p>20. Demonstrate structures related to the fibrous pericardium in front, behind, below and on each side.</p> <p>21. Demonstrate the fibrous and the parietal and visceral layer of serous pericardium</p> <p>22. Demonstrate the reflections of the parietal and visceral layer of serous pericardium</p> <p>23. Identify the structures forming the boundaries of transverse sinus in front, behind, above and below correctly</p> <p>24. Identify the structures forming the boundaries of oblique sinus in front, behind, above and below correctly</p> <p>25. Identify the fold of Marshall accurately</p> <p>26. Demonstrate the subcostal and parasternal route of paracentesis correctly</p> <p>27. Demonstrate the route of intracardiac injection</p>						

	<ol style="list-style-type: none"> 1. Describe the different parts of the heart 2. Describe the part of heart forming the apex, its location, direction and position of the apex beat. 3. Describe the parts of the heart forming its base and the vertebral level of the base 4. Describe the structures forming the boundaries above, below, right side and left side of the base of the heart 5. Describe the features of base of the heart. 6. List the structures forming the posterior relation of the base of heart. 7. Explain the anatomical basis for difficulty of swallowing in mitral stenosis. 8. Describe the extent & parts of the heart forming its right border 9. Describe the structures related to the right border of heart from within outward 10. Describe the extent and parts of heart forming the inferior border of heart 11. Describe the features of inferior border of heart 12. Describe the extent and features of left border of the heart 13. Describe the parts of the heart forming the sterno-costal surface of the heart 14. Describe the features on the sterno-costal surface of the heart 15. Describe the structures related to sterno-costal surface 16. Describe the parts of the heart forming the diaphragmatic / inferior surface of the heart 17. Describe the features on the diaphragmatic / inferior surface of the heart 18. Describe the structures related to diaphragmatic / inferior surface 19. Describe the parts of the heart forming the left surface of the heart 20. Describe the features on the left surface of the heart 21. Describe the structures related to left surface 			<p>Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE Knowledge: MCQ's Short essay Short answers Viva - voce Skill: Spotters Discussion OSPE</p>	
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	<p>42. Demonstrate the structures related to diaphragmatic/inferior surface</p> <p>43. Identify the parts of the heart forming the left surface of the heart</p> <p>44. Identify the features on the left surface of the heart</p> <p>45. Demonstrates the structures related to left surface.</p> <p>46. Identify the subdivisions of atrio-ventricular groove</p> <p>47. Demonstrate the course and content of the right part of the atrio-ventricular groove</p> <p>48. Demonstrate the course and content of left part of the atrio-ventricular groove</p> <p>49. Identify the crux of the heart correctly</p> <p>50. Describe the location and the extent of the right atrium and right auricle accurately</p> <p>51. Describe the sulcus terminalis and its extent</p> <p>52. Describe the structures related to the right atrium in front, behind, lateral and medial</p> <p>53. Describe the two parts of right atrial chamber</p> <p>54. Describe the parts of right atrium forming the sinus Venarum</p> <p>55. Describe the situation and features of various openings of the right atrium</p> <p>56. Describe the location and features of the atrium proper</p> <p>57. Describe the location and parts of the interior of right ventricle</p> <p>58. Describe the features of the inflow and outflow tract of right ventricle</p> <p>59. Describe the situation of left atrium and auricle</p> <p>60. Describe the features of interior of left atrium</p> <p>61. Describe the location and parts of the interior of left ventricle</p> <p>62. Describe the features of the inflow and outflow tract of left ventricle</p> <p>63. Describe the features on the right and left side of interatrial septum</p> <p>64. Describe the components and features of ventricular septum</p>				
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AN22.3	<p>Describe and demonstrate origin, course and branches of coronary arteries</p> <ol style="list-style-type: none"> Describe the origin, course, branches and supply of the right coronary artery Describe the origin, course, branches and supply of the left coronary artery Describe the coronary predominance in man Describe the myocardial circulation and collateral circulation in heart with applied anatomy Demonstrate origin, course and branches of right coronary artery Demonstrate the origin, course, and branches of left coronary artery Describe the area supplied by right coronary artery Describe the area supplied by left coronary artery 	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	<p>Knowledge:</p> <p>MCQ's Short essay Short answers Viva - voce Skill assessment: Spotters Discussion OSPE</p>	Physiology
AN22.4	<p>Describe anatomical basis of ischaemic heart disease</p> <ol style="list-style-type: none"> Define ischaemic heart disease Describe the cause and risk factor of ischemic heart disease Explain the coronary blood flow in development of ischaemic heart disease 	K	KH	Y	Lecture and Demonstration(Small group)- 2 hrs	<p>Knowledge:</p> <p>MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE</p>	Physiology General medicine
AN22.5	<p>Describe & demonstrate the formation, course, tributaries and termination of coronary sinus</p> <ol style="list-style-type: none"> Describe the drainage and termination of venae cordis minimi and anterior cardiac veins Describe the formation, course and termination of coronary sinus Describe the tributaries and drainage of coronary sinus. Demonstrate formation, course and termination of coronary sinus. Demonstrate tributaries and their termination of coronary sinus 	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	<p>Knowledge:</p> <p>MCQ's Short essay Short answers Viva - voce Skill : Spotters Discussion OSPE</p>	

AN22.6	Describe the fibrous skeleton of heart 1. Describe the Parts and structure forming the skeleton of heart. 2. Describe the functions of the skeleton of heart.	K	KH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : OSPE	
AN22.7	Mention the parts, position and arterial supply of the conducting system of heart 1. Describe the parts and location of conducting system of heart. 2. Describe the arterial supply of the conducting system of heart. 3. Identify the location of the parts of conducting system of heart.	K	KH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Viva - voce Skill : OSPE	
Topic: Mediastinum							
AN23.1	Describe & demonstrate the external appearance, relations, blood supply, nerve supply,lymphatic drainage and applied anatomy of oesophagus 1. Describe the extension and dimensions of esophagus 2. Describe the curvatures and constrictions of esophagus and clinical significance 3. Describe the parts, course, and relations of esophagus 4. Describe the arterial supply ,venous and lymphatic drainage of esophagus 5. Describe the nerve supply of esophagus 6. Describe the applied anatomy of esophagus 7. Demonstrate the location of constriction of esophagus accurately 8. Identify the parts and demonstrate the relations of esophagus correctly	K/S	SH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE	General surgery

AN23.2	<p>Describe & demonstrate the extent, relations tributaries of thoracic duct and enumerate its applied anatomy</p> <ol style="list-style-type: none"> 1. Describe the location , extent, and dimensions of thoracic duct 2. Describe the formation, course, relations and termination of thoracic duct 3. Describe the tributaries of thoracic duct 4. Describe the applied anatomy of thoracic duct 5. Identify and demonstrate the formation, course, relations and termination of thoracic duct accurately 6. Identify the tributaries of thoracic duct correctly 	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	<p>Knowledge: MCQ's Long question Short essay Short answers Viva - voce Skill: Spotters OSPE</p>	General surgery
AN23.3	<p>Describe & demonstrate origin, course, relations, tributaries and termination of superior venacava, azygos, hemiazygos and accessory hemiazygos veins</p> <ol style="list-style-type: none"> 1. Describe the dimensions and location of superior vena cava 2. Describe the formation, course , and termination of superior vena cava 3. Describe the subdivisions and relations of superior vena cava 4. Describe the tributaries of superior vena cava 5. Describe the length, course and tributaries of the brachiocephalic veins 6. Describe the applied anatomy of superior vena cava 7. Describe the Location and function of azygos vein 8. Describe the formation, course, relation and termination of azygos vein 9. Describe the tributaries of azygos vein 10. Describe the applied aspect of azygos vein 11. Describe the location, formation, course, relations and termination of hemiazygos vein 12. Describe the tributaries of hemiazygos vein 13. Describe the location, formation, course, relations and termination of accessory hemiazygos vein 14. Describe the tributaries of accessory hemiazygos vein 15. Identify and demonstrate the superior vena cava, azygos, 	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	<p>Knowledge: MCQ's Long question Short essay Short answers Viva - voce Skill : Spotters OSPE</p>	

	hemiazygos, and accessory hemiazygos veins and their tributaries correctly							
AN23.4	<p>Mention the extent, branches and relations of arch of aorta & descending thoracic aorta</p> <ol style="list-style-type: none"> Describe the four parts of aorta Describe the extent, course and relations of ascending aorta Describe the aortic sinuses at the root of aorta Describe the branches and distribution of ascending aorta Describe the extent, course and relations of arch of aorta Describe the branches and distribution of arch of aorta Describe the extent, course and relations of descending thoracic aorta Describe the branches and distribution of descending thoracic aorta Explain aneurysm of aorta. Identify and demonstrate the parts and branches of aorta 	K	KH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE		
AN23.5	<p>Identify & Mention the location and extent of thoracic sympathetic chain</p> <ol style="list-style-type: none"> Describe the location, extent , course , and relations of thoracic sympathetic trunk Describe the ganglion and branches of thoracic sympathetic nerve. Describe the applied anatomy of sympathetic trunk Identify and demonstrate the thoracic sympathetic trunk 	K/S	SH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE		
AN23.6	<p>Describe the Splanchnic nerves</p> <ol style="list-style-type: none"> Describe the formation, course and termination of greater, lesser and least splanchnic nerves Describe the branches and distribution of the splanchnic nerves Describe the applied aspect of the splanchnic nerves Identify and demonstrate the splanchnic nerves 	K	KH	N	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short answers Viva - voce Skill: Spotters OSPE		
AN23.7	Mention the extent, relations and applied anatomy of lymphatic duct	K	KH	Y	Lecture and Demonstration(S	Knowledge: MCQ's	General surgery	

	1. Describe the origin and termination of the lymphatic duct 2. Describe the course and relations of the lymphatic duct 3. Describe the applied anatomy of the lymphatic duct.						Short essay Short answers Viva - voce Skill : Spotters OSPE	
Topic: Lungs & Trachea								
AN24.1	Mention the blood supply, lymphatic drainage and nerve supply of pleura, extent of pleura and describe the pleural recesses and their applied anatomy 1. Define and describe the layers of the pleura. 2. Describe the pulmonary ligament and its function 3. Describe the recesses of the pleura with clinical correlations 4. Describe the nerve supply with clinical correlation of pleura 5. Describe the arterial supply, venous and lymphatic drainage of pleura 6. Explain and demonstrate the layers of pleura	K	KH	Y	Lecture and Demonstration(Small group)- 2 hrs			General medicine Physiology
AN24.2	Identify side, external features and relations of structures which form root of lung & bronchial tree and their clinical correlate 1. Describe the anatomical position and determine the side of the lungs 2. Describe the lobes and fissures of lungs 3. Describe the external features and relations of lungs 4. Describe the relation and arrangement of structures in the root of the lungs 5. Describe the intrapulmonary bronchial tree and pulmonary units of lung with clinical correlations 6. Demonstrate the features that determines the side of lungs 7. Demonstrate the structures forming impressions on the surface of the lungs 8. Demonstrate the relation and arrangement of structures in the root of the lungs accurately	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs		Knowledge: MCQ's Short essay Short answers Viva - voce Skill: Spotters OSPE	General medicine Physiology

AN24.3	Describe a bronchopulmonary segment	K	KH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill: Spotters OSPE	General medicine Physiology
AN24.4	Identify phrenic nerve & describe its formation & distribution	K/S	SH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill: Spotters OSPE	
AN24.5	Mention the blood supply, lymphatic drainage and nerve supply of lungs	K	KH	Y	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE	
AN24.6	Describe the extent, length, relations, blood supply, lymphatic drainage and nerve supply of trachea	K	KH	N	Lecture and Demonstration(S mall group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill : Spotters OSPE	
	1. Define and describe the characteristic features of bronchopulmonary segment						
	2. Describe the number and nomenclature of bronchopulmonary segment						
	3. Explain the anatomical basis of bronchopulmonary segment in conservative lung surgery						
	1. Describe the formation and course of phrenic nerve						
	2. Describe the branches and distribution of phrenic nerve						
	3. Identify the phrenic nerve						
	1. Describe the arterial supply, venous and lymphatic drainage of lungs						
	2. Describe the nerve supply of lungs						
	1. Describe the extent & its variation, and dimensions of trachea						
	2. Describe the course and relations of thoracic part of trachea						
	3. Describe the arterial supply, venous and lymphatic drainage of trachea						
	4. Describe the nerve supply of trachea						
	5. Demonstrate palpation of trachea						
	6. Identify and explain the importance of carina correctly						

Topic: Thorax							
AN25.1	Identify, draw and label a slide of trachea and lung	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill: Slide discussion with identification of structures Spotters	General Surgery
	<ol style="list-style-type: none"> 1. Discuss the microscopic structure of trachea 2. Enumerate the layers of trachea 3. Discuss the type of epithelium lining the trachea 4. Identify and draw the microscopic structure of trachea 5. Discuss the microscopic structure of lung 6. Enumerate the division of respiratory tract 7. Differentiate between bronchus and bronchiole 8. Name the lining epithelium of alveoli of lung 9. Identify and draw the microscopic structure of lung 						
AN25.2	<p>Describe development of pleura, lung & heart</p> <ol style="list-style-type: none"> 1. Describe the formation of body cavities 2. Development of pleuropericardial membranes and its derivatives 3. Describe the development of various components of respiratory system 4. Enumerate stages of development of lung 5. Explain the embryological basis of anomalies associated with respiratory development 6. Discuss tracheoesophageal fistula – types, causation 7. Describe the formation of heart tube and its subdivisions 8. Describe the fate of various dilations of heart tube 9. Enumerate the development of chambers of heart 10. Describe the formation of interatrial septum 11. Describe the formation of interventricular system 12. Describe the steps in formation of valves of heart 13. Describe the development of conducting system of heart 14. Describe the formation of pericardium and sinuses 15. Identify and demonstrate steps involved in development of coelomic cavity 16. Identify and demonstrate steps involved in development of lung 17. Identify and demonstrate steps involved in development 	K	KH	Y	Lecture, Video/ Model/ Chart demonstration	Knowledge: Long essay, Short essay, Short answers, MCQ's Skill: Spotters, OSPE Viva-Voce	

	of interatrial septum 18. Identify and demonstrate steps involved in development of interventricular septum 19. Identify and demonstrate steps involved in development of various chambers of heart								
AN25.3	Describe fetal circulation and changes occurring at birth 1. Describe the path of fetal circulation 2. List the adult remnants of fetal structures associated	K	KH	Y	Lecture, Video demonstration	Short answers, MCQ's, OSPE, Viva-Voce			
AN25.4	Describe embryological basis of: 1) atrial septal defect, 2) ventricular septal defect, 3) Fallot's tetralogy & 4) tracheo-oesophageal fistula B198 1. Describe Atrial septal defect 2. Describe ventricular septal defect 3. Describe the components of Fallot's tetralogy 4. Discuss tracheoesophageal fistula – types, causation 5. Describe the embryological basis of the defects	K	KH	Y	Lecture, Video/model demonstration	Short answers, MCQ's, Spotters, OSPE, Viva-Voce			Physiology
AN25.5	Describe developmental basis of congenital anomalies, transposition of great vessels, dextrocardia, patent ductus arteriosus and coarctation of aorta 1. Transposition of great vessels 2. Dextrocardia 3. Patent ductus arteriosus 4. Coarctation of aorta 5. Identify and demonstrate causation of above	K	KH	Y	Lecture, Video/model demonstration	Short answers, MCQ's, Spotters, OSPE, Viva-Voce			Physiology
AN25.6	Mention development of aortic arch arteries, SVC, IVC and coronary sinus 1. Describe the formation and fate of pharyngeal arch arteries 2. Describe the development of vertebral artery 3. Describe the development of internal thoracic artery 4. Describe the fate of visceral veins and formation of portal vein 5. Describe the fate of cardinal veins and formation of SVC & IVC	K	KH	N	Lecture, Video/model demonstration	Short answers, MCQ's, Spotters, OSPE, Viva-Voce			

	6. Development of azygous vein 7. Identify and demonstrate the above development in chart or model given									
AN25.7	Identify structures seen on a plain x-ray chest (PA view) 1. Demonstrate the identifying features of X-chest PA view 2. Demonstrate the tracings of cardiac shadow 3. Identify the bones forming the thoracic cage 4. Identify the trachea, lungs and the domes of the diaphragm 5. Identify the shoulder joint	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Viva - voce Skill: Spotters OSPE				
AN25.8	Identify and describe in brief a barium swallow 1. Define barium swallow 2. Describe the procedure and contrast used in barium swallow 3. Describe indications and contraindications of barium swallow 4. Describe the normal and abnormal conditions of esophagus in barium swallow	K/S	SH	N	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: MCQ's Short essay Short answers Viva - voce Skill assessment: Spotters OSPE				
AN25.9	Demonstrate surface marking of lines of pleural reflection, lung borders and fissures, trachea, heart borders, apex beat & surface projection of valves of heart 1. Mark correctly the lines of pleural reflection in the given cadaver 2. Mark correctly the lung borders in the given cadaver 3. Mark correctly the fissures of lungs in the given cadaver 4. Mark correctly the trachea in the given cadaver 5. Mark correctly the borders of heart in the given cadaver. 6. Mark correctly the apex beat in the given cadaver 7. Mark correctly the valves of the heart in the given cadaver 8. Explain the clinical correlations of the surface markings	K/S	SH	Y	Lecture and Demonstration(Small group)- 2 hrs	Knowledge: Viva - voce Skill : Spotters				
Topic: Skull osteology										

AN26.1	Demonstrate anatomical position of skull, identify and locate individual skull bones in skull.	K/S	SH	Y	Lecture, Video Demonstration, Small group discussion	Knowledge: MCQ's Viva Skill: Spotters
	<ol style="list-style-type: none"> 1. Describe the anatomical position of the skull 2. Describe the individual bones forming skull 3. Identify the individual bones forming the skull 4. Demonstrate the anatomical position of skull 					
AN26.2	Describe the features of norma frontalis, verticalis, occipitalis, lateralis and basalis	K/S	SH	Y	Lecture, video demonstration, small group discussion	Knowledge: short answer MCQ's Skill: Surface marking, OSPE, spotters
	<ol style="list-style-type: none"> 1. Define norma frontalis, verticalis, occipitalis, lateralis and basalis 2. Describe the features of norma frontalis, verticalis, occipitalis, lateralis and basalis 3. Identify the foramina present in norma frontalis, verticalis, occipitalis, lateralis and basalis correctly 4. Enumerate the foramina and structures passing through the foramina in the norma frontalis, verticalis, occipitalis, lateralis and basalis 					
AN26.3	Describe cranial cavity its subdivisions, foramina and structures passing through them	K/S	SH	Y	Lecture, video demonstration, small group discussion	Knowledge: MCQ's Short answer Viva Skill: Spotters, OSPE
	<ol style="list-style-type: none"> 1. Name the divisions of cranial cavity 2. Describe the features of inner surface of calvaria 3. Name the subdivisions of interior of cranial cavity/ base of skull 4. Define the boundaries of anterior, middle and posterior cranial fossa 5. Describe the features of anterior, middle and posterior cranial fossa 6. Identify the foramina present in the cranial cavity 7. Enumerate the structures passing through the foramina in the cranial cavity 					
AN26.4	Describe morphological features of mandible	K	KH	Y	Lecture,	Knowledge:

	<ol style="list-style-type: none"> Name the presenting parts of mandible Discuss the features in the external and internal surface of the body of the mandible Describe the features of ramus of the mandible Identify the mandibular canal correctly Name the structures passing through mental and mandibular foramina Describe the muscle attachments of the mandible Discuss the age changes of the mandible Demonstrate the anatomical position of mandible 					Video demonstration, small group discussion	Short answers MCQ's Skill: Spotters OSPE of clinical case	
AN26.5	<p>Describe features of typical and atypical cervical vertebrae</p> <ol style="list-style-type: none"> Name the typical and atypical cervical vertebrae Enumerate the features of typical cervical vertebra Discuss carotid tubercle and its importance Name the structures passing through foramen transversarium of typical cervical vertebra Describe the attachments of typical cervical vertebra Discuss the atypical features of atlas Describe the attachments and relations of atlas Name the joints formed by atlas Discuss the atypical features of axis Describe the attachments of axis Name the joints formed by axis Identify cervical vertebra, atlas and axis Discuss the anatomical basis of judicial hanging 	K/S	SH	Y		Lecture, video demonstration Small group discussion	Knowledge: short answers, MCQ's viva Skill: OSPE, Spotters	
AN26.6	<p>Explain the concept of bones that ossifies in membrane</p> <ol style="list-style-type: none"> Recall ossification, types of ossification Define membranous ossification Discuss the process of membranous ossification Name the bones which follows membranous ossification 	K	KH	N		Lecture, video demonstration	Knowledge: short essay, short answer, MCQ's	
AN26.7	<p>Describe the features of 7th cervical vertebra</p> <ol style="list-style-type: none"> Enumerate the features of 7th cervical vertebra Describe the attachments of 7th cervical vertebra Name the structures passing through foramen transversarium of 7th cervical vertebra 	K/S	SH	N		Lecture, video demonstration, small group discussion	Knowledge: short answers, MCQ's viva Skill: Spotters	

	4. Identify the 7 th cervical vertebra							
Topic – Scalp								
AN27.1	Describe the layers of scalp, its blood supply, its nerve supply and surgical importance 1. Enumerate the layers of scalp 2. Discuss the features of layers of the scalp 3. Name the muscles present in the aponeurotic layer of the scalp 4. Discuss in detail about the dangerous layer of scalp 5. Describe the nerve supply of scalp 6. Describe the blood supply of scalp 7. Discuss the anatomical basis of black eye	K	KH	Y	Lecture , dissection	Knowledge: Long essay, short essay, short answer, MCQ, viva Practical : specimen discussion	General surgery	
AN27.2	Describe emissary vein with its role in spread of infection from extracranial route to intra cranial venous sinuses 1. Define emissary veins 2. Enumerate the features of emissary veins 3. Discuss how extracranial infection can spread to intracranial venous sinuses	K	KH	Y	lecture	Knowledge: Short essay, short answer, MCQS		
Topic – Face and parotid region								
AN 28.1	Describe and demonstrate muscles of facial expression and their nerve supply	K/S	SH	Y	Lecture, dissection, video	Knowledge: long essay,		

	<ol style="list-style-type: none"> 1. Discuss the classification of muscles of facial expression 2. Name the muscles of eyelid 3. Discuss orbicularis oculi under – parts, origin, insertion, actions 4. Name the muscles of nose 5. Name the muscles of lips and cheeks 6. Describe buccinator under – origin, insertion, nerve supply and action 7. Enumerate the structures piercing buccinator 8. Discuss orbicularis oris under - parts, origin, insertion, nerve supply and action 9. Define modiolus 10. Name the muscles forming modiolus 11. Discuss facial expressions and muscles causing them 12. Describe the nerve supply of muscles of face 13. Identify muscles of face 14. Demonstrate the attachments & actions of facial muscles 15. Demonstrate the muscles of facial expression 			<p>demonstration, small group discussion</p>	<p>short essay, short answer, MCQS skill: spotters, OSPE, Viva</p>	
<p>AN28.2</p>	<p>Describe sensory innervation of face</p> <ol style="list-style-type: none"> 1. Name the three divisions of trigeminal nerve 2. Name the branches of ophthalmic division of trigeminal nerve 3. Discuss the areas innervated by ophthalmic division of trigeminal nerve 4. Name the branches of maxillary division of trigeminal nerve 5. Discuss the areas innervated by maxillary division of trigeminal nerve 6. Name the branches of mandibular division of trigeminal nerve 7. Discuss the areas innervated by mandibular division of trigeminal nerve 8. Discuss the anatomical basis of corneal reflex 	<p>K</p>	<p>KH</p>	<p>Y</p>	<p>Lecture, dissection</p>	<p>Knowledge: short essay</p>

AN28.3	Describe and demonstrate origin/formation, course, branches/tributaries of facial vessels	K/S	SH	Y	Lecture, dissection, small group discussion	Knowledge: Short essay, short answer, MCQ Skill: spotters, surface marking, OSPE	
AN28.4	Describe and demonstrate the branches of facial nerve with distribution <ol style="list-style-type: none"> 1. Name the arteries supplying the face 2. Describe facial artery on the face along with branches 3. Describe facial vein under – formation, tributaries, deep connections and applied anatomy (dangerous area of face) 4. Discuss the formation and fate of retromandibular vein 5. Identify the facial artery on the face 6. Demonstrate the branches of facial artery in the face 7. Demonstrate the formation, tributaries and fate of retromandibular vein 8. Discuss the formation, tributaries and termination of external jugular vein 	K/S	SH	Y	Lecture, practical, small group discussion, video demonstration	Knowledge: Short essay, short answer, MCQ Skill: spotters, surface marking	
AN28.5	Describe cervical lymphnodes and lymphatic drainage of head and neck <ol style="list-style-type: none"> 1. Name the cervical group of lymphnodes 2. Describe the areas drained by cervical group of lymphnodes 3. Discuss the surgical importance of cervical lymphadenopathy 	K	KH	Y	Lecture, practical, small group discussion, video demonstration	Knowledge: Short essay, short answer, MCQ	
AN28.6	Identify superficial muscles of face, their nerve supply and actions Same as 28.1	K/S	SH	Y			
AN28.7	Explain the anatomical basis of facial nerve palsy <ol style="list-style-type: none"> 1. Recall the actions of muscles of face 2. Recall the innervation of facial muscles 3. Define lower motor neuron palsy 	K	KH	Y	Lecture	Knowledge: Short essay, MCQs, Viva, small group	General medicine

	4. Discuss the features of Bell's palsy							discussion	
AN28.8	Explain the surgical importance of facial vein 1. Recall the venous drainage of face 2. Describe the communications of facial vein with intra cranial venous sinus (cavernous sinus) 3. Discuss cavernous venous thrombosis with respect to deep facial vein	K	KH	Y	Lecture	Knowledge: Short essay, MCQs, Viva	General surgery		
AN28.9	Describe & demonstrate the parts, borders, surfaces, contents, relations and nerve supply of parotid gland with course of its duct and surgical importance 1. Enumerate the coverings of parotid gland 2. Describe the external features of parotid gland 3. Enumerate the structures present within the parotid gland 4. Describe the relations of parotid gland 5. Discuss parotid duct – course and termination 6. Describe the nerve supply of parotid gland 7. State the advantage of Hiltons method of draining parotid abscess 8. Identify parotid gland and parotid duct 9. Demonstrate the parts, borders and surfaces of parotid gland 10. Identify the structures present within the parotid gland 11. Demonstrate the relations of parotid gland	K/S	SH	Y	Lecture, dissection, video Demonstration, small group discussion	Knowledge: Short essay, short answer, MCQ Skill: spotters, surface marking	General surgery		
AN28.10	Explain the anatomical basis of Frey's syndrome 1. Discuss the sensory nerve supply of parotid region of the face 2. Describe the secretomotor pathway of parotid gland 3. Define parotidectomy	K	KH	N	Lecture	Knowledge: Short essay, short answer, MCQ	General surgery		
Topic : Posterior triangle of neck									
AN29.1	Describe and demonstrate attachments, nerve supply, relations and actions of sternocleidomastoid 1. Discuss origin and insertion of sternocleidomastoid 2. Name the muscles supplied by spinal accessory nerve	K/S	KH	Y	Lecture, dissection, video demonstration, small group	Knowledge: Short essay, short answer, MCQ			

	<ol style="list-style-type: none"> 3. Describe the nerve supply of sternocleidomastoid 4. Demonstrate the actions of sternocleidomastoid 5. Describe the relations of sternocleidomastoid 6. Demonstrate the attachments of sternocleidomastoid muscle 7. Demonstrate the structures related to sternocleidomastoid 					discussion	Skill: spotters, surface marking, OSPE & viva	
AN29.1a	Describe & Demonstrate the boundaries & contents of Posterior triangle of neck	K/S	SH	Y				
	<ol style="list-style-type: none"> 1. Describe the boundaries of posterior triangle of neck 2. Name the subdivisions of posterior triangle of neck 3. Enumerate the contents of posterior triangle of neck 4. Discuss the formation, tributaries and termination of external jugular vein 							
AN29.2	Explain anatomical basis of Erb's and klumpke's palsy	K	KH	Y		Lecture	Knowledge: short essay, short answer, MCQs, OSPE	General surgery
	Same as 10.6							
AN29.3	Explain anatomical basis of Wry neck	K	KH	N		Lecture, Video demonstration	Knowledge: short essay. Short answer, viva, OSPE	General surgery
	<ol style="list-style-type: none"> 1. Define Wry neck/ Torticollis 2. Enumerate its causes 3. Explain anatomical basis of Wry neck 							
AN29.4	Describe and demonstrate attachments of 1) inferior belly of omohyoid, 2) scalenus anterior 3) scalenusmedius 4) levator scapulae	K/S	SH	N		Lecture, Practical - dissection	Knowledge: short essay. Short answer, viva, OSPE. Skill: spotters, discussion	
	<ol style="list-style-type: none"> 1. Describe the attachments of inferior belly of Omohyoid 2. Identify the boundaries of Occipital triangle correctly 3. Describe the attachments of scalenus anterior 4. Enumerate the relations of scalenus anterior muscle 5. Discuss the boundaries of scaleno vertebral triangle 6. Describe the attachments of scalenus medius and levator scapulae muscles 7. Discuss the features and anatomical basis of scalenus anticus syndrome 8. Demonstrate the attachments of levator scapulae muscle 							

	accurately 9. Identify and demonstrate the attachments of scalenus anterior and scalenus medius muscle correctly 10. Identify omohyoid muscle and demonstrate the attachments correctly												
Topic – Cranial cavity													
AN30.1	Describe the cranial fossa and identify related structures 1. Describe the features of cranial cavity 2. Identify crista gali in the cut skull 3. Name the components of sella turcica 4. Identify cavum trigeminale and name the content	K/S	SH	Y	Lecture, Practical – dissection, small group discussion	Knowledge: short essay, short answer, MCQS skill: discussion, spotters, Viva-Voce							
AN30.2	Describe and Identify major foramina in the cranial cavity 1. Name the major foramina in the cranial cavity 2. Identify the foramina in the cut skull correctly 3. Enumerate the structures passing through the foramina of the cranial cavity	K/S	SH	Y	Lecture, Small group discussion & demonstration	Knowledge: short essay, short answer, MCQS skill: discussion, spotters, Viva							
AN30.3	Describe and identify the dural folds and dural venous sinuses 1. Name and identify the dural folds 2. Name the sinuses related to falx cerebri, falx cerebelli, tentorium cerebelli 3. Describe paired and unpaired venous sinuses 4. Describe location, walls and relations of cavernous sinus 5. Describe the contents of cavernous sinus 6. Describe the communications of cavernous sinus 7. Identify the cavernous sinus correctly 8. Demonstrate the relations and communications of cavernous sinus accurately 9. Describe the attachments of falx cerebri 10. Describe the attachments of tentorium cerebelli	K/S	SH	Y	Lecture, Practical – dissection, small group discussion	Knowledge: Long essay, short essay, short answer, MCQS skill: discussion, surface marking spotters, Viva							

	11. Describe location, and communications of superior sagittal sinus 12. Identify dural venous sinuses correctly 13. Identify dural folds correctly								
AN30.4	Describe clinical importance of dural venous sinuses 1. Discuss subdural hemorrhage and its etiology 2. Discuss the connections of cavernous venous sinus	K	KH	Y	Lecture, video demonstration, small group discussion	Knowledge: short essay, short answer, MCQS, Viva			
AN30.5	Explain effects of pituitary tumors on visual pathway 1. Discuss pituitary gland – location, relations, blood supply and applied anatomy 2. Discuss the visual pathway 3. Describe the lesions caused due to compression of optic chiasma	K	KH	Y	Lecture	Knowledge: long essay, short essay, short answer, MCQS			
AN31.1	Describe & Identify extra ocular muscles of eyeball 1. Describe the attachments & nerve supply of extra ocular muscles of orbit 2. Describe axes & movements of extra ocular muscles of orbit 3. Describe the associated movements of eyeball 4. Describe the attachments, actions & nerve supply of levator palpebrae superioris	K/S	SH	Y	Lecture Dissection demonstration Small group discussion	Knowledge: Long & short essay, Short answers MCQ's Skill: Spotters, Specimen discussion Viva-Voce			
AN31.2	Describe & demonstrate nerves & vessels in the orbit	K/S	SH	Y	Lecture	Knowledge: Ophthalmolog			

<p>1. Describe the functional components, peculiarities of optic nerve</p> <p>2. Describe the course & relations of intra orbital & canalicular part of optic nerve</p> <p>3. Describe the blood supply of optic nerve</p> <p>4. Identify the optic nerve correctly</p> <p>5. Describe the functional components of oculomotor nerve</p> <p>6. Describe the deep & superficial origin of oculomotor nerve</p> <p>7. Describe the course, relations & distribution of oculomotor nerve</p> <p>8. Identify the oculomotor nerve & its branches accurately</p> <p>9. Describe the situation, connections & branches of ciliary ganglion</p> <p>10. Identify the ciliary ganglion correctly</p> <p>11. Demonstrate the ciliary ganglion</p> <p>12. Describe the origin, course, distribution and peculiarities of trochlear nerve</p> <p>13. Identify the trochlear nerve correctly</p> <p>14. Describe the origin, course, distribution and peculiarities of abducent nerve</p> <p>15. Identify the abducent nerve correctly</p> <p>16. Describe the course & distribution of branches of lacrimal nerve</p> <p>17. Describe the course & distribution of branches of frontal nerve</p> <p>18. Describe the course & distribution of branches of nasociliary nerve</p> <p>19. Identify the lacrimal, frontal & nasociliary nerves correctly</p> <p>20. Demonstrate the branches of nasociliary nerve</p> <p>21. Describe the course & branches of ophthalmic artery</p> <p>22. Describe the course & tributaries of ophthalmic veins</p> <p>23. Demonstrate the ophthalmic artery & vein</p>					<p>Dissection demonstration</p> <p>Small group discussion</p>	<p>Short essay,</p> <p>Short answers</p> <p>MCQ's</p> <p>Skill:Spotters,</p> <p>OSPE</p> <p>Viva-Voce</p>	<p>y</p> <p>Physiology</p>
AN31.3	Describe anatomical basis of Horner's syndrome	K	KH	N	Lecture, Video	Short answers,	Ophthalmolog

	1. Describe the Horner's syndrome 2. Describe the anatomical basis of Horner's syndrome					demonstration	MCQ's, OSPE	y
AN31.4	Enumerate the components of lacrimal apparatus	K	KH	Y	Lecture	Short answers		
AN31.5	Explain the anatomical basis of oculomotor, trochlear and abducent nerve palsies along with strabismus	K	KH	Y	Lecture, video demonstration	Short answers, OSPE	Ophthalmology	
Topic : Anterior triangle								
AN32.1	Describe boundaries and subdivisions of anterior triangle 1. Describe the boundaries of anterior triangle of neck 2. Name the subdivisions of anterior triangle of neck	K	KH	Y	Lecture, Practical-dissection, small group discussion	Knowledge: long essay, short essay, short answer, MCQS		
AN32.2	Describe and demonstrate the boundaries and contents of muscular triangle, carotid triangle and submental triangle 1. Describe and identify boundaries and contents of muscular triangle 2. Describe the formation and branches of ansa cervicalis 3. Identify ansa cervicalis correctly 4. Demonstrate the branches of ansa cervicalis accurately 5. Describe the boundaries and contents of carotid triangle 6. Demonstrate the boundaries of carotid triangle accurately 7. Identify the contents of carotid triangle correctly 8. Discuss formation and contents of carotid sheath 9. Describe carotid body and carotid sinus with applied anatomy 10. Describe boundaries and contents of submental triangle 11. Demonstrate the boundaries of submental triangle accurately 12. Identify the contents of submental triangle correctly 13. Discuss the relations of posterior belly of digastric 14. Enumerate the branches of external carotid artery 15. Demonstrate the boundaries and contents of muscular triangle 16. Describe the boundaries and contents of digastric triangle	K/S	SH	Y	Lecture, video demonstration Practical-dissection, small group discussion	Knowledge: long essay, short essay, short answer, MCQS Skill : surface marking, spotter, discussion		

	17. Demonstrate the boundaries of digastric triangle accurately 18. Identify the contents of digastric triangle correctly								
Topic – Temporal and infra temporal regions									
AN33.1	Describe and demonstrate extent, boundaries and contents of temporal and infra temporal fossae 1. Describe the boundaries of temporal fossa 2. Enumerate the contents of temporal fossa 3. Describe the boundaries and contents of infratemporal fossa 4. Describe origin and divisions of maxillary artery 5. Describe the branches and relations of maxillary artery 6. Describe origin and course of mandibular nerve 7. Describe the branches and relations of mandibular nerve 8. Describe location, connections and branches of otic ganglion 9. Demonstrate the boundaries of temporal fossa correctly 10. Demonstrate the contents of temporal fossa accurately 11. Demonstrate the boundaries of infra temporal fossa correctly 12. Identify the maxillary artery and its branches correctly 13. Identify the mandibular nerve correctly 14. Demonstrate the branches of mandibular nerve correctly								
AN33.2	Describe and demonstrate attachments, direction of fibers, nerve supply and actions of muscles of mastication								
		K/S	SH	Y	Lecture, video demonstration Practical- dissection, small group discussion	Knowledge: long essay, short essay, short answer, MCQS Skill : surface marking, spotter, discussion			
		K/S	SH	Y	Lecture, video demonstration Practical-	Knowledge: long essay, short essay,			

	<ol style="list-style-type: none"> Describe and demonstrate attachments, direction of fibers, nerve supply and actions of masseter Describe and demonstrate attachments, direction of fibers, nerve supply and actions of temporalis Describe and demonstrate attachments, direction of fibers, nerve supply and actions of medial pterygoid Describe and demonstrate attachments, direction of fibers, nerve supply and actions of lateral pterygoid Discuss the relations of lateral pterygoid muscle Define lock jaw – give its anatomical basis Identify masseter and demonstrate its attachments accurately Identify temporalis and demonstrate its attachments accurately Identify medial pterygoid and demonstrate its attachments accurately Identify lateral pterygoid and demonstrate its attachments accurately 	K/S	SH	Y	dissection, small group discussion	short answer, MCQS Skill : surface marking, spotter, discussion, viva, OSPE	
AN33.3	<p>Describe and demonstrate articulating surface, type & movements of temporomandibular joint</p> <ol style="list-style-type: none"> Describe articulating surface and type of temporomandibular joint Describe ligaments and relations of temporomandibular joint Describe the movements and muscles involved of temporomandibular joint Demonstrate the movements of temporomandibular joint correctly Demonstrate the articulating surfaces of temporomandibular joint correctly 	K	KH	Y	Lecture, video demonstration Practical- dissection, small group discussion	Knowledge: long essay, short essay, short answer, MCQS Skill : spotter, viva, OSPE	
AN33.4	<p>Explain the clinical significance of pterygoid venous plexus</p> <ol style="list-style-type: none"> Describe the location, tributaries and communications of pterygoid plexus of veins Discuss its role in cavernous sinus thrombosis 	K	KH	Y	Lecture	Knowledge: short essay, short answer	General surgery

AN33.5	Describe the features of dislocation of temporomandibular joint	K	KH	N	Lecture	Knowledge: short essay, short answer	General surgery
1. Describe the articular disc of temporomandibular joint 2. Describe the features of temporomandibular joint 3. Describe the features of dislocation of temporomandibular joint							
Topic: Submandibular region							
AN34.1	Describe & demonstrate the morphology, relations and nerve supply of submandibular salivary gland & submandibular ganglion	K/S	SH	Y	Lecture Dissection demonstration Small group discussion	Knowledge: Long & short essay, Short answers MCQ's Skill:Spotters, Specimen discussion Viva-Voce	General Surgery
1. Describe the boundaries of submandibular region 2. Describe the superficial & deep parts of submandibular gland 3. Describe the parts of superficial part of submandibular gland 4. Discuss the relations of submandibular gland 5. Describe the course & termination of submandibular duct 6. Describe the blood supply of submandibular gland 7. Describe the nerve supply of submandibular gland 8. Describe the sublingual gland 9. Demonstrate the boundaries of submandibular region 10. Demonstrate the surfaces of superficial part of submandibular gland 11. Demonstrate the structures related to the surfaces of superficial part of submandibular gland 12. Identify the submandibular duct 13. Tell the location of submandibular ganglion 14. Describe the connections of submandibular ganglion 15. Describe the parasymphathetic route of submandibular ganglion 16. Enumerate the structures supplied by submandibular ganglion 17. Describe the origin & course of lingual nerve 18. Describe the branches and area of distribution of lingual nerve							

	19. Identify the lingual nerve 20. Demonstrate the branches of lingual nerve appropriately 21. Identify the submandibular ganglion 22. Identify the connections of submandibular ganglion correctly									
AN34.2	Describe the basis of formation of submandibular stones 1. Describe the bimanual examination of submandibular salivary gland 2. Define the sialography 3. Define the ranula	K	KH	N	Lecture, video demonstration	MCQ's OSPE Viva-Voce				
Topic: Deep structures in the neck										
AN35.1	Describe the parts, extent, attachments, modifications of deep cervical fascia 1. Name the parts of deep cervical fascia 2. Discuss the attachments of deep cervical fascia 3. Describe the horizontal tracings of deep cervical fascia 4. Describe the vertical tracings of deep cervical fascia 5. Describe the extent of pretracheal fascia 6. Describe the extent of prevertebral fascia 7. Describe the formation of carotid sheath 8. Name the content of carotid sheath 9. Describe the boundaries & contents of retropharyngeal space 10. Describe the boundaries & contents of lateral pharyngeal space 11. Discuss the applied importance of retropharyngeal space 12. Discuss the applied importance of carotid sheath 13. Identify the contents of carotid sheath 14. Demonstrate the boundaries of retropharyngeal space	K	KH	Y	Lecture, dissection demonstration Video demonstration	Knowledge: Long essay Short essay Short answers MCQ's Skill: Spotters OSPE of clinical case Viva-Voce				ENT

AN35.2	<p>Describe & demonstrate location, parts, borders, surfaces, relations & blood supply of thyroid gland</p> <ol style="list-style-type: none"> 1. Discuss the location of thyroid gland 2. Discuss the coverings of thyroid gland 3. Discuss the parts of thyroid gland 4. Describe the borders & surfaces of lateral lobe of thyroid gland 5. Describe the relations of lateral lobe of thyroid gland 6. Describe the borders & surfaces of isthmus of thyroid gland 7. Describe the relations of isthmus of thyroid gland 8. Discuss the arterial supply and venous drainage of thyroid gland 9. Discuss the nerve supply of thyroid gland 10. Identify the thyroid gland correctly 11. Demonstrate the parts of thyroid gland correctly 12. Demonstrate the surfaces and borders of lateral lobe of thyroid gland accurately 13. Demonstrate the surfaces & borders of isthmus 14. Demonstrate the relations of lateral lobe of thyroid gland 15. Demonstrate the blood vessels supplying the thyroid gland 16. Discuss the surgical importance of relations of thyroid arteries with nerve during thyroid surgeries 17. Discuss the surgical importance of capsule of thyroid gland 18. Discuss the clinical importance of attachment of capsule of thyroid gland 	K/S	SH	Y	<p>Lecture Dissection demonstration Small group discussion PBL/ CBD</p>	<p>Knowledge: Long essay, short essay, short answers, MCQ's Skill: OSPE, Spotters, Soft part discussion, Surface marking Viva-Voce</p>	<p>Surgery Physiology Endocrinology</p>
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AN35.3	<p>Demonstrate & describe the origin, parts, course and branches of subclavian artery</p> <ol style="list-style-type: none"> Describe the origin of subclavian artery Describe the parts and course of subclavian artery Describe the relations of 1st part of subclavian artery Describe the relations of 2nd part of subclavian artery Describe the relations of 3rd part of subclavian artery Discuss the branches of subclavian artery Identify the subclavian artery correctly Demonstrate the relations of subclavian artery accurately Identify and demonstrate the branches of subclavian artery accurately 	K/S	SH	Y	Lecture Dissection Demonstration	<p>Knowledge: Short essay short answers MCQ's Skill: Spotters Viva-Voce</p>
AN35.4	<p>Describe & demonstrate origin, relations, tributaries and termination of internal jugular & brachiocephalic vein</p> <ol style="list-style-type: none"> Describe the origin of Internal Jugular Vein Describe the course of Internal Jugular Vein Describe the termination of internal Jugular vein Discuss the relations of Internal Jugular Vein Describe the Tributaries of Internal Jugular Vein Discuss the communications of Internal Jugular Vein Identify the Internal Jugular Vein Demonstrate the tributaries of Internal Jugular Vein Discuss the surgical importance of Internal Jugular Vein Discuss the clinical importance of Internal Jugular vein Describe the formation of Brachiocephalic vein Describe the course of Brachiocephalic Vein Describe the termination of Brachiocephalic vein Discuss the relations of Brachiocephalic Vein Describe the Tributaries of Brachiocephalic Vein Discuss the communications of Brachiocephalic Vein Identify the Brachiocephalic Vein Demonstrate the tributaries of Brachiocephalic Vein Discuss the clinical importance of Internal Jugular Vein 	K/S	SH	Y	Lecture Dissection Demonstration	<p>Knowledge: Short essay short answers MCQ's Skill: Spotters Viva-Voce</p>

AN35.5	<p>Describe and demonstrate extent, drainage & applied anatomy of cervical lymph nodes</p> <ol style="list-style-type: none"> Describe the inner & outer circle of lymph nodes Describe the classification of deep cervical lymph nodes Describe the location & area drained by jugulo digastric lymph nodes Describe the location & area drained by jugulo omohyoid lymph nodes Describe the location & area drained by submental lymph nodes Describe the location & area drained by buccal, parotid, retroauricular, occipital lymph nodes Describe the location & area drained by pre laryngeal & retropharyngeal nodes Demonstrate the location of all cervical lymph nodes Discuss the surgical importance of cervical lymph nodes 	K/S	SH	Y	Lecture Dissection Demonstration	Knowledge: Short essay short answers MCQ's Skill: OSPE Viva-Voce	Surgery ENT
AN35.6	<p>Describe and demonstrate the extent, formation, relation & branches of cervical sympathetic chain</p> <ol style="list-style-type: none"> Describe the components of cervical sympathetic chain Describe the location, formation and branches of superior cervical ganglion Describe the location, formation, branches and communications of middle cervical ganglion Describe the location, formation, relations and branches of inferior cervical ganglion Discuss the surgical importance of cervical sympathetic chain Identify the cervical sympathetic chain Demonstrate the branches of cervical sympathetic chain 	K/S	SH	Y	Lecture Dissection demonstration Video demonstration Case based learning	Knowledge: short answers MCQ's Skill: Spotters, OSPE Viva-Voce	

AN35.7	<p>Describe the course and branches of IX,X, XI & XII nerve in the neck</p> <ol style="list-style-type: none"> 1. Describe the deep origin & central connections of Hypoglossal Nerve 2. Describe the superficial origin, course & relations of Hypoglossal nerve 3. Describe the branches & distribution of Hypoglossal nerve 4. Identify the Hypoglossal nerve 5. Demonstrate the branches of Hypoglossal nerve 6. Discuss the clinical importance of Hypoglossal nerve 7. Describe the parts of Accessory nerve 8. Describe the deep & superficial origin, course, relations & distribution of cranial part of Accessory Nerve 9. Describe the deep & superficial origin , course, relations & branches of spinal part of Accessory Nerve 10. Identify the Accessory nerve 11. Demonstrate the branches of cervical & spinal part of Accessory nerve 12. Discuss the clinical importance of Accessory nerve 13. Describe the nuclear origin & functional components of vagus Nerve 14. Describe the superficial origin , course & relations of right & left vagus nerve in head & Neck 15. Describe the course & relations of right & left vagus nerve in thorax 16. Describe the course & relations of right & left vagus nerve in abdomen 17. Describe the branches & distribution of vagus nerve in neck, thorax and abdomen 18. Describe the difference between right & left recurrent laryngeal nerves 19. Identify the vagus nerve & recurrent laryngeal nerve correctly 20. Demonstrate the branches of vagus nerve 21. Discuss the clinical importance of vagus nerve 	K	KH	Y	Lecture Small group discussion Dissection demonstration	Knowledge: Long essay Short essay Short answers MCQ's Skill: Spotters, OSPE Viva-Voce	Surgery, Gastro- enteroogy
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	22. Describe the deep origin & central connections of glossopharyngeal Nerve 23. Describe the superficial origin , course & relations of glossopharyngeal nerve 24. Describe the branches & distribution of glossopharyngeal nerve 25. Identify the glossopharyngeal nerve correctly 26. Demonstrate the branches of glossopharyngeal nerve accurately 27. Discuss the clinical importance of glossopharyngeal nerve												
AN35.8	Describe the anatomically relevant clinical features of thyroid swellings	K	KH	N	Small group discussion, video demonstration	MCQ's, OSPE, Viva-Voce	General Surgery						
AN35.9	1. Describe why thyroid swelling moves with deglutition Describe the clinical features of compression of subclavian artery and lower trunk of brachial plexus by cervical rib	K	KH	N			General Surgery						
AN35.10	Describe the fascial spaces of Neck	K	KH	N			General Surgery						
	1. Describe the boundaries & contents of retropharyngeal space 2. Describe the boundaries & contents of lateral pharyngeal space 3. Discuss the applied importance of retropharyngeal space 4. Demonstrate the boundaries of retropharyngeal & lateral pharyngeal spaces 5. Discuss the applied importance of lateral pharyngeal space												
Topic: Mouth, Pharynx & Palate													
AN36.1	Describe the morphology, relations, blood supply and applied anatomy of palatine tonsil, Pharynx and composition of soft palate	K/S	KH/SH	Y	Lecture:2hrs Dissection demonstration,	Knowledge: long essay, short essay, short answers, MCQ's Skill:spotters, specimen	ENT Physiology						
	1. Describe the parts of soft palate 2. Describe the composition of soft palate 3. Describe the attachments & actions of palatine muscles 4. Describe the motor & sensory nerve supply of soft palate												

	<p>5. Describe the blood supply of soft palate</p> <p>6. Identify the soft palate</p> <p>7. Demonstrate the palatine muscle</p> <p>8. Discuss the situation of palatine tonsil</p> <p>9. Describe the parts of palatine tonsil</p> <p>10. Describe the relations of palatine tonsil</p> <p>11. Describe the blood supply & nerve supply of palatine tonsil</p> <p>12. Describe the clinical significance of palatine tonsil</p> <p>13. Identify the palatine tonsil</p> <p>14. Demonstrate the relations of palatine tonsil</p> <p>15. Describe the parts of pharynx</p> <p>16. Describe the interior of nasopharynx, oropharynx & laryngopharynx</p> <p>17. Describe the attachments and actions of constrictor muscles of pharynx</p> <p>18. Describe the attachments & actions of longitudinal muscles of pharynx</p> <p>19. Describe the structures passing between the constrictor muscles</p> <p>20. Describe the motor & sensory nerve supply of pharynx</p> <p>21. Describe the blood supply of pharynx</p> <p>22. Describe the formation of pharyngeal plexus</p>					
AN36.2	<p>Describe the components & functions of waldeyers ring</p> <p>1. Describe the location and components of waldeyers ring</p> <p>2. Describe the functions of waldeyers ring</p>	K	KH	Y	Lecture Video demonstration	Short answer MCQ's ENT
AN36.3	<p>Describe the boundaries and clinical significance of pyriform fossa</p> <p>1. Describe the boundaries of pyriform fossa</p> <p>2. Describe the clinical significance of pyriform fossa</p>	K	KH	N	Lecture Video demonstration	Short answer MCQ's ENT
AN36.4	<p>Describe the anatomical basis of tonsillitis, tonsillectomy, adenoids and peritonsillar abscess</p>	K	KH	N	Lecture Video demonstration	Short answer MCQ's ENT
AN36.5	<p>Describe the clinical significance of killan's dehiscence</p> <p>1. Describe the location of killan's dehiscence</p> <p>2. Describe the clinical significance of killan's dehiscence</p>	K	KH	N	Lecture Video demonstration	Short answer MCQ's ENT

Topic: Nasal Cavity							
AN37.1	Describe and demonstrate features of nasal septum, lateral wall of nose, their blood supply and nerve supply	K/S	SH	Y	Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	ENT
	<ol style="list-style-type: none"> Describe the boundaries of nasal cavity Describe the formation of nasal septum Describe the blood supply & lymphatic drainage of nasal septum Describe the nerve supply of nasal septum Describe the formation of lateral wall of nasal cavity Describe the blood supply & lymphatic drainage of lateral wall of nasal cavity Describe the nerve supply of lateral wall of nasal cavity Describe the features and openings of meatuses of lateral wall of nasal cavity Describe the lining epithelium of nasal cavity Describe the anatomical basis of nasal bleeding Describe the anatomical basis of dangerous area of face Identify the vomer bone correctly in the given specimen Identify the conchae & meatuses accurately in the given specimen Demonstrate the openings in the meatuses accurately in the dissected cadaver 						
AN37.2	<p>Describe the location and functional anatomy of paranasal sinuses</p> <ol style="list-style-type: none"> Describe the functions of paranasal air sinuses Describe the location, boundaries, blood supply, nerve supply & communication of frontal air sinuses Describe the location, boundaries, blood supply, nerve supply & communication of ethmoidal air sinuses Describe the location, boundaries, blood supply, nerve supply & communication of maxillary air sinuses Describe the location, boundaries, relations, blood supply, nerve supply & communication of sphenoidal air sinuses Describe the surgical importance of paranasal air sinuses Identify the openings of paranasal sinuses correctly in the given specimen 	K	KH	Y	Lecture Small group discussion	Knowledge: Short essay Short answers MCQ's Skill:Spotters,	ENT Radiology

AN37.3	Describe the anatomical basis of sinusitis & maxillary sinus tumours	K	KH	N	Case based discussion	MCQ's, OSPE	ENT
Topic - Larynx							
AN38.1	<p>Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx</p> <ol style="list-style-type: none"> Describe the location and extent of larynx Enumerate the cartilages of larynx with their position Describe the parts and attachments of thyroid cartilage Describe the joints formed by cartilages of larynx Describe the ligaments and membranes of larynx Describe the intrinsic and extrinsic muscles of the larynx along with the nerve supply Discuss the blood supply of larynx Describe the actions of intrinsic and extrinsic muscles of the larynx Describe the features of cavity of larynx Describe the blood supply and nerve supply of larynx Identify the cartilages of larynx correctly in the given specimen Identify the intrinsic and extrinsic muscles of larynx in the given specimen Identify & Demonstrate the features of cavity of larynx in the given specimen Describe the importance of watershed line of larynx 	K/S	SH	Y	Lecture, video demonstration Practical- dissection, small group discussion	Knowledge: long essay, short essay, MCQS Skill : surface marking, spotter, discussion, OSPE	ENT
AN38.2	<p>Describe the anatomical aspects of laryngitis</p> <ol style="list-style-type: none"> Describe the features of cavity of larynx 	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	ENT
AN38.3	<p>Describe the anatomical basis of recurrent nerve injury</p> <ol style="list-style-type: none"> Discuss the origin & course of recurrent laryngeal nerve Describe the innervations of Recurrent laryngeal nerve Describe the different shapes of rima glottidis 	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	ENT

Topic: Tongue							
	K/S	SH	Y	Lecture, dissection demonstration, case based discussion	Knowledge: long essay, short essay, short answers, MCQ'S Skill: Specimen discussion, spotters, OSPE Viva-voce	ENT	
AN39.1	Describe & demonstrate the morphology, nerve supply, embryological basis of nerve supply, blood supply, lymphatic drainage and actions of extrinsic and intrinsic muscles of tongue						
	<ol style="list-style-type: none"> Describe the parts and features of tongue Discuss the difference in the morphology of dorsum & ventral surface of tongue Describe the attachments & actions of extrinsic muscles of tongue Describe the attachments & actions of intrinsic muscles of tongue Describe the motor & sensory nerve supply of tongue Describe the embryological basis of nerve supply of tongue Describe the blood supply of tongue Describe the lymphatic drainage of tongue Describe the clinical significance of lymphatic drainage of tongue Demonstrate the parts of tongue correctly Demonstrate the extrinsic muscles of tongue accurately Describe the anatomical importance of lymphatic drainage of tongue 						
AN39.2	Explain the anatomical basis of hypoglossal nerve palsy	K	KH	N	Lecture	MCQ's	ENT
Topic : Organ of hearing and equilibrium							
	K/S	SH	Y	Lecture, video demonstration Practical- dissection, small group discussion	Knowledge:short answer, MCQS Skill : spotter, discussion, viva	ENT	
AN40.1	Describe and identify the parts, blood supply and nerve supply of external ear						
	<ol style="list-style-type: none"> Describe and identify parts of external ear Outline the blood supply and nerve supply of external ear Discuss external acoustic meatus- subdivisions, blood supply and nerve supply Identify the parts of external ear 						

	K /S	SH	Y	Lecture, video demonstration Practical- dissection, small group discussion	Knowledge: long essay, short essay, short answer, MCQS Skill : spotter, discussion, viva	ENT
AN40.2	Describe and demonstrate the boundaries , contents, relations and functional anatomy of middle ear and auditory tube					
	<ol style="list-style-type: none"> Describe and identify the boundaries if middle ear Enumerate the contents of middle ear Describe the parts, blood supply and nerve supply of tympanic membrane Describe the clinical importance of tympanic membrane Describe the features, joints formed and functions of ear ossicles Describe the blood supply & nerve supply of middle ear Describe the muscles of middle ear- attachment, actions, nerve supply and applied anatomy Describe boundaries and cells mastoid antrum- Describe auditory tube – parts, relations, muscles attached Discuss the functions of auditory tube Demonstrate the boundaries of middle ear accurately in the given specimen Identify the parts of auditory tube correctly Demonstrate the relations of middle ear accurately in the given specimen Identify the contents of middle ear correctly Demonstrate the relations of auditory tube 					
AN40.3	Describe the features of internal ear					
	<ol style="list-style-type: none"> Discuss bony labyrinth Discuss membranous labyrinth Describe the structure & functions of organ of Corti 					
AN40.4	Explain anatomical basis of otitis externa and otitis media					
	<ol style="list-style-type: none"> Describe the course and lining of external acoustic meatus Describe the mucous lining of middle ear Describe the anatomical basis of otitis media 					
AN40.4	Explain anatomical basis of myringotomy					

	1. Define myringotomy 2. Describe the anatomical importance of myringotomy							long essay, short essay, short answer, MCQ	
Topic: Back region									
AN42.1	Describe the contents of vertebral canal	K/S	SH	Y					
AN42.2	Describe & demonstrate the boundaries and contents of Suboccipital triangle 1. Describe the boundaries of suboccipital triangle 2. Describe the contents of suboccipital triangle 3. Describe great occipital & third occipital nerve 4. Describe occipital artery 5. Identify the boundaries of suboccipital triangle correctly in the given specimen 6. Demonstrate the contents of suboccipital triangle in the dissected specimen 7. Discuss the clinical significance of suboccipital triangle	K/S	SH	Y			Lecture, dissection demonstration, video demonstration	Knowledge: short essay, short answers, MCQ'S Skill: spotters, Specimen discussion, OSPE	
AN42.3	Describe the position, direction of fibers, relations, nerve supply, actions of semispinalis capitis and splenius capitis 1. Describe the muscles of back 2. Describe the attachments & actions of semispinalis capitis 3. Describe the relations & nerve supply of semispinalis capitis 4. Describe the attachments & actions of splenius capitis 5. Describe the relations & nerve supply of splenius capitis 6. Describe the erector spinae muscle	K	KH	N			Lecture, dissection demonstration	Spotters	
Topic: head & neck joints, Histology, development, radiology & Surface marking									
AN43.1	Describe & demonstrate the movements with muscles producing the movements of atlantooccipital joint & atlantoaxial joint	K/S	SH	Y			Lecture, video demonstration	Knowledge: short answers, MCQ'S	

	<ol style="list-style-type: none"> 1. Describe the type & ligaments of atlanto occipital joints 2. Describe the movements & muscles producing the movements & nerve supply of atlanto occipital joints 3. Describe the type & ligaments of medial atlanto axial joints 4. Describe the type & ligaments of lateral atlanto axial joints 5. Describe the movements & muscles producing the movements & nerve supply of atlanto axial joints 						
AN43.2	<p>Identify, describe and draw the microanatomy of pituitary gland, thyroid, parathyroid gland, tongue, salivary glands, tonsil, epiglottis, cornea, retina</p> <ol style="list-style-type: none"> 1. Discuss the microscopic structure of pituitary gland 2. Enumerate the lobes of pituitary gland 3. Name the different types of cells in anterior lobe 4. Differentiate the staining characteristics of chromophils and chromophobes 5. Identify and draw the microscopic structure of pituitary gland accurately 6. Discuss the microscopic structure of thyroid gland 7. Discuss the different stages of follicles 8. Enumerate the lining epithelium of different stages of follicles 9. Identify and draw the microscopic structure of thyroid gland correctly 10. Discuss the microscopic structure of parathyroid gland 11. Enumerate the cells of parathyroid gland 12. Identify and draw the microscopic structure of parathyroid gland accurately 13. Discuss the microscopic structure of tongue 14. Define papilla 15. Enumerate the different types of papillae 16. Differentiate filiform, fungiform and circumvallate papillae 17. Identify and draw the microscopic structure of tongue accurately 18. Discuss the microscopic structure of parotid gland 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Sm all group)- 02hrs	Skill: spotters Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Slide discussion with identification of structures Spotters	General Surgery

AN43.3	<p>19. Define serous acini</p> <p>20. Discuss duct system of parotid gland</p> <p>21. Differentiate serous and mucous acini</p> <p>22. Identify and draw the microscopic structure of parotid gland</p> <p>23. Discuss the microscopic structure of submandibular salivary gland</p> <p>24. Enumerate structure of mucous acini</p> <p>25. Explain serous Demilune</p> <p>26. Differentiate parotid and submandibular salivary gland</p> <p>27. Identify and draw the microscopic structure of submandibular salivary gland accurately</p> <p>28. Discuss the microscopic structure of palatine tonsil</p> <p>29. Explain the epithelium of palatine tonsil</p> <p>30. Differential lymph node and palatine tonsil</p> <p>31. Identify and draw the microscopic structure of palatine tonsil</p> <p>32. Discuss the microscopic structure of epiglottis</p> <p>33. Name the type of cartilage in epiglottis</p> <p>34. Explain the lining epithelium of epiglottis</p> <p>35. Identify and draw the microscopic structure of epiglottis</p> <p>36. Discuss the microscopic structure of cornea</p> <p>37. Enumerate the lining epithelium of cornea</p> <p>38. Discuss the layers of cornea</p> <p>39. Enumerate the reasons for transparency of cornea</p> <p>40. Identify and draw the microscopic structure of cornea accurately</p> <p>41. Discuss the microscopic structure of retina</p> <p>42. Discuss the lining epithelium of retina</p> <p>43. Enumerate the layers of retina</p> <p>44. Discuss the different types of cells in each layer</p> <p>45. Identify and draw the microscopic structure of retina</p> <p>Identify, describe and draw microanatomy of olfactory epithelium, eyelid, lip, sclero-corneal junction, optic nerve, cochlea- organ of corti, pineal gland</p> <p>1. Discuss the microscopic structure of olfactory epithelium</p>	K/S	SH	N	Lecture – 1 Hr Practical demonstration(Sma II group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's	
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AN43.4	<p>2. Explain the different types of cells of olfactory mucosa</p> <p>3. Identify and draw the microscopic structure of olfactory epithelium</p> <p>4. Discuss the microscopic structure of eyelid</p> <p>5. Enumerate the layers of eyelid</p> <p>6. Describe the clinical significance of eyelid</p> <p>7. Identify and draw the microscopic structure of eyelid</p> <p>8. Discuss the microscopic structure of lip</p> <p>9. Describe the layers of lip</p> <p>10. Identify and draw the microscopic structure of lip accurately</p> <p>11. Discuss the microscopic structure of sclero-corneal junction</p> <p>12. Identify and draw the microscopic structure of sclero-corneal junction accurately</p> <p>13. Discuss the microscopic structure of optic nerve</p> <p>14. Explain the coverings of optic nerve</p> <p>15. Define the nerve cells present in optic nerve</p> <p>16. Differentiate cross section of peripheral nerve and optic nerve</p> <p>17. Identify and draw the microscopic structure of optic nerve accurately</p> <p>18. Discuss the microscopic structure of organ of corti</p> <p>19. Define the lining epithelium of organ of corti</p> <p>20. Define scala media, scala tympani and scala vestibule</p> <p>21. Define the different types of cells of organ of corti</p> <p>22. Identify and draw the microscopic structure of organ of corti</p> <p>23. Discuss the microscopic structure of pineal gland</p> <p>24. Enumerate the cells of pineal gland</p> <p>25. Identify and draw the microscopic structure of pineal gland</p>			<p>Practical discussion Skill assessment: Slide discussion with identification of structures Spotters</p>	
AN43.4	<p>Describe the development and developmental basis of congenital anomalies of face, palate, tongue, branchial apparatus, pituitary gland, thyroid gland & eye</p>	K	KH	Y	
	<p>1. Describe the steps involved in development of various</p>				

	parts of face – lips, cheeks, eyes, nose, external ear 2. Describe the formation of nasal cavities, septum and paranasal air sinuses 3. Describe the steps in development of face 4. Describe the development of oral cavity, teeth and pharynx 5. Describe the development of tongue 6. Identify and demonstrate the above development in chart or model given								
AN43.5	Demonstrate 1. Testing of muscles of facial expression, extraocular muscles, muscles of mastication 2. Palpation of carotid arteries, facial artery, superficial temporal artery 3. Location on internal and external jugular veins 4. Location of hyoid bone, thyroid cartilage and cricoid cartilage with their vertebral level 1. Demonstrate the clinical testing of muscles of facial expression accurately 2. Demonstrate the clinical testing of muscles of mastication accurately 3. Demonstrate the palpation of carotid, facial & superficial temporal arteries accurately 4. Demonstrate the location of internal & external jugular veins accurately 5. Demonstrate the location of hyoid bone, thyroid cartilage and cricoid cartilages with respect to vertebral level	K/S	SH	Y	Video demonstration Practical demonstrations on simulators or subjects	OSPE Viva-Voce	General surgery		
AN43.6	Demonstrate surface projection of thyroid gland, parotid gland & duct, pterion, common carotid artery, internal jugular vein, subclavian vein, external jugular vein, facial artery in the face and accessory nerve	K/S	SH	Y	Demonstration on cadaver	OSPE Viva-Voce	General Surgery		

	1. Mark the thyroid gland on the surface of given cadaver 2. Mark the parotid gland & parotid duct on the surface of given cadaver 3. Mark the pterion on the surface of given cadaver 4. Mark the common carotid artery on the surface of given cadaver 5. Mark the internal jugular, external jugular & subclavian vein on the surface of given cadaver 6. Mark the facial artery in the face of given cadaver 7. Mark the accessory nerve on the surface of given cadaver									
AN43.7	Identify the anatomical structure in 1. Plain X-ray skull 2. AP view & Lateral View 3. Plain X-ray cervical spine AP & lateral view 4. Plain X-ray of paranasal sinuses	K/S	SH	Y	Practical	Spotters OSPE Viva-Voce	Raiodiagnosis			
AN43.8	Describe the anatomical route used for carotid angiogram and vertebral angiogram 1. Describe angiogram 2. Describe the anatomical route used for carotid angiogram and vertebral angiogram	K/S	SH	N	Video demonstration	OSPE, Viva-Voce	Radiodiagnosis			
AN43.9	Identify anatomical structures in carotid angiogram and vertebral angiogram	K/S	SH	N	Practical	Spotters, OSPE, Viva-Voce	Radiodiagnosis			
Topic: Anterior abdominal wall										
AN44.1	Describe & demonstrate the Planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions & Quadrants of abdomen	K/S	SH	Y	Lecture – 1 Hr Practical demonstration	Knowledge: Short essay/ short answers/	Surgery			

AN44.2:	<ol style="list-style-type: none"> 1. Enumerate the structures at transpyloric plane 2. Enumerate the structures at transtuberular plane 3. Enumerate the structures at subcostal plane 4. Describe the transpyloric, transtuberular, subcostal, lateral vertical planes, linea alba & linea semilunaris of the abdomen 5. Describe the 9 quadrants of the abdomen and its clinical significance 6. Correlate the structures of transpyloric, subcostal plane and transtuberular plane with CT and MRI images 7. Mark accurately the planes and 9 quadrants of abdomen in the given cadaver 8. Discuss the importance of Langer's lines while putting abdominal incisions 9. Demonstrate the various regions over the given cadaver 	K/S	SH	Y	(Small group)- 02hrs	MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Discussion with identification of structures Spotters	
	<p>Describe & identify the fascia, nerves & blood vessels of anterior abdominal wall</p> <ol style="list-style-type: none"> 1. Describe the superficial Camper's fascia and deep Scarpa's fascia over the anterior abdominal wall 2. Identify the attachment of the fascia and to mark over the Holden's line 3. Discuss the clinical significance of Camper's fascia and Scarpa's fascia, and how these fasciae prevent the extravasation of urine in case of urethral rupture in males 4. Enumerate the nerves innervating the anterior abdominal wall 5. Identify the lower 6 thoracic nerves and L1 branches (iliohypogastric and ilioinguinal nerves) & Subcostal nerve 6. Enumerate the anterior, lateral and 3 superficial inguinal arteries & veins 7. Discuss the clinical importance of superficial veins of abdomen as seen in Portal vein obstruction leading to the formation of Caput medusae 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Discussion with identification of structures Spotters	

		<p>8. Demonstrate the Camper and scarpa's fascia</p> <p>9. Demonstrate the vessels and nerves seen in the anterior abdominal wall in the dissected cadaver</p>	<p>K/S</p>		
<p>AN44.3:</p>	<p>Describe the formation of rectus sheath and its contents</p> <ol style="list-style-type: none"> 1. Describe the mode of formation & boundaries of Rectus sheath 2. Enumerate the contents of the Rectus sheath 3. Describe the origin, insertion, nerve supply, action and peculiarities of the Rectus abdominis muscle 4. Demonstrate the Rectus sheath in the given cadaver 5. Demonstrate the contents of Rectus sheath in the dissected cadaver 		<p>SH</p>		<p>Y</p>
			<p>Lecture</p>		<p>Knowledge : long essay, short essay, short answer, MCQ</p>

AN44.4:	<p>Describe & demonstrate extent, boundaries, contents of inguinal canal including Hesselbach's triangle</p>	K/S	SH	Y	Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	<p>Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Discussion with identification of structures Spotters</p>	General surgery
	<ol style="list-style-type: none"> 1. Describe the extent and boundaries of Inguinal canal 2. Describe the contents of Inguinal canal in male and female cadavers 3. Demonstrate the extent & boundaries of inguinal canal in the given cadaver correctly 4. Identify and demonstrate the contents of Inguinal canal in male and female cadavers accurately 5. Describe formation & location of superficial inguinal ring 6. Enumerate the structures passing through the superficial inguinal ring in male & female 7. Describe formation & location & contents of deep inguinal ring 8. Enumerate the structures passing through the deep inguinal ring in male & female 9. Identify the superficial inguinal ring in male & female cadavers correctly 10. Identify the deep inguinal ring in male & female cadavers correctly 11. Describe the location and boundaries of Hesselbach's triangle 12. Identify & demonstrate the boundaries of Hesselbach's triangle in the dissected cadaver correctly 						

	13. Describe the anatomical significance of hesselbach's triangle									
AN44.5:	<p>Explain the anatomical basis of inguinal hernia</p> <ol style="list-style-type: none"> Describe the defensive mechanism to maintain the integrity of the inguinal canal Define inguinal hernia & femoral hernia Describe the anatomical basis of inguinal hernia Describe the coverings of direct & indirect inguinal hernia Differentiate between direct and indirect inguinal hernias Differentiate inguinal hernia from femoral hernia Identify the site of direct & indirect inguinal hernia Demonstrate the coverings of direct & indirect inguinal hernia correctly in the dissected cadaver 	K/S	SH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery			
AN44.6:	<p>Describe & demonstrate attachments of muscles of anterior abdominal wall</p> <ol style="list-style-type: none"> Enumerate the muscles of anterior abdominal wall Identify the muscles of anterior wall of abdomen in the dissected cadaver Describe the attachments, direction of fibers, nerve supply & actions of External oblique muscle Describe the attachments, direction of fibers, nerve supply & actions of internal oblique muscle Describe the attachments, direction of fibers, nerve supply & actions of transverse abdominis muscle Demonstrate the attachments of external oblique muscle in the dissected cadaver correctly Demonstrate the attachments & direction of fibers of internal oblique muscle in the dissected cadaver correctly Demonstrate the attachments & direction of fibers of transverse abdominis muscle in the given cadaver correctly Describe the structures derived from the flat muscles of anterior abdominal wall 	K	KH	N	Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Discussion with identification of structures Spotters	General surgery			

	10. Describe the formation & components of conjoint tendon 11. Demonstrate the conjoint tendon in the given cadaver correctly 12. Describe the formation & extensions of inguinal ligament 13. Demonstrate the inguinal ligament in the dissected cadaver correctly 14. Describe the formation and action of cremaster muscle 15. Demonstrate the formation and action of cremaster muscle in the dissected cadaver correctly 16. Describe the cremasteric reflex 17. Describe the attachment, action & nerve supply of pyramidalis 18. Identify and demonstrate the pyramidalis in the dissected cadaver correctly	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery
AN44.7:	Enumerate common abdominal incisions 1. Enumerate the common abdominal incisions 2. Discuss anatomical importance of Langer's line for abdominal skin incisions						
Topic: Posterior Abdominal Wall							
AN45.1:	Describe Thoracolumbar fascia 1. Name the layers of thoracolumbar fascia 2. Describe the features of thoraco lumbar fascia 3. Describe the attachment of anterior, middle and posterior layers of Thoracolumbar fascia 4. Name the muscles attached to the Thoracolumbar fascia	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	
AN45.2:	Describe & demonstrate Lumbar plexus for its root value, formation & branches	K/S	SH	12	Lecture – 1 Hr Practical	Knowledge: Short essay/ short	

	<p>1. Describe the root value, formation and branches of Lumbar plexus</p> <p>2. Identify the branches of Lumbar plexus in the given cadaver correctly</p> <p>3. Describe the course & distribution of branches of lumbar plexus</p> <p>4. Demonstrate the branches of lumbar plexus in the dissected cadaver accurately</p>					
<p>AN45.3:</p>	<p>Mention the major subgroups of back muscles, nerve supply and action</p> <ol style="list-style-type: none"> 1. Name the major muscles of back 2. Identify the major muscles of back 3. Describe attachments, nerve supply, relations & actions of Psoas major muscle 4. Demonstrate the attachment, relations & nerve of psoas major in the dissected cadaver correctly 5. Describe the attachments of psoas sheath 6. Discuss the anatomical significance of Psoas abscess 7. Describe the boundaries & contents of Lumbo-sacral triangle of Marcille 8. Demonstrate the boundaries & contents of Lumbo-sacral triangle of Marcille 9. Describe attachments, nerve supply, relations & actions of Psoas minor muscle 10. Demonstrate the attachment, relations & nerve of psoas minor in the dissected cadaver correctly 11. Describe attachments, nerve supply, relations & actions of iliacus muscle 12. Demonstrate the attachment, relations & nerve of iliacus in the dissected cadaver correctly 13. Describe attachments, nerve supply, relations & actions of quadratus lumborum muscle 14. Demonstrate the attachment, relations & nerve of quadratus lumborum in the dissected cadaver correctly 	K	KH	N	<p>demonstration (Small group)- 02hrs</p> <p>Lecture</p>	<p>answers/ MCQ's</p> <p>Practical discussion</p> <p><u>Skill assessment:</u></p> <p>Discussion with identification of structures</p> <p>Spotters</p> <p>Knowledge : long essay, short essay, short answer, MCQ</p>

Topic: Male External Genitalia							
AN46.1:	Describe & demonstrate coverings, internal structure, side determination, blood supply, nerve supply, lymphatic drainage & descent of testis with its applied anatomy	K/S	SH	Y	Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	General Surgery
	<ol style="list-style-type: none"> 1. Describe the location and shape of testis 2. Describe the external features of the testis 3. Describe the internal structure of the testis 4. Describe the coverings of testis 5. Describe the blood supply, nerve supply & lymphatic drainage of testis 6. Discuss the anatomical basis of the descent of the testis and factors responsible for the descent 7. Discuss the embryological basis of undescended testis and ectopic testis 8. Demonstrate the coverings, features and blood supply of testis in the given dissected cadaver correctly 9. Describe the clinical features and anatomical importance of hydrocele 10. Differentiate right & left testis 			Y			
AN46.2:	Describe parts of Epididymis <ol style="list-style-type: none"> 1. Describe the location & various parts of the Epididymis 2. Describe the functions of Epididymis 	K	KH	Y	Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Discussion with identification of structures Spotters	
AN46.3:	Describe Penis under following headings: Parts, components, blood supply and lymphatic drainage	K	KH	Y	Lecture – 1 Hr Practical	Knowledge: Short essay/	

	<ol style="list-style-type: none"> Describe the parts, structure and coverings of the Penis Discuss the blood supply and lymphatic drainage of Penis Discuss the mechanism of erection and ejaculation Discuss the clinical aspects of impotency Demonstrate the parts, coverings and blood supply of Penis in the given dissected cadaver Describe the anatomical significance of lymphatic drainage of penis 						demonstration (Small group)- 02hrs	short answers/ MCQ's Practical discussion <u>Skill</u> assessment: Discussion with identification of structures Spotters		
AN46.4:	Explain the anatomical basis of Varicocele	K	KH	N			Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery	
	<ol style="list-style-type: none"> Describe the anatomical basis of Varicocele Discuss the causes of Varicocele and why it is more common on the left side 									
AN46.5:	Explain the anatomical basis of Phimosis & circumcision	K	KH	N			Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery	
	<ol style="list-style-type: none"> Define phimosis and circumcision Describe the anatomical basis of Phimosis Describe the anatomical basis of Circumcision 									
Topic: Abdominal cavity										
AN47.1:	Describe & identify boundaries and recesses of Lesser & Greater sac	K/S	SH	Y			Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	General Surgery	

	<ol style="list-style-type: none"> 1. Enumerate the layers of peritoneum 2. Describe the boundaries of Lesser sac/ Omental bursa 3. Identify the boundaries of Lesser sac/ Omental bursa correctly 4. Describe the surgical importance of Lesser sac 5. Describe the boundaries of Greater sac 6. Identify the boundaries of Greater sac correctly 7. Describe the boundaries of Epiploic foramen/ Foramen of Winslow 8. Identify the boundaries of Epiploic foramen/ Foramen of Winslow 9. Describe the recesses of Lesser sac/ Omental bursa 10. Describe the recesses of Greater sac 11. Describe the peritoneal recesses in relation to caecum and appendix 12. Describe the Intersigmoid recess 13. Describe the Vertical disposition of the peritoneum 14. Describe the Horizontal disposition of the peritoneum 15. Describe the functions of Peritoneum 		SH	Y	<p>Lecture Dissection Demonstration Video demonstration Case based discussion/PBL</p>	<p>Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,</p>	General Surgery
<p>AN47.2:</p> <ol style="list-style-type: none"> 1. List the various peritoneal folds 2. Identify the various peritoneal folds correctly 3. Describe the attachments of greater omentum 4. Describe the contents and functions of greater omentum 5. Identify the greater omentum with its attachments 6. Describe the attachments of lesser omentum 7. Describe the contents of lesser omentum 8. Identify the lesser omentum with its attachments 9. Describe the attachments and borders of Mesentery of small intestine 10. Describe the contents of Mesentery of small intestine 11. Identify the Mesentery of small intestine with its attachments and borders 12. Describe the Transverse mesocolon 13. Describe the Sigmoid mesocolon 	<p>Name & identify various peritoneal folds & pouches with its explanation</p>	K/S					

	14. Describe the Mesoappendix 15. Describe the Hepatorenal pouch 16. Describe the surgical importance of Hepatorenal pouch 17. Describe the Rectouterine pouch (Pouch of Douglas) 18. Describe the surgical importance of Rectouterine pouch (Pouch of Douglas)								
AN47.3:	Explain anatomical basis of Ascites & Peritonitis 1. Explain the anatomical basis of Ascites 2. Describe the causes of Ascites 3. Explain the anatomical basis of Peritonitis 4. Describe the causes of Peritonitis	K/S	SH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General Surgery		
AN47.4:	Explain anatomical basis of Subphrenic abscess 1. Name the subphrenic spaces 2. Describe the location & boundaries of subphrenic spaces 3. Explain the anatomical basis of Subphrenic abscess 4. Describe the route of spread of infection to the subphrenic space	K/S	SH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General Surgery		
AN47.5	Describe & demonstrate major viscera of abdomen under following headings (anatomical position, external and internal features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied aspects) 1. Describe the anatomical position of stomach 2. Describe the location and parts of the stomach 3. Demonstrate the location and parts of the stomach 4. Describe the external and internal features of the stomach 5. Demonstrate the external and internal features of the stomach 6. Describe the structures forming the stomach bed 7. Discuss the important peritoneal and other relations of the stomach	K/S	SH	Y	Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	General Surgery		

	<ol style="list-style-type: none"> 8. Demonstrate the important peritoneal and other relations of the stomach 9. Describe the ligaments of the stomach 10. Describe the blood supply of the stomach 11. Describe the nerve supply of the stomach 12. Describe the lymphatic drainage of the stomach 13. Discuss the applied anatomy of the stomach 14. Describe the anatomical position of spleen 15. Describe the location of the spleen 16. Describe the size and shape of the spleen 17. Describe the external features of the spleen 18. Demonstrate the external features of the spleen 19. Discuss the important peritoneal and other relations of the spleen 20. Demonstrate the important peritoneal and other relations of the spleen 21. Describe the ligaments of the spleen 22. Describe the blood supply of the spleen 23. Describe the nerve supply of the spleen 24. Describe the lymphatic drainage of the spleen 25. Discuss the applied anatomy of the spleen 26. Describe the anatomical position of liver 27. Describe the location of the liver 28. Demonstrate the location of the liver 29. Describe the external and internal features of the liver 30. Demonstrate the external and internal features of the liver 31. Describe the lobes of the liver 32. Describe the hepatic segments of the liver 33. Describe the Bare area of liver with its boundaries 34. Demonstrate the Bare area of liver with its boundaries 35. Describe the location and contents of porta hepatis 36. Demonstrate the location and contents of porta hepatis 37. Discuss the important peritoneal and visceral relations of the liver 38. Demonstrate the important peritoneal and visceral 					
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	<p>the pancreas</p> <p>66. Demonstrate the important peritoneal and other relations of the pancreas</p> <p>67. Describe the ducts of the pancreas</p> <p>68. Describe the blood supply of the pancreas</p> <p>69. Describe the nerve supply of the pancreas</p> <p>70. Describe the lymphatic drainage of the pancreas</p> <p>71. Discuss the applied anatomy of the pancreas</p> <p>72. Describe the differences between jejunum and ileum</p> <p>73. Demonstrate the differences between jejunum and ileum</p> <p>74. Describe the blood supply of jejunum and ileum</p> <p>75. Describe the nerve supply of jejunum and ileum</p> <p>76. Describe the lymphatic drainage of jejunum and ileum</p> <p>77. Discuss the applied anatomy of jejunum and ileum</p> <p>78. Describe the parts of the large intestine</p> <p>79. Discuss the cardinal features of the large intestine</p> <p>80. Demonstrate the cardinal features of the large intestine</p> <p>81. Describe the blood supply of the large intestine</p> <p>82. Describe the nerve supply of the large intestine</p> <p>83. Describe the lymphatic drainage of the large intestine</p> <p>84. Discuss the applied anatomy of the large intestine</p> <p>85. Describe the differences between the small and large intestines</p> <p>86. Describe the different types of caecum</p> <p>87. Discuss the important peritoneal and other relations of the caecum</p> <p>88. Demonstrate the important peritoneal and other relations of the caecum</p> <p>89. Describe the interior of the caecum</p> <p>90. Describe the blood supply of the caecum</p> <p>91. Describe the nerve supply of caecum</p> <p>92. Describe the lymphatic drainage of the caecum</p> <p>93. Discuss the applied anatomy of caecum</p> <p>94. Describe the parts of the appendix</p> <p>95. Discuss the various positions of the appendix</p>					
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	<p>96. Discuss the important peritoneal and other relations of the appendix</p> <p>97. Demonstrate the important peritoneal and other relations of the appendix</p> <p>98. Describe the blood supply of the appendix</p> <p>99. Describe the nerve supply of appendix</p> <p>100. Describe the lymphatic drainage of the appendix</p> <p>101. Discuss the applied anatomy of the appendix</p> <p>102. Describe the Mc Burney's point and its applied importance</p> <p>103. Describe the anatomical position of the kidney</p> <p>104. Describe the location of the kidney</p> <p>105. Demonstrate the anatomical position of the kidney</p> <p>106. Describe the coverings of the kidney</p> <p>107. Describe the external and internal features of the kidney</p> <p>108. Demonstrate the external and internal features of the kidney</p> <p>109. Describe the anterior relations of the left kidney</p> <p>110. Describe the anterior relations of the right kidney</p> <p>111. Describe the posterior relations of the kidney</p> <p>112. Demonstrate the important relations of the kidney</p> <p>113. Describe the hilum of the kidney</p> <p>114. Demonstrate the structures present in the hilum of the kidney</p> <p>115. Describe the ligaments of the kidney</p> <p>116. Describe the blood supply of the kidney</p> <p>117. Describe the vascular segments of the kidney</p> <p>118. Describe the nerve supply of the kidney</p> <p>119. Describe the lymphatic drainage of the kidney</p> <p>120. Discuss the applied anatomy of the kidney</p> <p>121. Describe the steps of dissection for exposure of kidney from behind</p> <p>122. Describe the Morris parallelogram</p> <p>123. Describe the parts of the ureter</p> <p>124. Describe the course of the ureter</p>					
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AN47.6	<p>125. Describe the relations of the ureter</p> <p>126. Describe the constrictions of the ureter</p> <p>127. Describe the blood supply of the ureter</p> <p>128. Describe the nerve supply of the ureter</p> <p>129. Describe the lymphatic drainage of the ureter</p> <p>130. Discuss the applied anatomy of the ureter</p> <p>131. Describe the anatomical position of suprarenal gland</p> <p>132. Describe the location and parts of the suprarenal gland</p> <p>133. Demonstrate the location and parts of the suprarenal gland</p> <p>134. Describe the coverings of the suprarenal gland</p> <p>135. Describe the external and internal features of the suprarenal gland</p> <p>136. Demonstrate the external and internal features of the suprarenal gland</p> <p>137. Describe the important relations of the suprarenal gland</p> <p>138. Describe the blood supply of the suprarenal gland</p> <p>139. Describe the nerve supply of the suprarenal gland</p> <p>140. Describe the lymphatic drainage of the suprarenal gland</p> <p>141. Discuss the applied anatomy of the suprarenal gland</p>	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery
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	<ol style="list-style-type: none"> 1. Explain the anatomical significance of Splenic notch 2. Describe the cause for accessory spleens 3. Describe the location of accessory spleens 4. Explain the anatomical basis of Kehr's sign 5. Define vagotomy 6. Describe the different types of vagotomy 7. Describe the site of needle puncture in Liver biopsy with anatomical significance 8. Define cholecystitis & obstructive jaundice 9. Describe the anatomical basis of referred pain in cholecystitis & obstructive jaundice 10. Describe the conditions which causes referred pain around umbilicus 11. Describe the anatomical basis for referred pain around umbilicus 12. Explain the anatomical basis for radiating pain of kidney to groin 13. Discuss the anatomical basis for lymphatic spread in carcinoma stomach 									
AN47.7:	<p>Mention the clinical importance of Calot's triangle</p> <ol style="list-style-type: none"> 1. Describe the boundaries of Calot's triangle 2. Describe the contents of Calot's triangle 3. Discuss the clinical importance of Calot's triangle 	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery			
AN47.8:	<p>Describe & identify the formation, course relations and tributaries of Portal vein, Inferior vena cava & Renal vein</p>	K/S	SH	Y	Lecture Dissection Demonstration	Knowledge: Long essay, short essay,				

	<ol style="list-style-type: none"> 1. Describe the formation & termination of Portal vein 2. Identify the Portal vein in the dissected cadaver 3. Describe the course & relations of Portal vein 4. Demonstrate the relations & tributaries of portal vein 5. Enumerate the tributaries of Portal vein 6. Describe the formation, termination, course & relations of Inferior vena cava 7. Identify the Inferior vena cava 8. Demonstrate the relations and tributaries of inferior vena cava 9. Enumerate the tributaries of Inferior vena cava 10. Describe the clinical importance of compression of Inferior vena cava 11. Describe the formation & termination of Renal vein 12. Identify the Renal vein 13. Describe the course & relations of Renal vein in the dissected cadaver correctly 14. Enumerate the tributaries of Renal vein 15. Describe the variations of renal, portal & inferior vena cava 			Video demonstration Case based discussion/PBL	short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	
AN47.9:	Describe & identify the origin, course, important relations and branches of Abdominal aorta, Coeliac trunk, Superior mesenteric, Inferior mesenteric & common iliac arteries	K/S	SH	Y	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	
	<ol style="list-style-type: none"> 1. Describe the origin of Abdominal aorta 2. Identify the Abdominal aorta correctly 3. Describe the course & relations of Abdominal aorta 4. Demonstrate the course & relations of abdominal aorta in the dissected cadaver correctly 5. Enumerate the branches of Abdominal aorta 6. Describe the origin of Coeliac trunk 7. Identify the Coeliac trunk correctly 8. Describe the course & relations of Coeliac trunk 9. Identify the branches of celiac trunk in the dissected cadaver correctly 10. Enumerate the branches of Coeliac trunk 			Lecture Dissection Demonstration Video demonstration Case based discussion/PBL		

	<p>11. Describe the origin of Superior mesenteric artery 12. Identify the Superior mesenteric artery 13. Describe the course & relations of Superior mesenteric artery 14. Demonstrate the branches of Superior mesenteric artery in the dissected cadaver correctly 15. Enumerate the branches of Superior mesenteric artery 16. Describe the origin of Inferior mesenteric artery 17. Identify the Inferior mesenteric artery 18. Describe the course & relations of Inferior mesenteric artery 19. Demonstrate the branches of inferior mesenteric artery in the dissected cadaver correctly 20. Enumerate the branches of Inferior mesenteric artery 21. Describe the origin of Common iliac artery 22. Identify the Common iliac artery 23. Describe the course of Common iliac artery 24. Describe the important relations of Common iliac artery 25. Enumerate the branches of Common iliac artery 26. Demonstrate the branches of common iliac artery 27. Describe the variations of celiac, superior & inferior mesenteric artery 28. Enumerate the structures supplied by celiac, superior & inferior mesenteric artery</p>					
AN47.10:	<p>Enumerate the sites of portosystemic anastomosis 1. Enumerate the sites of portosystemic anastomosis 2. Explain the anastomoses between the portal and systemic venous systems 3. Explain the clinical significance of portosystemic anastomosis</p>	K	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery
AN47.11:	<p>Explain the anatomic basis of hematemesis & caput medusa in portal hypertension</p>	K	Y	Lecture	Knowledge : long essay,	General surgery

	<ol style="list-style-type: none"> 1. Define portal hypertension, hematemesis & caput medusa 2. Explain the anatomical basis of hematemesis in portal hypertension 3. Explain the anatomical basis of caput medusa in portal hypertension 						short essay, short answer, MCQ	
AN47.12:	<p>Describe important nerve plexuses of posterior abdominal wall</p> <ol style="list-style-type: none"> 1. Enumerate the important nerve plexuses of posterior abdominal wall 2. Describe the location & branches of Lumbar sympathetic chain 3. Enumerate the autonomic plexus of the posterior abdominal wall 4. Describe the location & formation of coeliac plexus 5. Describe the branches of coeliac plexus 6. Describe the location of superior hypogastric plexus 7. Describe the functions of superior hypogastric plexus 8. Discuss the applied anatomy related to the important nerve plexuses of posterior abdominal wall 	K	KH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ		
AN47.13:	<p>Describe & demonstrate the attachments, openings, nerve supply & action of the thoracoabdominal diaphragm</p>	K	SH	Y	Lecture Dissection Demonstration	Knowledge: Long essay, short essay,		

	<ol style="list-style-type: none"> 1. Enumerate the parts of thoracoabdominal diaphragm 2. Describe the attachments of thoracoabdominal diaphragm 3. Describe the central tendon of thoracoabdominal diaphragm 4. Demonstrate the attachments of thoracoabdominal diaphragm in the dissected cadaver 5. List the major openings of thoracoabdominal diaphragm 6. Describe the location of thoracoabdominal diaphragm with respect to the vertebral level 7. Describe the structures passing through the Venacaval opening of thoracoabdominal diaphragm 8. describe the structures passing through the Oesophageal opening of thoracoabdominal diaphragm 9. Describe the structures passing through the Aortic opening of thoracoabdominal diaphragm 10. Demonstrate the major openings of thoracoabdominal diaphragm in the dissected cadaver 11. List the minor openings of thoracoabdominal diaphragm 12. Describe the structures passing through the minor openings of thoracoabdominal diaphragm 13. Describe the nerve supply & blood supply of thoracoabdominal diaphragm 14. Describe the actions of thoracoabdominal diaphragm 			<p>Video demonstration Case based discussion/PBL</p>	<p>short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,</p>		
AN47.14:	<p>Describe the abnormal openings of thoracoabdominal diaphragm and diaphragmatic hernia</p> <ol style="list-style-type: none"> 1. Describe the abnormal openings of thoracoabdominal diaphragm 2. Describe the anatomical significance of various types of diaphragmatic hernia 	K	KH	N	Lecture	<p>Knowledge : long essay, short essay, short answer, MCQ</p>	General surgery
Topic: Pelvic Wall And Viscera							
AN48.1:	Describe & identify the muscles of Pelvic diaphragm	K/S	SH	Y	Lecture	Knowledge:	

	<ol style="list-style-type: none"> 1. Describe the components and muscles of the Pelvic diaphragm 2. Identify the muscles of pelvic diaphragm 3. Describe the attachments, action & nerve supply of Levatorani 4. Describe the attachments, action & nerve supply of piriformis 5. Describe the attachments, action & nerve supply of coccygeus 6. Describe the attachments, action & nerve supply of obturator internus 7. Describe the functions of pelvic diaphragm 8. Describe hiatus urogenitalis and hiatus rectalis 9. Describe anatomical significance of pelvic diaphragm 10. Mention the functions and evolution of the pelvic diaphragm 11. Demonstrate the muscles forming the Pelvic diaphragm in the given dissected cadaver correctly 			Dissection Demonstration Video demonstration Case based discussion/PBL	Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,
AN48.2:	Describe & demonstrate the (position, features, important peritoneal & other relations, blood supply, nerve supply, lymphatic drainage and clinical aspects of) important male & female pelvic viscera	K/S	SH	Y	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,
	<ol style="list-style-type: none"> 1. Mention the contents of male pelvic viscera 2. Mention the contents of female pelvic viscera 3. Mention the important differences between rectum and other parts of large intestine 4. Describe the position of the rectum 5. Describe the course of the rectum 6. Describe the curvatures or flexures of the rectum 7. Demonstrate the features of the rectum 8. Describe the peritoneal & other relations of the rectum 9. Demonstrate the peritoneal & other relations of the rectum 10. Describe the supports of the rectum 11. Describe the interior of the rectum 			Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	

					<ol style="list-style-type: none"> 12. Describe the blood supply of the rectum 13. Describe the nerve supply of the rectum 14. Describe the lymphatic drainage of the rectum 15. Discuss the applied anatomy of the rectum 16. Describe the position of the anal canal 17. Describe the features of the anal canal 18. Identify and demonstrate the features of the anal canal 19. Describe the relations of the anal canal 20. Describe the interior of the anal canal 21. Describe the sphincters of the anal canal 22. Describe the blood supply of the anal canal 23. Describe the nerve supply of the anal canal 24. Describe the lymphatic drainage of the anal canal 25. Discuss the applied anatomy of the anal canal 26. Describe the position of the urinary bladder 27. Describe the capacity of the urinary bladder 28. Identify and demonstrate the features of the urinary bladder 29. Name the structures forming the bladder bed 30. Describe the relations of the urinary bladder 31. Demonstrate the relations of the urinary bladder 32. Describe the space of Retzius 33. Mention the ligaments of the urinary bladder 34. Describe the interior of the urinary bladder 35. Describe the boundaries of the Trigone 36. Demonstrate the boundaries of the Trigone 37. Mention the importance of the Trigone 38. Describe the blood supply of the urinary bladder 39. Describe the nerve supply of the urinary bladder 40. Describe the lymphatic drainage of the urinary bladder 41. Discuss the applied anatomy of the urinary bladder 42. Name the parts of the male urethra 43. Identify and demonstrate the different parts of the urethra 	
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					<p>44. Describe the prostatic part of male urethra 45. Describe the membranous part of male urethra 46. Describe the penile or spongy part of male urethra 47. Describe the female urethra 48. Describe the sphincters of the urethra 49. Describe the blood supply of the urethra 50. Describe the nerve supply of the urethra 51. Describe the lymphatic drainage of the urethra 52. Discuss the applied anatomy of the urethra 53. Identify the vas deferens/ ductus deferens 54. Describe the course of the vas deferens 55. Describe the blood supply of vas deferens 56. Identify and describe the spermatic cord 57. Describe the coverings of the spermatic cord 58. Mention the contents of the spermatic cord 59. Describe the position of seminal vesicles 60. Describe the function of seminal vesicles 61. Describe the blood supply of seminal vesicles 62. Describe the nerve supply of seminal vesicles 63. Mention the formation of ejaculatory duct 64. Describe the position of the prostate 65. Describe the features of the prostate 66. Identify and demonstrate the features of the prostate 67. Describe the capsule of the prostate 68. Compare the capsules of the prostate and thyroid gland 69. Describe the lobes of the prostate 70. Describe the relations of the prostate 71. Describe the supports of the prostate 72. Mention the structures traversing the prostate 73. Describe the blood supply of the prostate 74. Describe the nerve supply of the prostate 75. Describe the lymphatic drainage of the prostate 76. Discuss the applied anatomy of the prostate 77. Name the female reproductive organs 78. Describe the position of the ovary</p>	
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<p>AN48.3:</p>	<p>79. Describe the features of the ovary 80. Identify and demonstrate the features of the ovary 81. Describe the relations of the ovary 82. Describe the boundaries of the ovarian fossa 83. Describe the blood supply of the ovary 84. Describe the nerve supply of the ovary 85. Describe the lymphatic drainage of the ovary 86. Discuss the applied anatomy of the ovary 87. Mention the parts of the Fallopian tube/ uterine tube 88. Describe the position of the uterine tube 89. Describe the features of the uterine tube 90. Identify and demonstrate the features of the uterine tube 91. Describe the relations of the uterine tube 92. Describe the blood supply of the uterine tube 93. Describe the nerve supply of the uterine tube 94. Describe the lymphatic drainage of the uterine tube 95. Discuss the applied anatomy of the uterine tube 96. Mention the parts of the uterus 97. Describe the axes of the uterus 98. Describe the position of the uterus 99. Describe the features of the uterus 100. Identify and demonstrate the features of the uterus 101. Describe the peritoneal and other relations of the uterus 102. Describe the supports of the uterus 103. Describe the blood supply of the uterus 104. Describe the nerve supply of the uterus 105. Describe the lymphatic drainage of the uterus 106. Discuss the applied anatomy of the uterus 107. Describe the fornices of the vagina 108. Describe the blood supply of the vagina 109. Describe the nerve supply of the vagina 110. Describe the lymphatic drainage of the vagina</p> <p>Describe & demonstrate the origin, course, important relations and branches of internal iliac artery</p>	K/S	SH	Y	Lecture Dissection	Knowledge: Long essay,	
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	<ol style="list-style-type: none"> Describe the origin & course of internal iliac artery. Describe the important relations and branches of internal iliac artery Demonstrate the important relations and branches of internal iliac artery in the dissected cadaver 					Demonstration Video demonstration Case based discussion/PBL	short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	
AN48.4:	Describe the branches of Sacral Plexus <ol style="list-style-type: none"> Describe the formation of sacral plexus Describe the branches and distribution of Sacral Plexus 	K	KH	Y		Lecture	Knowledge : long essay, short essay, short answer, MCQ	
AN48.5:	Explain the anatomical basis of suprapubiccystostomy, Urinary obstruction in benign prostatic hypertrophy, Retroverted uterus, Prolapse uterus, Internal and external haemorrhoids, Anal fistula, Vasectomy, Tubal pregnancy & Tubal ligation <ol style="list-style-type: none"> Define Suprapubic cystostomy Explain the anatomical basis of Suprapubic cystostomy Mention the uses of Suprapubic cystostomy Explain the anatomical basis of Urinary obstruction in benign prostatic hypertrophy Define Retroversion of uterus Explain the anatomical basis of Retroverted uterus Define prolapse of uterus Explain the anatomical basis of Prolapse uterus Mention the causes for prolapse uterus Describe the different types of prolapse uterus Define haemorrhoids Describe the types of haemorrhoids Explain the anatomical basis of Internal and external haemorrhoids Mention the causes for haemorrhoids Describe the clinical features of haemorrhoids Explain sentinel pile Define Anal fistula 	K	KH	N		Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery

	18. Explain the anatomical basis of Anal fistula 19. Define Vasectomy 20. Explain the anatomical basis of Vasectomy 21. Explain the anatomical basis of Tubal pregnancy 22. Explain the anatomical basis of Tubal ligation											
AN48.6:	Describe the neurological basis of Automatic bladder 1. Define Automatic bladder 2. Explain the neurological basis of automatic bladder 3. List the neurological disorders of bladder	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery					
AN48.7:	Mention the lobes involved in benign prostatic hypertrophy & prostatic cancer 1. Define benign prostatic hypertrophy 2. Mention the lobes involved in benign prostatic hypertrophy 3. Mention the lobes involved in prostatic cancer	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery					
AN48.8:	Mention the structures palpable during vaginal and rectal examination 1. Mention the position for vaginal examination 2. Mention the structures palpable during vaginal examination 3. Mention the position for rectal examination 4. Mention the structures palpable during rectal examination	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General surgery					
Topic: Perineum												
AN49.1:	Describe & demonstrate the superficial & deep perineal pouch (boundaries and contents)	K/S	SH	Y	Lecture Dissection	Knowledge: Long essay,	Obstetrics & gynaecology					

	<ol style="list-style-type: none"> Describe the boundaries and division of perineum Describe the boundaries of superficial perineal pouch. Identify the structures: root of the penis and superficial perineal muscles; within the superficial perineal pouch in the given male cadaver. Describe the boundaries of deep perineal pouch. Identify the structures: deep transverse perinei and sphincter urethrae with membranous urethrae in males, within the deep perineal pouch in the given cadaver Demonstrate the dorsal vein of penis in the male dissected cadaver and nerves seen in the superficial perineal pouch Demonstrate the vessels and nerves seen in the deep perineal pouch in the dissected cadaver 				<p>Demonstration Video demonstration Case based discussion/PBL</p>	<p>short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,</p>	
AN49.2	<p>Describe & identify Perineal body</p> <ol style="list-style-type: none"> Describe the formation of Perineal body Identify the structures forming the Perineal body in the given Female cadaver Mention the functions of Perineal body and its clinical importance Demonstrate the structures forming the Perineal body in the dissected cadaver 	K/S	SH	Y	<p>Lecture Dissection Demonstration Video demonstration Case based discussion/PBL</p>	<p>Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,</p>	Obstetrics & gynaecology
AN49.3	<p>Describe & demonstrate Perineal membrane in male & female</p> <ol style="list-style-type: none"> Describe the structures forming the Perineal membrane in males & females. Identify the structures piercing the Perineal membrane in the given male & female cadavers. Demonstrate the structures forming and piercing the perineal membrane in the dissected cadaver 	K/S	SH	Y	<p>Lecture Dissection Demonstration Video demonstration Case based discussion/PBL</p>	<p>Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,</p>	
AN49.4	<p>Describe & demonstrate boundaries, content & applied anatomy of Ischiorectal fossa</p>	K/S	SH	Y	<p>Lecture</p>	<p>Knowledge:</p>	General

	<ol style="list-style-type: none"> Describe the boundaries of Ischiorectal fossa. Identify the structures present in the Ischiorectal fossa in the given cadaver Describe the location, formation and contents of ischiorectal fossa Identify the Alcock's/Pudendal canal and its contents Demonstrate the inferior rectal vessels and nerves seen the Ischiorectal fossa in the given dissected cadaver Describe the Ischiorectal abscess and its clinical features Describe the anatomical significance of pudendal nerve block 					Dissection Demonstration Video demonstration Case based discussion/PBL	Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	surgery	
AN49.5	Explain the anatomical basis of Perineal tear, Episiotomy, Perianal abscess and Anal fissure	K	KH	N		Lecture	Knowledge : long essay, short essay, short answer, MCQ	Obstetrics &gynaecology	
	<ol style="list-style-type: none"> Describe the anatomical basis of Perineal tear Describe the anatomical basis and types of Episiotomy Describe the anatomical basis of formation of Perianal abscess Discuss the causes and anatomical basis of Anal fissure. 								
Topic: Vertebral column									
AN50.1	Describe the curvatures of the vertebral column	K	KH	Y		Lecture	Knowledge : long essay, short essay, short answer, MCQ		
	<ol style="list-style-type: none"> Name the curvatures of vertebral column Describe the curvatures of the vertebral column. 								
AN50.2	Describe & demonstrate the type, articular ends, ligaments and movements of Intervertebral joints, Sacroiliac joints & Pubic symphysis	K/S	SH	Y		Lecture Dissection	Knowledge: Long essay,		

	<ol style="list-style-type: none"> Describe the type, articular surfaces & ligaments of intervertebral joints Describe the movements & muscles producing them of intervertebral joints Demonstrate the articular surfaces and movements of intervertebral joints correctly Describe the type, articular surfaces & ligaments of sacroiliac joints Describe the movements & muscles producing them of sacroiliac joints Demonstrate the articular surfaces and movements of sacroiliac joints correctly Describe the type, articular surfaces & ligaments of pubis symphysis Describe the movements & muscles producing them of pubis symphysis Demonstrate the articular surfaces and movements of pubis symphysis correctly 					Demonstration Video demonstration Case based discussion/PBL	short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,		
AN50.3	<p>Describe lumbar puncture (site, direction of the needle, structures pierced during the lumbar puncture)</p> <ol style="list-style-type: none"> Describe the site of Lumbar puncture. Demonstrate the direction of the needle for lumbar puncture Mention the structures pierced by the needle during the lumbar puncture. 	K	KH	Y		Lecture	Knowledge : long essay, short essay, short answer, MCQ	General Medicine	
AN50.4	<p>Explain the anatomical basis of Scoliosis, Lordosis, Prolapsed disc, Spondylolisthesis & Spina bifida</p> <ol style="list-style-type: none"> Describe the anatomical basis of Scoliosis. Describe the anatomical basis of Lordosis. Describe the anatomical basis of Prolapsed disc. Describe the anatomical basis of Spondylolisthesis. Describe the anatomical/embryological basis of Spina bifida. 	K	KH	N		Lecture	Knowledge : long essay, short essay, short answer, MCQ	Orthopaedics	
Topic: Sectional Anatomy									
AN51.1	Describe & identify the cross-section at the level of T8, T10 and L1 (transpyloric plane)	K/S	SH	Y		Lecture	Knowledge:	Radiodiagnosis	

	<ol style="list-style-type: none"> Enumerate the structures at cross section at the level of T8 vertebra Identify and demonstrate the structures at the level of T8 vertebra accurately Enumerate the structures at cross section at the level of T10 vertebra Identify and demonstrate the structures at the level of T10 vertebra accurately Enumerate the structures at cross section at the level of L1 vertebra Identify and demonstrate the structures at the level of L1 vertebra accurately Correlate the structures of transpyloric, subcostal plane and transtubercular plane with CT and MRI images 					Dissection Demonstration Video demonstration Case based discussion/PBL	Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	
AN51.2	<p>Describe & identify the midsagittal section of male and female pelvis</p> <ol style="list-style-type: none"> Describe the midsagittal section of male pelvis Identify the structures present in the midsagittal section of male pelvis correctly Describe the midsagittal section of female pelvis Identify the structures present in the midsagittal section of female pelvis correctly 	K	SH	Y	Lecture Dissection Demonstration Video demonstration Case based discussion/PBL	Knowledge: Long essay, short essay, short answers, MCQ'S Skill:Specimen discussion, spotters, OSPE,	Radiodiagnosis	
Topic: Histology & Embryology Number of competencies: (8) Number of procedures for certification: (NIL)								
AN 52.1:	<p>Describe & identify the micro anatomical features of Gastro-intestinal system: Oesophagus, Fundus of stomach, Pylorus of stomach, Duodenum, Jejunum, Ileum, Large intestine, Appendix, Liver, Gall bladder, Pancreas & Suprarenal gland.</p>	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(S mall group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Slide discussion with identification		

	<ol style="list-style-type: none"> 1. Enumerate the parts of Gastrointestinal tract (GIT) 2. Enumerate the layers of GIT 3. Discuss the general microscopic features of GIT 4. Identify and draw a neat labelled diagram of microscopic structure of esophagus 5. Mention the lining epithelium of esophagus 6. Discuss the microscopic structure of esophagus 7. Describe the Barrett's esophagus 8. Mention the different parts of the stomach 9. Mention the lining epithelium of stomach 10. Identify and draw a neat labelled diagram of microscopic structure of Fundus of stomach 11. Name the cells present in fundus of stomach and give their secretion 12. Identify and draw a neat labelled diagram of microscopic structure of Pylorus of stomach 13. Describe the comparison between the gastric glands of fundus and pylorus of stomach 14. Describe the applied anatomy of microscopic structure of stomach 15. Mention the parts of small intestine 16. Name the cells present in the small intestine and give their functions 17. Enumerate microscopic salient features of small intestine 18. Describe the plicae circulares or valves of Kerckring 19. Describe the intestinal villi and its functions 20. Identify and draw a neat labelled diagram of microscopic structure of duodenum 21. Describe Brunner's glands of duodenum 22. Describe intestinal glands/ crypts of Lieburkuhn 	of structures Spotters					
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					<p>23. Identify and draw a neat labelled diagram of microscopic structure of jejunum</p> <p>24. Identify and draw a neat labelled diagram of microscopic structure of ileum</p> <p>25. Describe the Peyer's patches of ileum</p> <p>26. Mention the important differences in the microscopic structure of duodenum, jejunum and ileum</p> <p>27. Describe the applied anatomy of microscopic structure of small intestine</p> <p>28. Mention the parts of large intestine</p> <p>29. Mention the functions of large intestine</p> <p>30. Enumerate microscopic salient features of large intestine</p> <p>31. Identify and draw a neat labelled diagram of microscopic structure of large intestine</p> <p>32. Describe the applied anatomy of microscopic structure of large intestine</p> <p>33. Mention the important differences in the microscopic structure of small intestine and large intestine</p> <p>34. Identify and draw a neat labelled diagram of microscopic structure of appendix</p> <p>35. Describe the applied anatomy of microscopic structure of appendix</p> <p>36. Mention the important differences between the microscopic structure of large intestine and appendix</p> <p>37. Compare the mucosa of oesophagus, stomach, small intestine and large intestine</p> <p>38. Mention the functions of liver</p> <p>39. Identify and draw a neat labelled diagram of microscopic structure of liver</p> <p>40. Draw and label classical lobule of liver</p> <p>41. Differentiate hepatic lobule from portal lobule</p> <p>42. Name the constituents of portal triad</p> <p>43. Describe the structure of a hepatic lobule</p> <p>44. Describe space of Disse and space of Mall</p>
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AN 52.2	<p>45. Describe the applied anatomy of microscopic structure of liver</p> <p>46. Name the layers present in the wall of the gall bladder</p> <p>47. Identify and draw a neat labelled diagram of microscopic structure of gall bladder</p> <p>48. Describe the applied anatomy of microscopic structure of gall bladder</p> <p>49. Identify and draw a neat labelled diagram of microscopic structure of pancreas</p> <p>50. Describe the pancreatic acini and centroacinar cells</p> <p>51. Describe the duct system of the pancreas</p> <p>52. Describe Islets of Langerhans</p> <p>53. Mention the pancreatic secretions</p> <p>54. Describe the applied anatomy of microscopic structure of pancreas</p> <p>55. Describe the cortex and medulla of suprarenal gland</p> <p>56. Name the layers of the adrenal cortex</p> <p>57. Describe the adrenal medulla</p> <p>58. Mention the hormones secreted by adrenal gland</p> <p>59. Identify and draw a neat labelled diagram of microscopic structure of suprarenal gland</p> <p>60. Describe the applied anatomy of microscopic structure of suprarenal gland</p>	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Slide discussion with identification of structures Spotters	
	Describe & identify the microanatomical features of: Urinary system: Kidney, Ureter & Urinary bladder Male Reproductive System: Testis, Epididymis, Vas deferens, Prostate & penis Female reproductive system: Ovary, Uterus, Uterine tube, Cervix, Placenta and umbilical cord						

						<ol style="list-style-type: none"> 1. Discuss the microscopic structure of kidney 2. Define cortex and medulla 3. Explain the structure of nephron 4. Differentiate proximal and distal convoluted tubule 5. Discuss juxtaglomerular apparatus 6. Identify and draw the microscopic structure of kidney 7. Discuss the microscopic structure of ureter 8. Enumerate the layers of ureter 9. Discuss the lining epithelium of ureter 10. Differentiate ureter and vas deferens 11. Identify and draw the microscopic structure of ureter 12. Discuss the microscopic structure of urinary bladder 13. Define the epithelium of urinary bladder 14. Describe the submucosa and muscularis mucosa of urinary bladder 15. Identify and draw the microscopic structure of urinary bladder 16. Discuss the microscopic structure of testis 17. Define seminiferous tubule 18. Enumerate the cells present in seminiferous tubules 19. Identify and draw the microscopic structure of testis 20. Discuss the microscopic structure of epididymis 21. Enumerate the lining epithelium of tubules in epididymis 22. Differentiate structure of testis and epididymis 23. Identify and draw the microscopic structure of epididymis 24. Discuss the microscopic structure of vas deferens 25. Define the lining epithelium of vas deferens 26. Explain the layers of vas deferens 27. Identify and draw the microscopic structure of vas deferens 28. Discuss the microscopic structure of prostate 29. Define the coverings of prostate gland 30. Describe the stroma of prostate gland 31. Enumerate the age changes of prostate gland 	
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AN 52.3	<p>32. Identify and draw the microscopic structure of prostate gland</p> <p>33. Discuss the microscopic structure of penis</p> <p>34. Identify and draw the microscopic structure of penis</p> <p>35. Discuss the microscopic structure of ovary</p> <p>36. Define cortex and medulla of ovary.</p> <p>37. Explain the different stages of follicles in cortex</p> <p>38. Discuss the structure of graafian follicle</p> <p>39. Define corpus luteum and fate of corpus luteum</p> <p>40. Identify and draw the microscopic structure of ovary</p> <p>41. Discuss the microscopic structure of uterus</p> <p>42. Explain the three layers of uterus</p> <p>43. Differentiate proliferative phase and secretory phase of uterus</p> <p>44. Identify and draw the microscopic structure of uterus</p> <p>45. Discuss the microscopic structure of uterine tube</p> <p>46. Discuss the layers of uterine tube</p> <p>47. Explain the mucosa of uterine tube</p> <p>48. Identify and draw the microscopic structure of uterine tube</p> <p>49. Discuss the microscopic structure of cervix.</p> <p>50. Discuss ectocervix and endocervix</p> <p>51. Explain squamocolumnar junction with its clinical significance</p> <p>52. Identify and draw the microscopic structure of cervix</p> <p>53. Discuss the microscopic structure of placenta</p> <p>54. Explain fetal and maternal part of placenta</p> <p>55. Discuss the placental barrier</p> <p>56. Identify and draw the microscopic structure of placenta</p> <p>57. Discuss the microscopic structure of umbilical cord</p> <p>58. Discuss the covering and stroma of umbilical cord</p> <p>59. Identify and draw the microscopic structure of umbilical cord</p>	K/S	SH	N	Lecture – 1 Hr Practical	Knowledge: Short essay/
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	congenital pyloric stenosis, omphalocele, congenital umbilical hernia 3. Describe the formation of Meckel's diverticulum 4. Describe the formation of midgut and its derivatives 5. Describes the steps in rotation of gut, its significance and timing 6. Describe the effect of malrotation of gut 7. Describe the formation of cloaca, its division and contribution to structures of hindgut 8. Describe the embryological basis of anomalies associated 9. Describe the development of salivary glands 10. Describe the development of pancreas 11. Describe the development of liver 12. Describe the development of extrahepatic biliary apparatus 13. Describe the development of spleen 14. Identify and demonstrate the above development in chart or model given 15. Identify and demonstrate the defects in above development in chart or model given								
AN52.7	Describe the development of Urinary system	K	KH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	General Surgery		
	1. Describe the evolutionary history of development of kidney 2. Describe the development of kidney & ureter – collecting system and secretory system 3. enumerate the timing of ascent of kidney 4. Describe the changes in blood supply of kidney with development 5. Enumerate the embryological basis of anomalies of kidney and ureter 6. Describe the steps in development of urinary bladder – wall, trigone								

AN52.8	<p>7. Describe the development of female urethra</p> <p>8. Describe the stages in development of male urethra and its fate.</p> <p>9. Enumerate the basis of anomalies associated with bladder and urethra</p> <p>10. Describe the difference in development of male and female urethra</p> <p>11. Identify and demonstrate the above development in chart or model given</p> <p>12. Identify and demonstrate the defects in above development in chart or model given</p> <p>Describe the development of male & female reproductive system</p>	K	KH	Y	Lecture	Knowledge : long essay, short essay, short answer, MCQ	Obstetrics & Gynaecology
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	<ol style="list-style-type: none"> 1. Describe the development of gonads 2. Enumerate the differences in the development of testis and ovary 3. Describe the development and fate of mesonephric duct 4. Describe the development and fate of paramesonephric duct 5. Describe the contribution of cloaca in development of components of genital system 6. Describe the development of uterus, fallopian tube 7. Describe the development of vagina 8. Enumerate the basis of anomalies associated with development of male genital system 9. Enumerate the basis of anomalies associated with development of female genital system 10. Describe the development of prostate and bulbourethral glands 11. Describe the development of external genitalia 12. Compare the stages involved in development of male and female external genitalia 13. Describe the stages and timing of descent of testis 14. List the factors responsible for descent of testis 15. Describe the anomalies associated with development of gonads 16. Identify and demonstrate the above development in chart or model given 					
Topic: Osteology						
AN53.1	Identify & hold the bone in the anatomical position, Describe the salient features, articulations & demonstrate the attachments of muscle groups	K/S	SH	Y	Lecture – 1 Hr Practical	Knowledge: Short essay/ General Surgery,

	<ol style="list-style-type: none"> 1. Identify the side of the Hip bone. 2. Hold the Hip bone in anatomical position 3. Describe & demonstrate the various parts of Hip bone. 4. Mention the articulating surfaces of the Hip bone. 5. Demonstrate the muscular attachments to the Hip bone. 6. Mention the ossification of Hip bone. 									Obstetrics & Gynaecology
AN53.2	<p>Demonstrate the anatomical position of bony pelvis & show boundaries of pelvic inlet, pelvic cavity, pelvic outlet</p> <ol style="list-style-type: none"> 1. Identify the parts of the bony pelvis. 2. Classify the bony pelvis. 3. Mention the commonest type of bony pelvis. 4. Hold the bony pelvis in anatomical position. 5. Describe & demonstrate the boundaries of pelvic inlet. 6. Describe & demonstrate the boundaries of pelvic cavity. 7. Describe & demonstrate the boundaries of pelvic outlet. 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(S mall group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Spotters	Obstetrics & Gynaecology			
AN53.3	<p>Define true pelvis and false pelvis and demonstrate sex determination in male & female bony pelvis</p> <ol style="list-style-type: none"> 1. Define true and false pelvis. 2. Demonstrate the boundaries of true and false pelvis. 3. Enumerate the differences between the male and female bony pelvis. 4. Identify the differences between male and female bony pelvis. 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(S mall group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Spotters	Obstetrics & Gynaecology			
AN53.4	<p>Explain and demonstrate clinical importance of bones of abdominopelvic region (sacralization of lumbar vertebra, Lumbarization of 1st sacral vertebra, types of bony pelvis & Coccyx)</p>	K/S	SH	N	Lecture – 1 Hr Practical demonstration(S)	Knowledge: Short essay/ short answers/				

	1. Classify and identify the typical and atypical lumbar vertebrae. 2. Describe the special features & attachments of sacrum. 3. Describe the clinical importance of the bones of abdominopelvic region. 4. Define sacralization of lumbar vertebra 5. Define lumbarization of 1 st sacral vertebra. 6. Describe the types of bony pelvis and coccyx.						mall group)- 02hrs	MCQ's Practical discussion <u>Skill</u> assessment: Spotters	
Topic: Radiodiagnosis									
AN54.1	Describe & identify features of plain X ray abdomen 1. Describe the features of plain X ray abdomen 2. Identify the features of plain X ray abdomen 3. Describe the important structures on plain X ray abdomen 4. Identify the important structures on plain X ray abdomen	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(S mall group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill</u> <u>assessment:</u> Spotters	Radiodiagnosis		

AN54.2	Describe & identify the special radiographs of abdominopelvic region (contrast X ray Barium swallow, Barium meal, Barium enema, Cholecystography, Intravenous pyelography & Hysterosalpingography) 1. Describe the principle of contrast X ray Barium studies 2. Describe the preparation of patient for the Barium studies 3. Enumerate the indications for contrast X ray Barium studies 4. Describe the appearance of structures on contrast X ray Barium swallow 5. Identify the structures on contrast X ray Barium swallow 6. Describe the appearance of structures on contrast X ray	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(S mall group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> Spotters	Radiodiagnosis		
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AN54.3	<p>Barium meal</p> <ol style="list-style-type: none"> 7. Identify the structures on contrast X ray Barium meal 8. Describe the appearance of structures on contrast X ray Barium enema 9. Identify the structures on contrast X ray Barium enema 10. Enumerate the indications for Cholecystography 11. Enumerate the contraindications for Cholecystography 12. Describe the appearance of structures on Cholecystography 13. Identify the structures on Cholecystography 14. Enumerate the indications for Intravenous pyelography 15. Enumerate the contraindications for Intravenous pyelography 16. Describe the appearance of structures on Intravenous pyelography 17. Identify the structures on Intravenous pyelography 18. Enumerate the indications for Hysterosalpingography 19. Enumerate the contraindications for Hysterosalpingography 20. Describe the appearance of structures on Hysterosalpingography 21. Identify the structures on Hysterosalpingography <p>Describe role of ERCP, CT abdomen, MRI, Arteriography in radiodiagnosis of abdomen</p> <ol style="list-style-type: none"> 1. Describe the principle of ERCP 2. Describe the role of ERCP in radiodiagnosis of abdomen 3. Describe the principle of CT scan 4. Describe the role of CT scan in radiodiagnosis of abdomen 5. Describe the principle of MRI 6. Describe the role of MRI in radiodiagnosis of abdomen 7. Describe the principle of Arteriography 8. Describe the role of Arteriography in radiodiagnosis of abdomen 	K	KH	N	Lecture	Knowledge : long essay, short essay, short answer, MCQ	Radiodiagnosis
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Topic: Surface marking

AN55.1	Demonstrate the surface marking of; Regions and planes of abdomen, Superficial inguinal ring, Deep inguinal ring, McBurney's point, Renal Angle & Murphy's point	K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's, viva Skill: Surface marking, OSPE, spotters	General Surgery
AN55.2	Demonstrate the surface projections of: Stomach, Liver, Fundus of gall bladder, Spleen, Duodenum, Pancreas, Ileocaecal junction, Kidneys & Root of mesentery	K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's, viva Skill: Surface marking, OSPE, spotters	General Surgery

Topic: Meninges & CSF

AN56.1	Describe and identify various layers of meninges with extent and modifications 1. Enumerate the layers of meninges with extent 2. Describe cranial dura – layers, folds applied anatomy 3. Discuss the differences between cranial and spinal dura 4. Describe arachnoid mater and subarachnoid space 5. Discuss piamater with its modification 6. Identify the layers of meninges 7. Identify the dural folds 8. Demonstrate the attachments of dural folds 9. Identify the piamater and demonstrate its modifications	K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's, viva Skill: Surface marking, OSPE, spotters	General medicine
AN56.2	Describe circulation of CSF with its applied anatomy 1. Describe CSF – composition, formation, circulation, absorption and applied anatomy 2. Discuss Queckenstedt test	K	KH	Y	Lecture, small group discussion	Knowledge: short essay, short answer MCQ's, viva	General medicine, Physiology

Topic – Spinal cord

		K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's, viva Skill: Surface marking, OSPE, spotters	
AN57.1	<p>Identify the external features of spinal cord</p> <ol style="list-style-type: none"> Describe the external features of spinal cord Identify the external features of spinal cord Name the coverings of spinal cord Discuss and Identify the fissures and sulci of spinal cord Describe the internal features of spinal cord Discuss the differences seen at transverse section of spinal cord at thoracic region, cervical region and lumbosacral region 			Y			
AN57.2	<p>Describe the extent of spinal cord in child and adult with its clinical correlation</p> <ol style="list-style-type: none"> Describe the relationship between spinal segment and vertebral segment in adult with its applied anatomy Describe the relationship between spinal segment and vertebral segment in child with its applied anatomy 	K	KH	Y	Lecture, small group discussion	Knowledge: short essay, short answer MCQ's, viva	
AN57.3	<p>Draw and label transverse section of spinal cord at mid-cervical and mid-thoracic level</p> <ol style="list-style-type: none"> Draw a neat labelled diagram of transverse section of spinal cord at mid-cervical level Draw a neat labelled diagram of transverse section of spinal cord at mid-thoracic level 	K	KH	Y	Lecture, small group discussion	Knowledge: short essay, short answer, viva	
AN57.4	<p>Enumerate ascending and descending tracts at mid thoracic level of spinal cord</p> <ol style="list-style-type: none"> Enumerate ascending tracts at mid thoracic level of spinal cord Enumerate descending tracts at mid thoracic level of spinal cord Discuss the features of upper motor neuron lesion Discuss the features of upper motor neuron lesion 	K	KH	Y	Lecture, small group discussion	Knowledge: short essay, short answer, viva	General medicine
AN57.5	<p>Discuss the anatomical basis of syringomyelia</p> <ol style="list-style-type: none"> Enumerate the ascending and descending tracts at cervical level of spinal cord Discuss syringomyelia – region of spinal cord affected 	K	KH	Y	Lecture, small group discussion	Knowledge: short essay, short answer	General medicine

and features									
Topic – Medulla oblongata									
58.1	Identify the external features of medulla oblongata 1. Discuss the external features of medulla oblongata 2. Identify the external features of medulla oblongata 3. Describe the features of lateral area of medulla 4. Describe the features of posterior area of medulla	K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's Skill: Surface marking, OSPE, spotters			
58.2	Describe transverse section of medulla oblongata at the level of 1)pyramidal decussation 2) sensory decussation 3) ION 1. Describe transverse section of medulla oblongata at the level of pyramidal decussation with a neat labelled diagram 2. Describe transverse section of medulla oblongata at the level of sensory decussation with a neat labelled diagram 3. Describe transverse section of medulla oblongata at inferior olivary nucleus with a neat labelled diagram	K	KH	Y	Lecture, small group discussion	Knowledge: long essay, short essay, short answer MCQ's, viva			
58.3	Enumerate cranial nerve nuclei in medulla oblongata with their functional Group	K	KH	Y	Lecture, small group discussion	Knowledge: long essay, short essay, short answer MCQ's, viva	Physiology		
58.4	Describe the anatomical basis and effects of medial and lateral medullary syndrome 1. Discuss the blood supply of medulla oblongata 2. Describe medial medullary syndrome - artery affected with features 3. Describe lateral medullary syndrome - artery affected with features	K	KH	N	Lecture, video demonstration, small group discussion	Knowledge: long essay, short essay, short answer MCQ's	General medicine, Physiology		
Topic – Pons									

59.1	Identify the external features of pons 1. Describe the external features of pons 2. Identify the external features of pons 3. Discuss the features of basilar part of pons	K/S	SH	Y	Lecture, video demonstration, small dissection, small group discussion	Knowledge: short essay, short answer MCQ's, viva Skill: spotters, viva	Physiology
59.2	Draw and label transverse section of pons at upper and lower level 1. Describe the internal features of transverse section of pons at level of facial colliculus with a neat labelled diagram 2. Describe the internal features of transverse section of upper pons with a neat labelled diagram	K	KH	Y	Lecture, small group discussion	Knowledge: long essay, short essay, short answer MCQ's, viva	
59.3	Enumerate cranial nerve nuclei in pons with their functional group	K	KH	Y	Lecture, small group discussion	Knowledge: long essay, short essay, short answer MCQ's, viva	
Topic: Cerebellum							
AN60.1	Describe & demonstrate external & internal features of cerebellum 1. Describe the anatomical subdivisions of cerebellum 2. Describe the morphological/ transverse subdivisions of cerebellum 3. Describe the functional / longitudinal subdivision of cerebellum 4. Describe the fissures, surfaces and lobes of cerebellum 5. Identify the fissures & surfaces of cerebellum 6. Demonstrate the lobes of cerebellum 7. Identify the cerebellar nuclei 8. Demonstrate the cerebellar peduncles	K/S	SH	Y	Lecture, dissection demonstration, small group discussion	Knowledge: long essay. Short essay, short answers, MCQ's Skill: spotters, specimen discussion, OSPE	
AN60.2	Describe connections of cerebellar cortex and intracerebellar nuclei	K	KH	Y	Lecture,	Short essay, short answers, MCQ's	

	<ol style="list-style-type: none"> Describe the location & arrangement of deep cerebellar nuclei Describe the afferents & efferents of inferior cerebellar peduncle Describe the afferents of middle cerebellar peduncle Describe the afferents & efferents of superior cerebellar peduncle Describe vestibule cerebellar circuit Describe spino cerebellar circuit Describe cerebro cerebellar circuit 	K	KH	N	Lecture, video demonstration, case based discussion	MCQ'S OSPE	General Medicine, Physiology
AN60.3	Describe anatomical basis of cerebellar dysfunction <ol style="list-style-type: none"> Describe the functions of cerebellum Describe the anatomical basis of archicerebellar syndrome Describe the anatomical basis of paleocerebellar syndrome 						
Topic: Midbrain							
AN61.1	Identify external & internal features of midbrain <ol style="list-style-type: none"> Describe the external features of midbrain Describe the internal parts of midbrain Describe the fibers passing through and their arrangement in crus cerebri Describe the connections substantianigra Describe the connections of superior colliculus Describe the connections of inferior colliculus Describe pretectal nucleus Identify & demonstrate the external & internal parts of midbrain 	K/S	SH	Y	Lecture, Dissection demonstration	Knowledge: Short essay, short answers, MCQ's, Skill: spotters, specimen discussion, OSPE Viva-Voce	
AN61.2	Describe internal features of midbrain at the level of superior & inferior colliculus	K	KH	Y			

	<ol style="list-style-type: none"> 1. Describe the features of midbrain at the level of superior colliculus 2. Describe the features of midbrain at the level of inferior colliculus 3. Describe the location, connections & functions of red nucleus 4. Identify the parts of midbrain at the level of superior & inferior colliculus 5. Identify the red nucleus 								
AN61.3	Describe anatomical basis & effects of Benedikt's and Weber's syndrome <ol style="list-style-type: none"> 1. Describe anatomical basis & effects of Benedikt's syndrome 2. Describe anatomical basis & effects of Weber's syndrome 	K	KH	N	Lecture, video demonstration	MCQ'S Viva-Voce	General Medicine		
Topic: Cranial nerve nuclei & Cerebral hemispheres									
AN62.1	Enumerate cranial nerve nuclei with its functional component	K	KH	Y					

AN62.2	<p>Describe & demonstrate surfaces, gyri, poles & functional areas of cerebral hemisphere</p> <ol style="list-style-type: none"> 1. Describe the parts of cerebral hemisphere 2. Describe the surfaces & borders of cerebral hemisphere 3. Describe the poles & lobes of cerebral hemisphere 4. Describe the sulci & gyri in superolateral surface of cerebral hemisphere 5. Describe the sulci & gyri in inferior surface of cerebral hemisphere 6. Describe the sulci & gyri in medial surface of cerebral hemisphere 7. Describe the boundaries & contents of interpeduncular fossa 8. Describe the location & connections of motor areas of cerebral cortex 9. Describe the location & connections of sensory areas of cerebral cortex 10. Describe the location & connections of visual & auditory areas of cerebral cortex 11. Enumerate the areas according to Brodmann's areas 12. Demonstrate the parts of cerebrum 13. Demonstrate the poles & lobes of cerebrum 14. Demonstrate the sulci & gyri of cerebral hemisphere 15. Demonstrate the functional areas of cerebral cortex 16. Demonstrate the boundaries & contents of interpeduncular fossa 17. Demonstrate the structures at the base of the brain 	K/S	SH	Y	<p>Lecture, dissection demonstration, small group discussion</p>	<p>Knowledge: long essay, short essay, short answers, MCQ,S Skill: Spotters, specimen discussion, OSPE Viva-Voce</p>	<p>General medicine & Physiology</p>
AN62.3	<p>Describe the white matter of cerebrum</p>	K/S	KH/SH	Y	<p>Lecture, dissection demonstration, small group</p>	<p>Knowledge: long essay, short essay,</p>	<p>General medicine & Physiology</p>

AN62.4	<ol style="list-style-type: none"> Describe the types of white matter of cerebrum Describe the arcuate/ association fibers Describe the corona radiata Describe the parts and relations of internal capsule Describe the fibers traversing & blood supply of each part of internal capsule Describe the commissural fibers Describe the parts, relations, connections and functions of corpus callosum Identify & demonstrate the association fibers & corona radiata Identify & demonstrate the parts & relations of internal capsule Identify & demonstrate the parts & relations of corpus callosum Discuss the anatomical significance in hemiplegia Discuss the clinical significance of corpus callosum 	K/S	KH/SH	Y	discussion, video demonstration	short answers, MCQ,S Skill: Spotters, specimen discussion, OSPE Viva-Voce	
	<p>Enumerate parts & major connections of basal ganglia & limbic system</p> <ol style="list-style-type: none"> Enumerate the parts of basal ganglia Describe the location, parts and relations of caudate nucleus Describe the location, parts and relations of lentiform nucleus Describe the connections of corpus striatum Describe the functions of basal ganglia Identify & demonstrate parts & relations of caudate nucleus Identify & demonstrate parts & relations of lentiform nucleus Describe the anatomical basis of Parkinson's disease Enumerate the components of limbic system Describe the olfactory pathway Describe divisions, connections and function of amygdaloid body Describe the clinical application of amygdaloid body 	K/S	KH/SH	Y	Lecture, dissection demonstration, small group discussion, video demonstration	Knowledge: Short essay, short answers, MCQ,S Skill: Spotters, Viva-Voce	Physiology

	<p>13. Describe the connections of septal areas</p> <p>14. Enumerate the components of hippocampal formation</p> <p>15. Describe the dentate gyrus</p> <p>16. Describe the structure and connections of hippocampus</p> <p>17. Describe the course and connections of fornix</p> <p>18. Discuss the functions of limbic system</p> <p>19. Identify and demonstrate the components of limbic system</p>								
AN62.5	<p>Describe boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus</p> <ol style="list-style-type: none"> 1. Enumerate the parts of thalamus 2. Describe the functions of thalamus 3. Describe the subdivisions of thalamic nucleus 4. Describe the functions & connections of thalamic nuclei 5. Describe the connections of medial & lateral geniculate bodies 6. Describe the pineal body 7. Describe the habenular nuclei and their connections 8. Describe the extent & subdivisions of hypothalamus 9. Describe the connections and functions of hypothalamus 	K	KH	Y	Lecture, dissection demonstration, small group discussion,	Knowledge:Short rtessay, short answers, MCQ,S Skill: Spotters, Viva-Voce	General medicine& Physiology		
AN62.6	<p>Describe & identify formation, branches & major areas of distribution of circle of willis</p> <ol style="list-style-type: none"> 1. Describe the formation and branches of circle of willis 2. Describe the areas of distribution of circle of willis 3. Identify & demonstrate the formation and branches of circle of willis 4. Describe the clinical significance of circle of willis 	K/S	SH	Y	Lecture, dissection demonstration, small group discussion,	Knowledge:Short rt essay, short answers, MCQ,S Skill: Spotters, Viva-Voce	General medicine& Physiology		
AN62.7	<p>Describe and demonstrate the blood supply of brain</p>	K/S	SH	Y	Lecture, dissection	Knowledge:Sho	General		

	<ol style="list-style-type: none"> 1. Describe the course & branches of internal carotid artery 2. Describe the origin, course, branches and area of distribution of anterior cerebral artery 3. Describe the origin, course, branches and area of distribution of middle cerebral artery 4. Describe the origin, course, branches and area of distribution of posterior cerebral artery 5. Describe the course, branches and area of distribution of vertebral artery 6. Describe the course, branches and area of distribution of basilar artery 7. Describe the venous drainage of brain 8. Identify & demonstrate the internal carotid artery and its branches 9. Identify & demonstrate the vertebral artery and its branches 10. Identify & demonstrate the basilar artery and its branches 11. Discuss the clinical significance of arterial supply of brain 				<p>demonstration, small group discussion,</p>	<p>right essay, short answers, MCQ,S Skill: Spotters, OSPE, Viva-Voce</p>	<p>medicine & Physiology</p>
Topic: ventricular system							
AN63.1	Describe & demonstrate parts, boundaries and features of IIIrd, IVth and lateral ventricle	K/S	SH	Y	Lecture, dissection demonstration, small group discussion, plastinated specimen demonstration	Knowledge: Short essay, short answers, MCQ,S Skill: Spotters, specimen discussion, OSPE, Viva-Voce	Physiology
	<ol style="list-style-type: none"> 1. Describe location & boundaries of third ventricle 2. Demonstrate the boundaries of third ventricle 3. Describe the parts and location of lateral ventricle 4. Describe the formation of boundaries of lateral ventricle 5. Demonstrate the boundaries of lateral ventricle 6. Describe the structures forming the roof & floor of fourth ventricle 7. Describe the angles and recesses of fourth ventricle 8. Identify & demonstrate the structure forming the roof and floor of fourth ventricle 	K	KH	N	Lecture	MCQ'S, Viva-	Paediatrics
AN63.2	Describe the anatomical basis of congenital						

hydrocephalus						voce	Physiology
Topic: Histology & Embryology							
AN 64.1	<p>Describe & identify the microanatomical features of Spinal cord, Cerebellum & Cerebrum</p> <ol style="list-style-type: none"> 1. Discuss the microscopic structure of spinal cord 2. Differentiate white matter and gray matter of spinal cord 3. Explain the different segments of spinal cord 4. Identify and draw the microscopic structure of spinal cord 5. Discuss the microscopic structure of cerebellum 6. Enumerate the three layers of cerebellum 7. Discuss about cells and synapses of cerebellum 8. Identify and draw the microscopic structure of cerebellum 9. Discuss the microscopic structure of cerebrum 10. Enumerate the layers of cerebrum 11. Discuss about the cells present in cerebrum 12. Identify and draw the microscopic structure of cerebrum 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> <u>Slid</u> discussion with identification of structures Spotters	
AN64.2	<p>Describe the development of neural tube, spinal cord, medulla oblongata, pons, midbrain, cerebral hemisphere & cerebellum</p> <ol style="list-style-type: none"> 1. Describe the formation of neural tube and its fate 2. Describe the formation of neural crest and its derivatives 3. Describe the development of spinal cord, histogenesis of neural tube and development of functional columns 4. Explain the positional changes in spinal cord 5. Describe the stages in development of brain 6. Describe the development of ventricles of brain 7. Describe the development of hindbrain and its derivatives 8. Describe the development of midbrain and its derivatives 9. Describe the development of forebrain and its derivatives 10. Identify and demonstrate the above development in chart or model given 	K	KH	Y	Lecture	MCQ'S, Viva-voce	

AN64.3	Describe various types of open neural tube defects with its embryological basis	K	KH	N			Obstetrics & Gynaecology, Pediatrics
	1. Describe the anomalies associated with development of nervous system and elaborate the basis						
Topic: Epithelium histology							
AN65.1	Identify epithelium under the microscope & describe the various types that correlate to its function	K/S	P	Y	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> <u>Slide discussion with identification of structures</u> <u>Spotters</u>	
	<ol style="list-style-type: none"> 1. Discuss the microscopic structure of epithelium 2. Classify epithelium with examples with functional significance 3. Discuss different types of simple and compound epithelium 4. Identify and draw the microscopic structure of epithelium 5. Identify and draw the microscopic structure of different types of epithelium 						
AN65.2	Describe the ultrastructure of epithelium	K	KH	N	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion	
	<ol style="list-style-type: none"> 1. Discuss the microscopic ultrastructure of epithelium 2. Enumerate the cell surface modifications with examples 3. Discuss the cell junction and its types 4. Identify and draw the microscopic ultrastructure of epithelium 						
Topic: Connective tissue histology							
AN66.1	Describe & identify various types of connective tissue with functional correlation	K/S	SH	Y	Lecture – 1 Hr	Knowledge:	

	<ol style="list-style-type: none"> 1. Discuss the microscopic structure of connective tissue 2. Discuss the microscopic structure of different types of connective tissue 3. Differentiate loose areolar tissue and dense connective tissue 4. Enumerate the cells and fibres of connective tissue 5. Identify and draw the microscopic structure of loose areolar tissue 6. Describe the structure of adipose cell 7. Types of adipose tissue 8. Identify and draw the microscopic structure of adipose tissue 					Practical demonstration(Sm all group)- 02hrs	Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> Slide discussion with identification of structures Spotters	
AN66.2	<p>Describe the ultrastructure of connective tissue</p> <ol style="list-style-type: none"> 1. Discuss the ultrastructure of connective tissue 2. Discuss the types of collagen fibres 3. Enumerate the composition of matrix 	K	KH	N	Lecture – 1 Hr Practical demonstration(Sm all group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion	Pathology	
Topic: Muscle histology								
AN67.1	<p>Describe & Identify various types of muscle under the microscope</p> <ol style="list-style-type: none"> 1. Discuss the classification of muscle 2. Discuss the microscopic structure of skeletal muscle 3. Explain dark band and light bands of skeletal muscle 4. Define sarcomere and structure of sarcomere 5. Identify and draw the microscopic structure of skeletal muscle 6. Discuss the microscopic structure of cardiac muscle 7. Explain the structure of intervertebral disc and its function 8. Differentiate skeletal and cardiac muscle 9. Identify and draw the microscopic structure of cardiac muscle 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Sm all group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> Slide discussion with identification of structures Spotters	Physiology	
AN67.2	<p>Classify muscle and describe the structure-function correlation of the same</p>	K	KH	Y	Lecture – 1 Hr Practical	Knowledge: Short essay/		

	1. Describe the classification of muscle 2. Correlate the structure of each type with its function								short answers/ MCQ's Practical discussion	
AN67.3	Describe the ultra structure of muscular tissue 1. Discuss the ultrastructure of muscular tissue 2. Describe dark band and I band 3. Types of proteins present in muscle 4. Identify and draw the ultrastructure of muscle	K	KH	N					Knowledge: Short essay/ short answers/ MCQ's Practical discussion	Physiology
Topic: Nervous tissue histology										
AN68.1	Describe & Identify multipolar & unipolar neuron, ganglia, peripheral nerve 1. Classify ganglia with examples 2. Discuss the structure of multipolar ganglion 3. Explain the structure of multipolar cells with example 4. Identify and draw the structure of multipolar ganglion 5. Discuss the structure of unipolar ganglion 6. Identify and draw the structure of unipolar ganglion 7. Describe the unipolar cells and its arrangement 8. Discuss the structure of peripheral nerve 9. Explain the structure of neuron 10. Describe the coverings of peripheral nerve 11. Discuss the cross section of peripheral nerve 12. Identify and draw the structure of peripheral nerve	K/S	SH	Y					Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> Slide discussion with identification of structures Spotters	
AN68.2	Describe the structure-function correlation of neuron	K	KH	Y						Physiology
AN68.3	Describe the ultrastructure of nervous tissue 1. Discuss the ultrastructure of nervous tissue 2. Describe the cell organelles present in neuron 3. Describe myelination of neuron 4. Identify and draw the ultrastructure of nervous tissue	K	KH	N					Knowledge: Short essay/ short answers/ MCQ's	

Topic: Blood Vessels						
		K/S	SH	Y		
AN69.1	Identify elastic & muscular blood vessels, capillaries under the microscope			Y		Physiology
AN69.2	Describe the various types and structure-function correlation of blood vessel <ol style="list-style-type: none"> 1. Discuss the structure of elastic artery 2. Explain the layers of elastic artery 3. Identify and draw the structure of elastic artery 4. Discuss the structure of muscular artery 5. Define vasavosorum and its function 6. Differentiate elastic and muscular artery 7. Identify and draw the structure of muscular artery 8. Discuss the structure of large sized vein 9. Identify and draw the structure of medium sized vein 10. Differentiate medium sized vein and large sized vein 	K	KH	Y	Lecture – 1 Hr Practical demonstration(Sim all group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Slide discussion with identification of structures Spotters
AN69.3	Describe the ultrastructure of blood vessels <ol style="list-style-type: none"> 1. Discuss the ultrastructure of blood vessel 2. Explain the arrangement of smooth muscle and connective tissue in each layer 3. Enumerate tunica intima, internal elastic lamina, external elastic lamina and tunica adventitia 4. Identify and draw the ultrastructure of blood vessel 	K	KH	Y	Lecture – 1 Hr Practical demonstration(Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion
Topic: Glands & Lymphoid tissue						
AN70.1	Identify exocrine gland under the microscope & distinguish between serous, mucous and mixed acini <ol style="list-style-type: none"> 1. Discuss the structure of serous salivary gland 2. Differentiate serous and mucous acini 3. Define intralobular, interlobular and excretory duct of serous salivary gland 4. Identify and draw the microscopic structure of parotid gland 5. Discuss the microscopic structure of submandibular salivary gland 6. Enumerate structure of mucous acini 7. Explain serous Demilune 	K/S	SH	Y		Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Slide discussion with identification of structures Spotters
					Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	Pathology

	8. Differentiate parotid and submandibular salivary gland 9. Identify and draw the structure of mixed salivary gland 10. Discuss the structure of mucous salivary gland 11. Identify and draw the structure of mucous salivary gland								
AN70.2	Identify the lymphoid tissue under the microscope & describe microanatomy of lymph node, spleen, thymus, tonsil and correlate the structure with function 1. Describe the structure of lymph node 2. Define cortex and medulla of lymph node 3. Discuss the type of cells present in lymph node 4. Identify and draw a neat labelled diagram of structure of lymph node 5. Discuss the structure of spleen 6. Define red pulp and white pulp of spleen 7. Explain the splenic circulation 8. Discuss the structure of thymus 9. . Explain the lobules and reticular framework of thymus 10. Identify and draw the structure of thymus 11. Discuss the structure of palatine tonsil 12. Identify and draw the structure of palatine tonsil 13. Explain the epithelium of palatine tonsil 14. Differentiate lymph node and palatine tonsil	K/S	SH	Y	Lecture – 1 Hr Practical demonstration (Small group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion Skill assessment: Slide discussion with identification of structures Spotters	Pathology		
Topic: Bone & Cartilage									
AN71.1	Identify bone under the microscope; classify various types and describe the structure-function correlation of the same	K/S	SH	Y	Lecture – 1 Hr Practical	Knowledge: Short essay/ short	Pathology		

	<ol style="list-style-type: none"> Discuss the structure of transverse section of compact bone Explain the different types of cells of bone with its functions Define haversian system, lamellae & lacunae Describe the components of haversian system Discuss the arrangement of osteon Identify and draw the structure of transverse section of compact bone Discuss the structure of longitudinal section of compact bone Explain haversian canal and volkmann's canal Identify and draw the structure of longitudinal section of compact bone 					demonstration(Sm all group)- 02hrs	answers/ MCQ's Practical discussion <u>Skill assessment:</u> Slide discussion with identification of structures Spotters	
AN71.2	<p>Identify cartilage under the microscope & describe various types and structure- function correlation of the same</p> <ol style="list-style-type: none"> Discuss the structure of hyaline cartilage with example Enumerate the matrix and cells of hyaline cartilage Identify and draw the structure of hyaline cartilage Discuss the structure of fibrocartilage with example Explain the arrangement of collagen fibres and fibroblasts Identify and draw the structure of fibrocartilage Discuss the structure of elastic cartilage Explain the arrangement of elastic fibres and cells Identify and draw the structure of elastic cartilage Correlate the structure & type of cartilage with its functions 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Sm all group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill:</u> Slide discussion with identification of structures Spotters	Pathology	
Topic: Integumentary System								
AN72.1	<p>Identify the skin and its appendages under the microscope and correlate the structure with function</p> <ol style="list-style-type: none"> Describe the microscopic structure of thick skin Describe the microscopic structure of thin skin Discuss the functions of skin Describe the appendages of skin Describe the structure of hair follicle 	K/S	SH	Y	Lecture – 1 Hr Practical demonstration(Sm all group)- 02hrs	Knowledge: Short essay/ short answers/ MCQ's Practical discussion <u>Skill assessment:</u> Slide discussion	Pathology	

	6. Describe the types and structure of sweat gland 7. Describe the structure of sebaceous gland 8. Describe the structure of nail 9. Identify the slide of thick & thin skin correctly 10. Draw a neat labelled diagram of thick & thin skin with appendages accurately 11. Correlate the structure of skin with its functions							with identification of structures Spotters	
Topic: Chromosomes									
AN73.1	Describe the structure of chromosomes with classification 1. Describe the morphology of chromosomes 2. Enumerate the classifications of chromosomes and their basis 3. Identify the type of chromosome	K	KH	Y	Lecture	MCQ'S, Viva-voce			
AN73.2	Describe technique of karyotyping with its applications 1. Describe the procedure of karyotyping 2. Enlist the utility of karyotyping and its limitations 3. Read and enumerate normal and abnormal karyotypes	K	KH	Y	Lecture	MCQ'S, Viva-voce			
AN73.3	Describe the Lyon's hypothesis 1. Define Barr Body and enumerate Lyon Hypothesis 2. Discuss the significance and application of hypothesis	K	KH	Y	Lecture	MCQ'S, Viva-voce			
Topic: Patterns of Inheritance									
AN74.1	Describe the various modes of inheritance with examples 1. Classify the categories of genetic diseases 2. Mention the various modes of inheritance 3. Describe the characteristics of various modes of inheritance 4. Mention examples for each mode of inheritance	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	General Medicine, Pediatrics		
AN74.2	Draw pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance 1. Identify the pattern of inheritance in the given chart of pedigree 2. Describe various patterns of inheritance 3. Describe the basic pedigree structure & notations used	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	General Medicine, Pediatrics		

	4. Draw the pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance								
AN74.3	Describe multifactorial inheritance with examples 1. Describe multifactorial inheritance 2. Mention examples for multifactorial inheritance	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	General Medicine,		
AN74.4	Describe the genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Haemophilia, Duchene's muscular dystrophy & Sickle cell anaemia Identify the disease condition based on the symptoms and pedigree chart	K	KH	N	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	General Medicine, Pediatrics		
Topic: Principle of Genetics, Chromosomal Aberrations & Clinical Genetics									
AN75.1	Describe the structural and numerical chromosomal aberrations 1. Classify the structural aberrations and explain each 2. Classify numerical aberrations and explain each type 3. Identify the chart of a particular type of aberration	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	Pediatrics		
AN75.2	Explain the terms mosaics and chimeras with example	K	KH	N	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	Pediatrics		
AN75.3	Describe the genetic basis & clinical features of Prader Willi syndrome, Edward syndrome & Patau syndrome	K	KH	N	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	Pediatrics		
AN75.4	Describe genetic basis of variation: polymorphism and mutation	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	Pediatrics		
AN75.5	Describe the principles of genetic counselling	K	KH	Y	Lecture, Small group discussion	MCQ's, Short answers Viva-Voce	Pediatrics, Obstetrics & Gynaecology		
Topic: Introduction to embryology									
AN76.1	Describe the stages of human life 1. Describe how a human life begins and define fertilisation, conceptus and gametogenesis	K	KH	Y	Lecture small group discussions	Short essay short answer MCQ's			

	2. Define the various of stages of human life [prenatal and postnatal] with time frame correctly 3. List the changes that occurs during embryogenic and foetal period of the prenatal development stage correctly 4. List the changes that occurs in infancy and childhood of the postnatal development stage correctly 5. List the changes that occurs in adolescence and adulthood of the postnatal development stage correctly 6. Mention the applied embryology associated with each stage of development				video assisted lecture	Viva	
AN76.2	Explain the terms- phylogeny, ontogeny, trimester, viability	K	KH	Y	Lecture	MCQ's, Viva-voce	
Topic: Gametogenesis and fertilization							
AN77.1	Describe the uterine changes occurring during the menstrual cycle 1. Define menstrual cycle 2. Specify the purpose of the menstrual cycle 3. Enumerate the phases of the menstrual cycle 4. Enumerate the changes occurring in the endometrium of the uterus during the menstrual cycle 5. Describe the changes occurring in the proliferative phase of the menstrual cycle 6. Describe the changes occurring in the secretory phase of the menstrual cycle 7. Describe the changes occurring in the menstrual phase of the menstrual cycle 8. Explain the mechanism of onset of menstrual bleeding	K	KH	Y	Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology
AN77.2	Describe the synchrony between the ovarian and menstrual cycles 1. Define ovarian cycle 2. Enumerate the phases of the ovarian cycle 3. Describe the changes occurring in the preovulatory phase of the ovarian cycle 4. Draw and label diagrams depicting folliculogenesis	K	KH	Y	Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology

	<ol style="list-style-type: none"> 5. Describe the changes occurring in the ovulatory phase of the ovarian cycle 6. Describe the changes occurring in the post-ovulatory phase of the ovarian cycle 7. Define ovulation 8. Describe the sequence of events occurring during ovulation 9. Explain the factors responsible for ovulation 10. Describe the hormonal control of ovarian and uterine cycles 11. Correlate the phases of the menstrual cycle with the various phases of ovarian cycle 	K	KH	Y	Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology
AN77.3	Describe spermatogenesis and oogenesis along with diagrams	K	KH	Y			
	<ol style="list-style-type: none"> 1. Define gametogenesis 2. Enumerate the stages of spermatogenesis 3. Describe the stages of spermatogenesis 4. Describe the changes occurring during spermiogenesis 5. Describe structure of mature sperm 6. Describe the stages of oogenesis 7. Describe the structure of graafian follicle 8. Differentiate between spermatogenesis & oogenesis 9. Draw a neat labelled diagram of mature sperm 10. Draw a neat labelled diagram of graafian follicle 	K	KH	Y	Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology
AN77.4	Describe the stages and consequences of fertilisation	K	KH	Y			
	<ol style="list-style-type: none"> 1. Define fertilization 2. Describe the steps of fertilization 3. Explain the process of approximation of gametes 4. Explain the process of capacitation of sperms 5. Enlist the barriers penetrated by the sperm before fusion with the ovum 6. Explain acrosome reaction 7. Enlist the effects of fertilization 8. Describe the process of contact and fusion of gametes during fertilization 	K	KH	Y	Lecture	Short essay	Obstetrics &
AN77.5	Enumerate and describe the anatomical principles underlying contraception	K	KH	Y			

	<ol style="list-style-type: none"> 1. Enlist the contraceptive techniques 2. Enumerate the techniques of permanent contraception 3. Enumerate the techniques of temporary contraception 4. Explain the anatomical basis of barrier techniques of contraception in both the sexes 5. Describe the effects of contraceptive hormonal pills on phases of the ovarian cycle 						small group discussions video assisted lecture	short answer MCQ's Viva	Gynaecology
AN77.6	<p>Describe teratogenic influences; fertility and sterility, surrogate motherhood, social significance of "sex-ratio".</p> <ol style="list-style-type: none"> 1. Define teratology 2. Distinguish malformation, disruption, deformation and dysplasia 3. Explain the principles of teratology 4. Classify teratogens giving examples 5. Define infertility 6. Explain the anatomical basis of male infertility 7. Explain the anatomical basis of female infertility 8. Enlist the assisted reproductive techniques 9. Define in vitro fertilization 10. Describe the steps in in vitro fertilization 11. List the reasons for using in vitro fertilization 12. Explain intracytoplasmic sperm injection 13. Explain gamete intrafallopian transfer 14. Explain surrogate motherhood 15. Discuss the social significance of sex ratio 	K	KH	N		Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology	
Topic: Second week of development									
AN78.1	<p>Describe cleavage and formation of blastocyst</p> <ol style="list-style-type: none"> 1. Describe the formation of cleavage 2. Define morula 3. Describe the formation of blastocyst 4. Describe the embryoblast and trophoblast 5. Describe the hatching of blastocyst 	K	KH	Y		Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva		
AN78.2	<p>Describe the development of trophoblast</p> <ol style="list-style-type: none"> 1. Describe the types of trophoblast 2. Describe the functions of each layer 	K	KH	Y		Lecture small group discussions video assisted	Short essay short answer MCQ's Viva		

						lecture Model demonstration			
AN78.3	Describe the process of implantation & common abnormal sites of implantation 1. Define implantation 2. Describe the steps of implantation 3. Describe the types of implantation 4. Describe the normal site of implantation 5. Mention the sites of abnormal implantation 6. Define the placenta previa and describe the degrees of placenta previa 7. Define ectopic pregnancy. 8. Describe the sites of ectopic pregnancy	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology		
AN78.4	Describe the formation of extra-embryonic mesoderm and coelom, bilaminar disc and prochordal plate 1. Describe the steps and fate in formation of extraembryonic mesoderm 2. Describe the 2 nd week of development 3. Identify the structures in the model / charts of this embryonic stage	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva			
AN78.5	Describe in brief abortion; decidual reaction, pregnancy test 1. Define abortion 2. Describe the process of decidual reaction 3. Describe the anatomical basis of pregnancy test	K	KH	Y	Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology		
Topic: 3rd to 8th week of development									
AN79.1	Describe the formation & fate of the primitive streak 1. Describe the steps in formation of primitive streak 2. Describe the fate of it 3. Enlist the anomalies and its basis	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva			
AN79.2	Describe formation & fate of notochord	K	KH	Y	Lecture	Short essay			

	1. Describe formation of notochord 2. Mention the fate of it				small group discussions video assisted lecture Model demonstration	short answer MCQ's Viva	
AN79.3	Describe the process of neurulation 1. Describe the process of neurulation 2. Describe the steps involved in neurulation	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	
AN79.4	Describe the development of somites and intra-embryonic coelom 1. Describe the Intra embryonic mesoderm 2. Describe formation of intraembryonic coelom	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology
AN79.5	Explain embryological basis of congenital malformations, nucleus pulposus, sacrococcygeal teratomas, neural tube defects 1. Describe basis of congenital malformations 2. Describe basis of sacrococcygeal teratoma	K	KH	N	Lecture small group discussions video assisted lecture Model demonstration	short answer MCQ's Viva	Obstetrics & Gynaecology
AN79.6	Describe the diagnosis of pregnancy in first trimester and role of teratogens, alpha-fetoprotein 1. Describe the basis of pregnancy test 2. Describe the effects of teratogens 3. Describe the clinical importance of alpha-feto protein	K	KH	N	Lecture small group discussions video assisted lecture Model demonstration	short answer MCQ's Viva	Obstetrics & Gynaecology Genetics

Topic: Fetal membranes

		K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	
AN80.1	Describe formation, functions & fate of-chorion: amnion; yolk sac; allantois & decidua 1. Describe chorion 2. Describe amnion and its fate 3. Describe allantois 4. Describe allantois 5. Describe decidua 6. Describe formation of chorion, amnion, yolk sac, allantois and decidua 7. Enumerate the function and fate of chorion, amnion, yolk sac, allantois and decidua.	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	
AN80.2	Describe formation & structure of umbilical cord 1. Describe formation of umbilical cord 2. Describe structure of umbilical cord 3. Enumerate the contents, function and clinical correlations of Umbilical cord.	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	
AN80.3	Describe formation of placenta, its physiological functions, foetomaternal circulation & placental barrier 1. Describe formation of placenta and formation of chorionic villi. 2. Describe structure of placenta 3. Describe function of placenta 4. Describe anomalies of placenta 5. List out the differences in the composition of primary, secondary and tertiary villus. 6. Describe the structure of a full term placenta. 7. Describe the constituents of placental barrier. 8. Describe the foeto maternal circulation. 9. Describe the congenital anomalies of Placenta according to its shape and its abnormal attachment to uterus.	K	KH	Y	Lecture small group discussions video assisted lecture Model demonstration	Short essay short answer MCQ's Viva	Obstetrics & Gynaecology
AN80.4	Describe embryological basis of twinning in monozygotic & dizygotic twins 1. Name the two types of twinning.	K	KH	Y	Lecture small group discussions	Short essay short answer MCQ's	Obstetrics & Gynaecology

	2. Describe the embryologic basis of monozygotic and dizygotic twins. 3. List out the difference between monozygotic and dizygotic twins. 4. Describe the congenital anomalies associated with twinning.					video assisted lecture Model demonstration	Viva	
AN80.5	Describe role of placental hormones in uterine growth & parturition	K	KH	Y		Lecture small group discussions	MCQ's Viva	Obstetrics & Gynaecology
AN80.6	Explain embryological basis of estimation of fetal age. 1. Differentiate embryonic and foetal period. 2. Describe key developmental events during embryonic and foetal period. 3. Describe the criteria for estimation of gestational age in days and weeks. 4. Describe the milestones in each trimester of pregnancy.	K	KH	N		Lecture small group discussions	Short answer MCQ's Viva	Obstetrics & Gynaecology
AN80.7	Describe various types of umbilical cord attachments	K	KH	N		Lecture small group discussions video assisted lecture	Short answer MCQ's Viva	Obstetrics & Gynaecology

Topic: Prenatal Diagnosis

AN81.1	Describe various methods of prenatal diagnosis	K	KH	Y				
AN81.2	Describe indications, process and disadvantages of amniocentesis 1. Describe the indications of amniocentesis 2. Describe the process of amniocentesis 3. Describe the advantages and disadvantages of amniocentesis	K	KH	Y		Lecture small group discussions video assisted lecture	Short essay short answer MCQ's Viva	Radiology, Genetics
AN81.3	Describe indications, process and disadvantages of chorion villus biopsy 1. Describe the indications of Chorion villous sampling 2. Describe the process of Chorion villous sampling 3. Describe the advantages and disadvantages of Chorion villous sampling	K	KH	Y		Lecture small group discussions/ Case based discussions video assisted lecture	Short essay short answer MCQ's Viva	Radiology, Genetics

Topic: Ethics in Anatomy					
AN 82.1	S	SH	Y	Reflection based on their experience in Dissection hall (Prose, Poetry) Formative Assessment – based on their active participation in Sessions	
<p>Demonstrate respect and follow the correct procedure when handling cadavers and other biologic tissue</p> <ol style="list-style-type: none"> 1. Demonstrate ability to follow Universal precautions while handling cadavers & biological tissues effectively 2. Demonstrate respect while following prescribed procedures in handling cadavers effectively 				<p>Large Group interactive lecture (on importance of biological tissue/ cadaver handling, precautions to be followed)</p> <p>Small Group demonstration in Dissection hall</p> <p>Video Demonstration</p>	

Integration

The teaching should be aligned and integrated horizontally and vertically in organ systems with clinical correlation that will provide a context for the learner to understand the relationship between structure and function and interpret the anatomical basis of various clinical conditions and procedures.

Practical Demonstration

1. **Gross Anatomy:** Dissection of the whole body at least once or prosected part demonstration or skill lab with CD of dissection stages

- Upper limb: Demonstration of structures in the:
- Bones of upper limb, Pectoral & scapular regions, Shoulder region, Axilla, Arm & forearm, Hand: palm & dorsum, & Joints of upper limb
- Lower limb: Demonstration of structures in the:
- Bones of lower limb, Gluteal region, Thigh: anterior, medial, posterior compartments, Popliteal fossa, Leg: anterior, lateral and posterior compartments, Foot: dorsum, sole & Joints of lower limb.
- Thorax: Demonstration of:
- Thoracic cage, Chest wall, Diaphragm, Mediastinum, Lungs & pleura, Heart & sinuses
- Abdomen: Demonstration of:
- Lumbar vertebra, Anterior abdominal wall, Inguinal region, Organs / viscera with blood vessels and nerves: GIT, Excretory system, Suprarenal, Posterior abdominal wall.
- Pelvis: Demonstration of:
- Bony Pelvis, Pelvic viscera with blood vessels and nerves, Perineum: external genitalia, perineal pouches and anal triangle including ischioanal fossa.
- Head & Neck: Demonstration of structures in the:
- Skull, Scalp, Superficial & deep structures of face & neck, Parotid region, Cranial cavity, Contents of orbit, Triangles of neck, Eyeball, Submandibular region with submandibular gland, Temporal & infra temporal fossa, Oral cavity: Tongue, Palatine tonsil, Palate, Nasal cavity, Pharynx, Larynx, Ear, Thyroid & parathyroid gland, Oesophagus, Trachea, Blood vessels and cranial nerves & Vertebral canal and contents.
- Brain: Demonstration of:
- Sections & prosected specimens of brain to demonstrate meninges, blood supply, functional cortical areas, ventricles, visual pathways, auditory pathways, basal ganglia, corpus striatum, cerebellum and sections of the brain stem.
- Demonstrations: Sectional anatomy
- Radiology: Demonstration of normal anatomical features in some commonly used skiagrams (plain & contrast), CT scan, ultrasound, MRI and endoscopy

2. **Histology**

- Demonstration of stained slides of all the clinically relevant tissues, organs and viscera.

3. **Developmental Anatomy**

- Demonstrate various stages of fertilization, implantation, formation of embryo,

development of fetus and development of various organs & systems, Commonly encountered congenital defects in models, charts & videos.

4. Medical Genetics

- Demonstration of normal karyotype, Clinical picture, features and karyotype of the common genetic conditions.

D. EARLY CLINICAL EXPOSURE

- The clinical training would start in the first year, focusing on communication, basic clinical skills and professionalism.
- There would be sufficient clinical exposure at the primary care level and this would be integrated with the learning of basic and laboratory sciences.
- Introduction of case scenarios for classroom discussion/case-based learning would be emphasized.
- It will be done as a coordinated effort by the pre-clinical, para-clinical and clinical faculty.
- Providing a clinical context and ensuring patient centricity of instructions are the key principles underlying early clinical exposure.
- The ECE provides for three key elements - basic science correlation, clinical skills including authentic patient contact and an introduction to humanities in medicine.
- Suggested topics for early clinical exposure

Sl No	Topics	Integration departments
Upper Limb		
1	Clinical importance of Brachial plexus & its injury	Anaesthesia, surgery, paediatrics & Orthopaedics
2	Fractures of bones & dislocations of joints	Orthopaedics
3	Mammary gland and its clinical importance	Surgery
4	Median nerve injury	Medicine & Orthopaedics
5	Ulnar nerve injury	Medicine & Orthopaedics
6	Radial nerve injury	Medicine & Orthopaedics
7	Clinical importance of Venous drainage of upper limb	Surgery
8	Surgical importance of Palmar spaces:	Surgery & Plastic surgery
Lower limb		
9	Clinical importance of Venous drainage of lower limb(Varicose veins)	Surgery
10	Fracture of neck of femur & avascular necrosis of head of femur	Orthopaedics
11	Compartment syndrome	Surgery & Plastic surgery
12	Peripheral pulsation & its clinical application	Surgery

13	Nerve injuries(Sciatica & Foot drop)	Orthopaedics
14	Medicolegal importance of lower end of femur	Radiology, forensic medicine
15	Clinical importance of arches of foot	Orthopaedics
Thorax		
16	Clinical importance of medias-tinum(Thoracic inlet syndrome etc):	Medicine & Surgery
17	Clinical importance of bronco pul-monary segments	Pulmonology, Medicine, Cardio-thoracic surgery
18	Surgical importance of Intercos-tal spaces	Medicine, Surgery
19	Clinical importance of pleura	Medicine
20	Clinical importance of curvatures of vertebral column	Orthopaedics, Medicine
21	Clinical importance of blood sup-ply of heart	Medicine, Cardiology
22	X-ray of thoracic cavity	Radiology, Pulmonology, Medicine
Abdomen & Pelvis		
23	Surgical importance of inguinal canal	Surgery
24	Clinical importance of peritoneum	Medicine & Surgery
25	Liver & Extrabiliary apparatus & its clinical importance	Medicine, Surgery, Gastroentorol-ogy
26	Appendicitis	Surgery
27	Surgical importance of rectum & anal canal	Surgery
28	Surgical importance of Pelvic floor	OBG
29	Clinical importance of genital sys-tem	OBG, Surgery
30	Surgical importance of excretory system(Renal stone & Constric-tion of ureter)	Urology
Head & Neck		
31	Surgical importance of scalp	Surgery
32	Facial nerve injury & its clinical importance	Medicine, Neurology

33	Clinical importance of parotid gland & its duct	Surgery, Medicine
34	Clinical importance of lymphatic drainage of head & Neck	Surgery, ENT
35	Cranial nerve & its applied importance	Neurology, ophthalmology, Medicine, ENT
36	Paranasal air sinuses & its clinical importance	ENT
37	Surgical importance of thyroid gland	Surgery
38	Radiology of head & neck	Radiology, ENT
Brain & Spinal cord		
39	Meninges & its applied importance	Neurosurgery
40	Blood supply of brain & its applied importance	Medicine, Neurosurgery
41	Radiology of brain	Radiology, Neurosurgery
42	Spinal cord & Its surgical importance	Neurosurgery, orthopaedics
Embryology & Genetics		
43	Abnormal implantation	OBG, Radiology
44	Twinning & Teratogens	OBG, Paediatrics, Pharmacology, Radiology
45	Congenital anomalies of face	Paediatrics, Plastic surgery
46	Congenital anomalies of GIT	Paediatric surgery
47	Congenital anomalies of Urogenital system	Paediatrics, paediatric surgery
48	Developmental anomalies of CVS & RS	Cardiothoracic surgery
49	Developmental anomalies of Branchial apparatus	Paediatric surgeon, Surgery
50	Numerical & structural abnormalities of chromosomes	Genetics, Paediatrics, radiology
51	Basis of genetic investigation & Procedure	Genetics, Biochemistry, Radiology

V. ASSESSMENT

A. Formative assessment

- Assessment of students shall be based day-to-day assessment pertaining to their performance with respect to assignments, preparation for seminar, involvement in discussion in small group teaching & other academic activities
- Minimum of three examinations shall be conducted & average of three is taken into consideration.
- Theory: 100 marks (Theory:70 & Continuous assessment:30)
- Practical: 100 Marks (Practical:70 & Continuous assessment:30)

- 3rd Internal assessment should preliminary/ pre-university examination

Formative assessment marks distribution pattern

Theory (100)		Practical (100)	
Internal assessment (70)	Continuous assessment (30)	Internal assessment(70)	Continuous assessment (30)
<ul style="list-style-type: none"> • MCQ's 01*20= 20 • Long essay (Case based) 1*10 = 10 • Short essay 5*5= 25 • Short answers 5*3 = 15 	<ul style="list-style-type: none"> • Unit test/ table test = 20 • Early Clinical Exposure = 10 	<ul style="list-style-type: none"> • OSPE = 20 • Practical = 50 • (Gross anatomy= 30, Histology=20) 	<ul style="list-style-type: none"> • Records (Gross anatomy& Histology=10 each) = 20 • Professionalism & Ethics (Punctuality & involvement, reflections, seminar, Research, extracurricular activities etc) = 10

University Examinations

1. Theory: 200 marks

Two papers of 100 marks each and duration of each paper will be 3 hours. Each paper candidate has to score 40% and aggregate of 2 papers is 50% to pass.

Distribution of chapters for paper I and II with weightage of marks in Anatomy for University Examination

Paper – I					Paper - II				
Topics	Marks	Long essay	Short essay	Short answers	Topics	Marks	Long essay	Short essay	Short answers
Head and Neck	25	√	√	√	Abdomen	30	√	√	√
Brain, Spinal cord	10	√	√	√	Pelvis	12	√	√	√
Upper limb	20	√	√	√	Perineum	08		√	√
Thorax including diaphragm	20	√	√	√	Lower limb	20	√	√	√
General Anatomy	05		√	√	Systemic Histology	10		√	√

General Embryology	10		√	√	Genetics	10		√	√
General Histology	10		√	√	Systemic Embryology	10		√	√
Total	100				Total	100			

Theory question paper pattern:

Sl no	Type of question	No of questions	Marks allotted per question	Marks
1	MCQ's	20	01	20
2	Long essay (Case based)	2	10	20
3	Short essay	6	05	30
4	Short answers	10	03	30
Total				100

2. Practical examination pattern: 80 marks

Candidate has to score 50% to pass.

Practical exam pattern:

Gross anatomy – 50 marks		Histology – 30 marks	
Description	Marks	Description	Marks
OSPE stations: 2* 5 marks	10	Spotters: 10*1 (Including one genetic chart)	10
Spotters: 1*1mark (Soft parts - 7no, Embryology models- 1 no, Bones- 1 no, X-Ray-1 no)	10	One General histology Slide discussion	10
Specimen discussion: 2*10 marks (one specimen above diaphragm & one specimen below diaphragm)	20	One systemic histology Slide discussion	10
Surface marking 1*10marks	10	Total	30
Total	50		

3. Viva- Voce: 20 marks and it will be added to practical exam marks.

- 4 stations * 05 marks = 20 marks
- Stations:
 - » Radiology

- » Embryology models/ charts
- » Above diaphragm (Ostology)
- » Below diaphragm (Osteology)

VI. LEARNING RESOURCE MATERIALS

Recommended books: Recent Editions.

1. Gross Anatomy

- Dissection manual with regional & applied anatomy by Mercy navis (3 volumes)
- Cunningham's Manual of Practical Anatomy by G.J.Romanes. Vol I, II & III, Published by Oxford University Press
- Grants Atlas of Anatomy by A.Agur, published by M.Lec
- Clinical Anatomy by Regions by R.S.Snell, published by Little brown & Company, Boston
- Text book of Anatomy by IB Singh (3volumes), published by Jaypee
- Text book of Anatomy by BD Chaurasia (3volumes), published by CBS
- Text book of Anatomy by Vishram Singh (3volumes), published by Elsevier
- Gray's Anatomy for Students, published by Elsevier

2. Histology

- Difiore's - Atlas of Histology with functional correlation, published by Lippincott Williams and Wilkins
- Text book of Human Histology by I.B.Singh, published by Jaypee brothers
- Text book of Histology by Gunasegaran, published by Elsevier

3. Developmental Anatomy/Embryology

- Langman's medical Embyology, published by Lippincott Williams and Wilkins
- Text book of Embryology by I.B.Singh published by Jaypee brothers
- Text book of Embryology by Vishram Singh, published by Elsevier

4. Neuroanatomy

Text book of Neuroanatomy by I.B.Singh, published by Jaypee brothers
Text book of Neuroanatomy by Vishram Singh, published by Elsevier

5. Osteology

- Text book of osteology by Poddar, Published by Scientific Book Company
- Text book of osteology by I.B.Singh, published by Jaypee brothers
- Surface and Radiological Anatomy
- Surface and Radiological Anatomy-A. Halim & A.C.Das, published by CBS

6. Genetics

- Text book of Genetics by S.D.Gangane, published by Elsevier

7. General Anatomy

- Hand book of General Anatomy by B.D.Chaurasia, published by CBS
- General Anatomy by Shoba Rawalani, published by Jaypee brothers

Reference books, Recent Editions. I Gross Anatomy

- Gray's Anatomy by Susan Standring
- Clinical Anatomy by Keith Moore, published by Lippincott Williams and Wilkins
- Text book of Anatomy by R.J.Last, published by Churchill Livingstone

8. Histology

- Histology; A text & Atlas By M.H. Ross, published by W. Pawalina Lippincott Williams & Williams
- Basic Histology by Luiz.C.Janqueira, published by Mc Graw Hill
- Wheaters Functional Anatomy, published by Elsevier

9. Developmental Anatomy/Embryology

- The Developing Human by Moore & Persaud, published by Lippincott Williams and Wilkins
- Human Embryology by William J. Larsen, published by Elsevier
- Essentials of Human Embryology by A.K.Datta published by Current books international

10. Neuroanatomy

- Clinical Neuroanatomy by Richard S.Snell, published by Lippincott Williams & Wilkins
- Human Neuroanatomy by Malcolm B Carpenter, published by Williams & Wilkins
- Essentials of Neuroanatomy by A.K.Datta, published by Current books international

11. Genetics

- Essential Medical Genetics by J.M. Connor, published by Blackwell Science Inc
- Oxford text book of Medical Genetics.

CDs & Internet:

- A.D.A.M. (Animated Dissection of Anatomy for Medicine) Comprehensive for Windows. Publisher: A.D.A.M. Software Inc.
- A.D.A.M. Interactive Anatomy, Publisher: A.D.A.M. Software Inc.
- Cardioviewer 3D: CD-ROM, ISBN: 0-8151-3106-2, publication date: 1996 Imprint: MOSBY (Marketed by Elsevier)
- Histology/pathology slides: <http://www.virtualslides.psu.edu/listSlides.jsp>
- Collection of Links to Anatomical resources on the internet: <http://www.west.asu.edu/jbuenke/medicine/anatomy.html>

Suggested topics for e-learning in Anatomy (Recommended to assist and supplement teaching)

1. Fertilization
2. Cleavage
3. Implantation
4. Post Natal Growth and Development
5. Development of Pharyngeal arches, clefts, pouches.
6. Descending tracts of Central Nervous System
7. Ascending tracts of Central Nervous system
8. Medical Genetics - common syndromes
9. Visual pathways and visual areas
10. Major Joints & Movements

PHYSIOLOGY COURSE CONTENT

I. GOAL

The goal of teaching physiology to undergraduates aims at providing the students a comprehensive knowledge of the normal functions of the human body to facilitate an understanding of the physiological basis of health and disease and an integrated approach for solving problems pertaining to practical skill-based knowledge in medicine.

II. OBJECTIVES

A undergraduate student in physiology will learn to:

A. Cognitive Domain

1. Describe the normal functions of all organ systems, regulatory mechanisms and interactions of the various organs for well co-ordinated total body function.
2. Understand the basic principles, mechanism and homeostatic control of all the functions of human body as a whole.
3. Elucidate the physiological aspects of normal growth and development.
4. Analyze the physiological responses and adaptation to different stresses during life processes.
5. Lay emphasis on applied aspect of physiological functions underlying disease state.
6. Correlate knowledge of physiology in areas indicated by National Health Programmes.

B. Affective Domain

1. Communicate effectively with peers and teachers
2. Communication with volunteers and patients in various teaching – learning activities.
3. Function as an effective team member

C. Psychomotor Domain

1. Acquire the skills to perform the experiments for study of physiological functions.
2. To report and interpret result of tests which he/she performed and observed in the laboratory.
3. Acquire skills in conducting research in the field of physiology through STS project.

III. COURSE OUTCOMES

At the end of the course the undergraduates must demonstrate:

1. Understanding of the normal functioning of the organs and organ systems of the body
2. Comprehension of the normal structure and organization of the organs and systems on basis of the functions
3. Understanding of age - related physiological changes in the organ functions that reflect normal growth and development
4. Understand the physiological basis of disease

IV. SYLLABUS:

TEACHING HOURS: Total Number of teaching Hrs: 530 Hrs

SI No	Teaching learning Methods	Hours of teaching
1	Didactic Lectures	160
2	Small group teaching / tutorials/Integrated teaching	70
3	Practical / Demonstrations	240
4	Self directed learning	25
5	Early clinical exposure (basic science correlation and clinical skills)	30
6	AETCOM Module	05

System wise Distribution of Teaching Hours

SI.No	System	No. of Hrs
1	General Physiology	09
2	Haematology	13
3	Nerve and Muscle physiology	09
4	Gastro- Intestinal physiology	10
5	Cardio Vascular physiology	25
6	Respiratory physiology	12
7	Renal physiology	10
8	Endocrine	16
9	Reproduction	10
10	Neurophysiology	30
11	Special Senses	10
12	Integrated physiology	06

Competencies & SLOs:

Topic: General Physiology		Number of competencies: (09)					
Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching learning methods	Assessment methods	Integration
PY1.1	Describe the structure and functions of a mammalian cell	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	Specific learning objectives:						
	1. Describe the functional morphology of the cell with a neat labeled diagram				Video, Model & Chart	MCQs Short essay, Short answers	
	2. Describe the Fluid mosaic model structure of cell membrane and its functions						
	3. Name the prominent cell organelles						
	4. Explain the structure and functions of nucleus & related structures					MCQs Short answers	
	5. Explain the structure and functions of mitochondria					MCQs Short answers	
	6. Mention the types and Explain the structure and functions of endoplasmic reticulum					MCQs Short answers	
	7. Explain the structure and functions of ribosomes					MCQs Short answers	
	8. Explain the structure and functions of Golgi apparatus					MCQs Short answers	
	9. Explain the functions of lysosomes and peroxisomes					MCQs Short answers	
	10. Explain the Structure & functions of Cytoskeleton					MCQs Short essay Short answers	
PY1.2	Describe and discuss the principles of homeostasis	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Define & Explain homeostasis						

	2. Mention types of homeostatic mechanisms															
	3. Explain Negative feedback mechanism															MCQs Short essay, Short answers
	4. Define controlled variable, sensor, comparator and set point with examples in negative feedback mechanism															MCQs Short essay, Short answers
	5. Explain positive feedback mechanism with examples															MCQs Short essay, Short answers
	6. Explain feed forward mechanism															MCQs Short answers
																Lecture, Small group discussion
PY1.3	Describe intercellular communication															Written/Viva voce
	Specific learning objectives:															
	1. Mention types of intercellular connections & communications															
	2. Explain various intercellular connections															MCQs Short answers
	3. Explain Endocrine, paracrine, autocrine and neurocrine mechanisms															MCQs Short answers
	4. Describe the mechanism of second messenger system															MCQs Short answers
																Lecture, Small group discussion
PY1.4	Describe apoptosis – programmed cell death															Written/Viva voce
	Specific learning objectives:															
	1. Define and explain the mechanism of apoptosis															MCQs Short answers
	2. Explain Significance of apoptosis															MCQs Short answers
	Describe and discuss transport mechanisms across cell membranes															Written/Viva voce
PY1.5																Lecture, Small group discussion

Specific learning objectives:										
PY1.6	Describe the fluid compartments of the body, its ionic composition & measurements	Specific learning objectives:	1. Enlist & describe different mechanisms of transports across cell membrane						Main essay	
			2. Define and mention types of diffusion						Video	MCQs Short essay, Short answers
			3. Explain simple diffusion with examples						Video	MCQs Short essay, Short answers
			4. Explain facilitated diffusion with examples						Video	MCQs Short essay, Short answers
			5. Explain carrier proteins and Patch – clamp technique						Video	MCQs Short essay, Short answers
			6. Define active transport and mention its types						Video	MCQs Short essay, Short answers
			7. Explain primary active transport with examples						Video	MCQs Short essay, Short answers
			8. Explain secondary active transport with examples						Video	MCQs Short essay, Short answers
			9. Explain exocytosis with Examples						Video	MCQs Short essay, Short answers
			10. Mention and explain the types of endocytosis						Video	MCQs Short essay, Short answers
			K	KH	Y			Lecture, Small group discussion	Written/Viva voce	
			Specific learning objectives:							
		1. Explain the human body composition and total body water								
		2. Describe the different body fluid							MCQs	

	compartments with its normal value						Short essay, Short answers	
	3. Mention the ionic composition in body fluid compartments							
	4. Explain the osmolal concentration of plasma						Short answers	
	5. Explain the principle, method and substances used in the measurement of fluid compartments.					Small group discussion	Short essay	
	6. Explain oedema and dehydration							
PY1.7	Describe the concept of pH & Buffer systems in the body	K	KH	Y		Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:							
	1. Explain concept of pH							
	2. Mention the types of buffer system in the body							
PY1.8	Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue	K	KH	Y		Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:							
	1. Define and mention types of membrane potential							
	2. Define resting membrane potential and mention normal values in different excitable tissue						MCQs Short essay, Short answers	
	3. Explain the genesis of resting membrane potential						MCQs Short essay, Short answers	
	4. Explain Gibbs – Donnan effect						MCQs Short essay, Short answers	
	5. Explain Nernst equation and its role in membrane potential						MCQs Short essay, Short answers	

	6. Explain Goldman – Hodgkins – Katz equation					MCQs Short essay, Short answers	
	7. Define and explain characteristics of graded potential					MCQs Short essay, Short answers	
	8. Define Action potential. Explain ionic basis of different phases of action potential					MCQs Short essay, Short answers	
	9. Describe the methods of recording of membrane potentials					Short essay, Short answers	
	Demonstrate the ability to describe and discuss the methods used to demonstrate the functions of the cells and its products, its communications and their applications in Clinical care and research.					Lecture, Small group discussion	
PY1.9		K	KH	Y		Written/Viva voce	
	Specific learning objectives:						
	1. Cell membrane functions					Chart discussion Practical OSPE	
	2. Effect of different concentration of saline on red blood cell					Practical Demonstration	
	3. Measurement of body fluids					Practical viva/ OSPE	
	4. Patch clamp technique					Lecture, small group discussion	Short essay, Short answers
	5. Recording of membrane potentials RMP & Action potential - Oscilloscope					Lecture, small group discussion	Short essay, Short answers
Number of competencies: 13							
Topic: Hematology							
Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching learning methods	Assessment methods	Integration
PY2.1	Describe the composition and functions of blood components	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						

	1. Describe the composition of blood								
	2. Describe the functions of blood							MCQs Short essay Short answers	
PY2.2	Discuss the origin, forms, variations and functions of plasma proteins	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	
	Specific learning objectives:								
	1. Enlist the plasma proteins							MCQs, Short answers	
	2. Describe the origin of plasma proteins								
	3. Describe the functions of plasma proteins							MCQs, Short essay	
	4. Explain plasmapheresis							MCQs, Short answers	
	5. Describe the methods of separation of plasma proteins							MCQs, Short answers	
PY2.3	Describe and discuss the synthesis and functions of Hemoglobin and explain its breakdown. Describe variants of hemoglobin	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	
	Specific learning objectives:								
	1. Mention the types of hemoglobin							MCQs Short answers	
	2. Explain the synthesis of hemoglobin and factors affecting it							MCQs	
	3. Explain the functions of hemoglobin							MCQs, Short essay	
	4. Describe derivatives of hemoglobin							MCQs	
	5. Explain the fate of hemoglobin							Short essay	
PY2.4	Describe RBC formation (Erythropoiesis & its regulation) and its functions	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	
	Specific learning objectives:								

PY2.5	1. Describe the structure and mention the normal values of RBC								
	2. Explain PCV, ESR, Osmotic fragility of RBC and blood indices								
	3. Describe the theories of haemopoiesis							MCQs, Short essay	
	4. Differentiate between red & yellow bone marrow							MCQs, Short essay	
	5. Describe the stages of erythropoiesis							MCQs Long essay	
	6. Describe the factors regulating erythropoiesis							MCQs, Short essay	
	Describe different types of anaemias & Jaundice	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	Pathology		
Specific learning objectives:									
PY2.6	1. Define and classify anaemia's								MCQs, Short essay
	2. Explain features of iron deficiency anemia								MCQs, Short essay
	3. Explain features of megaloblastic & pernicious anemias								MCQs Short essay
	4. Explain sickle cell anemia								
	5. Explain different types of thalasemia								
	6. Explain fate of RBC, Haemoglobin and bilirubin								MCQs Short essay
	7. Define and classify jaundice								MCQs, Short answers,
	8. Describe about features of different types of jaundice								MCQs, Short answers
Describe WBC formation (granulopoiesis) and its regulation	K	KH	Y	Lecture, Small group discussion	Written/Viva voce				
Specific learning objectives:									

	5. Describe the intrinsic pathway of coagulation						MCQs Long essay Short essay	
	6. Describe the extrinsic pathway of coagulation						MCQs Long essay Short essay	
	7. Explain clot retraction						MCQs Short answer	
	8. Explain the fibrinolytic system and its physiological role						MCQs Short answer	
	9. Explain the role of calcium, vitamin k liver in process of coagulation						MCQs	
	10. Explain mechanism of prevention of blood clotting in circulation						MCQs Short essay	
	11. Define and classify the anti-coagulants						MCQs Short essay	
	12. Explain the mechanism of action of different anticoagulants and its uses						MCQs, Short answers	
	13. Classify the bleeding disorders						MCQs Short essay	
	14. Explain thrombocytopenic purpura						MCQs	
	15. Explain Haemophilia						MCQs Short essay	
	16. Explain disseminated intravascular coagulation						MCQs, Short essay	
	17. Enlist the tests for coagulation						MCQs, Short answer	
	18. Explain prothrombin, partial thromboplastin, thrombin and clot retraction times						MCQs, Short answers	
PY2.9	Describe different blood groups and discuss the clinical importance of blood grouping, blood banking and transfusion	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	Pathology	
	Specific learning objectives:							
	1. Explain agglutinogens and agglutinins						Short answer	
	2. Mention different blood group system							
	3. Define Landsteiner law						Short answer	

	4. Describe ABO blood group and its inheritance				MCQs, Short essay	
	5. Describe Rh blood group and its inheritance				MCQs, Short essay	
	6. Explain Erythroblastosis fetalis				MCQs, Short essay	
	7. Explain clinical applications of blood grouping				MCQs, Short essay	
	8. Outline the precautions to be observed during blood transfusion					
	9. Explain cross matching				MCQs, Short essay	
	10. Describe the hazards of blood transfusion				MCQs, Short essay	
	11. Describe about blood storage for transfusion				MCQs, Short essay	
	12. Explain about artificial blood					
PY2.10	Define and classify different types of immunity. Describe the development of immunity and its regulation	K	KH	Y	Written/Viva voce	Lecture, Small group discussion
	Specific learning objectives:					
	1. List the lymphoid organs and its functions				MCQs Short answer	
	2. Define and classify immunity.					
	3. Define antigens and explain antigenicity				MCQs Short essay	
	4. Explain innate immunity				MCQs Short essay	
	5. Explain complement system				MCQs Long essay Short essay	
	6. Describe the development and regulation of cell mediated immunity					
	7. Explain HLA antigens, HLA typing and tissue transplant rejection					
	8. Describe the development and regulation of				MCQs	

	8. Determination of blood group					DOAP	Practical/ OSPE/ Viva voce	
PY2.12	Describe test for ESR, Osmotic fragility, Haematocrit. Note the findings and interpret the test results etc	K	KH	Y	Demonstration	Written/ Viva voce	Pathology	
	Specific learning objectives							
	1. Determination of ESR				Practical demonstration			
	2. Determination of Haematocrit				Practical demonstration			
	3. Determination of osmotic fragility of RBCs				Practical demonstration			
PY2.13	Describe steps for reticulocyte and platelet count	K	KH	Y	Demonstration	Written/ Viva voce	Pathology	
	Specific learning objectives							
	1. Determination of platelet count	S	KH	Y	Practical demonstration			
	2. Determination of reticulocyte count	S	KH	Y	Practical demonstration			
Topic: Nerve and Muscle Physiology Number of competencies: 18								
Number	COMPETENCY	Domain	Level	Core	Teaching	Assessment	Integration	
	The student should be able to:	K/S/A/C	K/KH/SH/P	(Y/N)	learning methods	methods		
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss Nerve Growth Factor & other growth factors/cytokines	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		
	Specific learning objectives:							
	1. Describe the structure of the neuron with a neat labeled diagram				Chart discussion	MCQs		
	2. Classify the neurons					MCQs Short answers		

	3. Explain the nerve growth factors and cytokines affecting neuronal growth							MCQs Short answers	
PY3.2	Describe the types, functions & properties of nerve fibers	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	
	Specific learning objectives:								
	1. Classify the nerve fibres and mention functions of different types of nerve fibres							MCQs	
	2. Explain Erlanger & Gasser classification							MCQs Short essay	
	3. Enlist and explain the properties of nerve fibres							MCQs Short answers	
PY3.3	Describe the degeneration and regeneration in peripheral nerves	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	General medicine
	Specific learning objectives:								
	1. Explain grading of nerve injury								
	2. Explain the Wallerian degeneration of nerve fibres							MCQs Short assay	
	3. Explain the stages of regeneration of nerve fibres							MCQs Short assay	
	4. Mention the factors affecting regeneration							MCQs Short assay	
PY3.4	Describe the structure of neuro-muscular junction and transmission of impulse	K	KH	Y	Lecture, Small group discussion			Written/Viva voce	Anesthesiology
	Specific learning objectives:								
	1. Describe the structure of neuromuscular junction							Long assay Short assay	
	2. Explain how transmission of impulse occurs across the neuromuscular junction							Long assay Short assay	
	3. Explain about synthesis and degradation of Ach							MCQs	
	4. Name the Ach receptors							MCQs	

	5. Explain Miniature end plate potential and End plate potential					MCQs Short answers	
PY3.5	Discuss the action of neuro-muscular blocking agents	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	Anaesthesiology Pharmacology
	Specific learning objectives:						
	1. Name and classify the neuromuscular blocking agents					MCQs Short answers	
	2. Explain the mechanism of action of neuromuscular blocking agents					MCQs Short essay Short answers	
	3. Name and explain the actions of neuromuscular stimulators					MCQs Short answers	
PY3.6	Describe the pathophysiology of Myasthenia gravis	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	Pathology
	Specific learning objectives:						
	1. Mention the cause for the Myasthenia Gravis					MCQs Short essay Short answers	
	2. Explain the pathophysiology of Myasthenia Gravis					MCQs Short answers	
	3. Mention the treatment of Myasthenia gravis					MCQs Short answers	
PY3.7	Describe the different types of muscle fibres and their structure	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Mention the types of muscle fibres					MCQs Short answers	
	2. Explain the structure of skeletal muscles					MCQs Short answers	
	3. Explain sarcomere					MCQs Short essay Short answers	
	4. Name the muscle proteins					MCQs	

	5. Describe the structure and functions of thick and thin filaments					Short answers	
	6. Explain sarcotubular system					MCQs Short essay Short answers	
	7. Explain the structure of smooth muscles					MCQs Short essay Short answers	
PY3.8	Describe action potential and its properties in different muscle types (Skeletal & Smooth)	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Explain the resting membrane potential in skeletal muscle					MCQs Short essay	
	2. Explain the action potential in skeletal muscle					MCQs Short answers	
	3. Explain the resting membrane potential and slow wave potential in smooth muscle					MCQs Short answers	
	4. Explain Spike potential and action potential in smooth muscle					Short answers	
PY3.9	Describe the molecular basis of muscle contraction in skeletal and smooth muscles	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Explain the process of excitation & Contraction coupling in skeletal muscle					MCQs Long essay Short essay	
	2. Explain the molecular basis of muscle contraction in skeletal muscles – Cross bridge formation, power stroke					MCQs Long essay Short essay	
	3. Name and explain the theories of muscle contraction					MCQs Short essay	
	4. Explain the process of muscle relaxation in skeletal muscle					MCQs	
	5. Explain rigor mortis & its significance					MCQs	

PY3.10	<p>6. Explain the excitation and contraction coupling in smooth muscle</p> <p>7. Explain the molecular basis of muscle contraction in smooth muscle</p> <p>8. Explain the excitation and contraction coupling in cardiac muscle</p> <p>9. Explain the molecular basis of muscle contraction in cardiac muscle</p> <p>10. Mention the differences in molecular basis of muscle contraction between skeletal, cardiac and smooth muscles</p> <p>Describe the mode of muscle contraction (isometric and isotonic)</p>	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	Short essay		
							Short answers		
							MCQs		
							Short essay		
Specific learning objectives	<p>1. Explain the contractile and elastic components of muscle</p> <p>2. Explain the different concepts of muscle length</p> <p>3. Mention the types and differences between the two types of skeletal muscle fibres</p> <p>4. Define and mention the types of motor units</p> <p>5. Explain the mechanism of isometric contraction with examples</p> <p>6. Explain the mechanism of isotonic contraction with examples</p> <p>7. Enlist the factors affecting contractile response in skeletal muscle</p> <p>8. Explain the effect of strength of stimulus on muscle contraction</p> <p>9. Explain the effect of repetitive stimulus on muscle contraction</p> <p>10. Explain the effect of temperature on muscle contraction</p> <p>11. Explain the effect of load on muscle contraction</p>							MCQs	
								MCQs	
								MCQs	
								Short essay	
								MCQs	
								MCQs	
								Short answer	
								MCQs	
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MCQs									
Short answer									
MCQs									
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MCQs									
Short answer									
MCQs									
Short answer									
MCQs									
Short answer									

PY3.11	Explain energy source and muscle metabolism	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives					MCQs Short essay MCQs	
	1. Name the different sources of energy for muscle contraction					MCQs Short answers	
	2. Explain the muscle metabolism during contraction during aerobic and anaerobic conditions						
	3. Explain oxygen demand, consumption and debt						
	4. Thermal changes during muscle contraction						
PY3.12	Explain the gradation of muscular activity	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	General Medicine
	Specific learning objectives						
	1. Explain the mechanism of gradation of muscular contraction by recruitment of motor unit.					MCQs	
PY3.13	Describe muscular dystrophy: myopathies	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	General Medicine
	Specific learning objectives						
	1. Explain the pathophysiology of muscular dystrophy					MCQs Short answer	
PY3.14	Perform Ergography	S	SH	Y	DOAP sessions	Practical/OS PE/Viva Voce	
	Specific learning objectives						
	1. Explain aim and principle of ergography						
	2. Name the different parts and its functions of ergograph						
	3. Carry out the procedure of ergography in a given subject				Performs	Practical/OSP E Viva voce	
	4. Analyses of the ergogram						
	5. Demonstrates the effect of motivation, venous occlusion and arterial occlusion on muscle				Performs	Practical/OSP E	

	contraction						Viva voce	
PY3.15	Demonstrate effect of mild, moderate and severe exercise and record changes in cardiorespiratory parameters	S	SH	Y	DOAP sessions	Practical/OSPE/Viva Voce		
	Specific learning objectives							
	1. Demonstrate the effect of mild, moderate and severe exercise on HR & BP				Performs	Practical/OSP Viva voce		
	2. Demonstrate the effect of mild, moderate and severe exercise on respiratory rate & depth using stethography				Performs	Practical/OSP Viva voce		
PY3.16	Demonstrate Harvard Step test and describe the impact on induced physiologic parameters in a simulated environment	S	SH	Y	DOAP sessions	Practical/OSPE/Viva Voce		
	Specific learning objectives							
	1. Demonstrate Harvard step test	S	KH	Y	Demonstration	----		
	2. Describe the effect of stress on physiological parameters	K	KH	Y	Lecture			
	3. Describe the effect of exposure to high and low temperature on physiological parameters	K	KH	Y	Lecture	----		
	4. Describe the effect of exposure to high altitude on physiological parameters	K	KH	Y	Lecture	----		
	5. Describe the effect of exposure to microgravity on physiological parameters	K	KH	Y	Lecture	----		
PY3.17	Describe Strength-duration curve	K	KH	Y	DOAP sessions	Practical/OSPE/Viva Voce		
	Specific learning objectives							
	1. Draw a neat labeled diagram of Strength-duration curve							
	2. Define and explain Rheobase							
	3. Define and explain Chronaxie and utilization time							
PY3.18	Observe with Computer assisted learning (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments	S	KH	Y	DOAP sessions	Practical/OSPE/Viva Voce		
	Specific learning objectives							
	1. Learn about instruments used in amphibian experiments				Observes	----		

	2. Learn about preparation of nerve muscle				Observes	----	
	3. Observes the recording of simple muscle twitch				Observes	----	
	4. Observes the effect of temperature on simple muscle twitch				Observes	----	
	5. Observes the effect of increasing strength of stimuli on simple muscle twitch				Observes	----	
	6. Observes the effect of successive stimuli on simple muscle twitch				Observes	----	
	7. Observes the effect of load on simple muscle twitch				Observes	----	
	8. Observes the phenomenon of onset of fatigue				Observes	----	
	9. Observes the effect of repetitive stimuli on simple muscle twitch – Genesis of tetanus				Observes	----	
	10. Observes the measurement of velocity of nerve conduction				Observes	----	
	11. Learn about the instruments used for Frog's heart experiment				Observes	----	
	12. Observes Frog heart dissection				Observes	----	
	13. Observes the recording of normal cardiogram in frog's heart				Observes	----	
	14. Observes the effect of temperature on frog's heart				Observes	----	
	15. Observes the effect of stannius ligatures on frog's heart				Observes	----	
	16. Observes the phenomenon of staircase effect & All or none law				Observes	----	
	17. Observes the long refractory period in cardiac muscle						
	18. Observes the effect of vagus nerve stimulation on frog's heart				Observes	----	
	19. Observes the effect of drugs on intact heart						
	20. Observes the effect of different ions perfusion on isolated frog's heart				Observes	----	
	21. Observes the effect of drugs perfusion on isolated frog's heart				Observes	----	
Number of competencies: 10							
Topic: Gastro-intestinal Physiology							
Number	COMPETENCY			Domain	Level	Core	Teaching
	The student should be able to:			K/S/A/C	K/KH/SH/P	(Y/N)	learning
							methods
							Assessment
							methods
							Integration

	1. Describe the process of mastication.					MCQs Short essay, Short answers	
	2. Describe the phases of deglutition.					MCQs Short essay, Short answers	
	3. Describe the Gastric movements in relation to food					MCQs Short essay, Short answers	
	4 Describe the different movements in Small intestine				Chart	MCQs Short essay, Short answers	
	5. Describe the different movements in large intestine				Chart	MCQs Short essay, Short answers	
	6. Defecation reflex				Chart	MCQs Short essay, Short answers	
	7.Explain the role of dietary fibers					MCQs Short essay, Short answers	
PY4.4	Describe the physiology of digestion and absorption of nutrients	K	KH	Y	Lecture, Small group	Written/ Viva voce	
	Specific learning objectives:						
	1. Digestion and absorption of carbohydrates					MCQs Short essay, Short answers	
	2. Digestion and absorption of proteins					MCQs Short essay, Short answers	
	3. Digestion and absorption of fat					MCQs Short essay, Short answers	
	4. Malabsorption syndrome						
PY4.5	Describe the source of GIT hormones, their regulation and functions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	Specific learning objectives:						
	1. Enlist the GI hormones						

	2 Explain the source and functions of gastrin.					MCQs, Short answers	
	3.Explain the source and functions of secretin					MCQs, Short answers	
	4.Explain the source and functions of CCK					MCQs, Short answers	
	5.Explain the source and functions of Motilin					MCQs, Short answers	
PY4.6	Describe the Gut-Brain Axis	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1.Explain the Gut-Brain axis						
PY4.7	Describe & discuss the structure and functions of liver and gall bladder	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	Specific learning objectives:						
	1. Explain the functional anatomy of liver and gallbladder					MCQs Short essay, Short answers	
	2.Describe the composition and functions of bile juice					MCQs Short essay, Short answers	
	3.Describe the mechanism and regulation of bile secretion					MCQs Short essay, Short answ	
	4. Differences between liver bile and gall bladder bile					MCQs Short essay, Short answers	
	5. Enlist bile salts and its functions.					MCQs Short essay, Short answers	
	6. Describe the Enterohepatic circulation and its importance					MCQs Short essay, Short answers	

	7. Explain the Bilirubin metabolism and different types of Jaundice						MCQs Short essay, Short answers	
PY4.8	Describe & discuss gastric function tests, pancreatic exocrine function tests & liver function tests	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		
	Specific learning objectives:							
	1. Describe the gastric function tests				Case Based Learning			
	2. Describe the Liver function tests					MCQs Short essay, Short answers		
	3. Describe the pancreatic function tests							
PY4.9	Discuss the physiology aspects of: peptic ulcer, gastro-oesophageal reflux disease, vomiting, diarrhoea, constipation Adynamic ileus, Hirschsprung's disease	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine
	Specific learning objectives:							
	1. Describe the pathophysiology of peptic ulcer						Short answers	
	2. Explain gastro- oesophageal reflux disease						Short answers	
	3. Explain the mechanism of vomiting						Short answers	
	4. Explain Dumping syndrome						MCQs Short answers	
	5. Explain Adynamic ileus							
	6. Explain diarrhoea and constipation							
	7. Explain Hirschsprung's disease							
PY4.10	Demonstrate the correct clinical examination of the abdomen in a normal volunteer or simulated environment	S	KH	Y	DOAP sessions	Practicals/OS PE		
	Specific learning objectives							
	1. Clinical examination of Abdomen	S	KH	Y	Demonstration			

Topic: Cardiovascular Physiology **Number of competencies: 16**

Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching learning methods	Assessment methods	Integration
PY5.1	Describe the functional anatomy of heart including chambers, sounds and Pacemaker tissue and conducting system.	K	KH	Y	Lecture, Small group	Written/Viva voce	
	Specific learning objectives:						
	1. Describe the structure of the heart chambers and heart wall					MCQs	
	2. Mention the types and functions of heart valves				Video	MCQs	
	3. Mention the types of heart sounds				Video		
	4. Explain the features of pacemaker tissue						
	5. Explain the conducting system of heart				Video & Chart	MCQs Short essay Short answers	
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	K	KH	Y	Lecture, Small group	Written/Viva voce	
	Specific learning objectives:						
	1. Describe the morphology of cardiac muscle.					MCQs Short answers	
	2. Enlist the properties of cardiac muscle					MCQs Short essay Short answer	
	3. Explain the action potential in cardiac muscle and differentiate the action potentials in different cardiac tissues					MCQs Short essay, Short answers	
	4. Explain refractory period in cardiac muscle and its significance					MCQs Short answers	
	5. Define autorhythmicity and explain pacemaker potential						
	6. Explain the excitation and contraction coupling in cardiac muscle					MCQs Short essay	
	7. Mention the factors affecting myocardial contractility						
	8. Define preload and explain its effect on					MCQs	

	myocardial contractility - Frank's Starling's law						Short essay Short answers MCQs Short answers	
	9. Define after load and explain its effect on myocardial contractility						MCQs Short answers	
	10. Explain innervations to the heart and effect of stimulation of nerves						MCQs Short essay Short answers	
PY5.3	Discuss the events occurring during the cardiac cycle	K	KH	Y		Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:							
	1. Define cardiac cycle and give its normal value						MCQs Short answer	
	2. Name the phases and its duration of cardiac cycle						MCQs	
	3. Explain the relation between duration of systole and diastole with HR.						MCQs Short answer	
	4. Describe the events occurring in different phases of cardiac cycle					Small group discussion Video	MCQs Long essay	
	5. Explain the Pressure changes in the atrias					Charts	MCQs Short essay	
	6. Explain the Pressure changes in the ventricles					Charts	MCQs Short essay	
	7. Explain the Pressure changes in the aorta and pulmonary artery					Charts	MCQs Short essay	
	8. Explain the Volume changes in the ventricles					Charts	MCQs Short essay	
	9. Explain the different heart sounds					Video	MCQs Short essay	
	10. Explain arterial pulse					Chart/ Practical	MCQs Short answer	
	11. Explain jugular venous pulsation and pressure					Chart/ Practical	MCQs Short essay Short answer	
PY5.4	Describe generation, conduction of cardiac impulse	K	KH	Y		Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:							
	1. Explain conducting system of heart							

PY5.7	Describe and discuss haemodynamics of circulatory system	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	Specific learning objectives					
	1. Describe the organization of vascular system					
	2. Describe the structure and characteristics of blood vessels					
	3. Define blood flow and mention factors affecting it					MCQs Short answer
	4. Explain Poiseuille's law					MCQs Short answer
	5. Explain relationship between pressure gradient and blood flow					
	6. Define Laplace law and mention its physiological applications in blood vessels					MCQs Short answer
	7. Explain peripheral resistance and its relationship to blood flow					MCQs Short answer
	8. Explain blood viscosity and factors affecting it					MCQs Short answer
	9. Explain velocity of blood flow and its relationship to cross-sectional area of blood vessels					
	10. Mention the types of blood flow					MCQs
	11. Explain laminar blood flow					MCQs Short answer
	12. Explain turbulent blood flow; Reynold's number					MCQs Short answer
	13. Explain the different methods of measurement of blood flow					MCQs
PY5.8	Describe and discuss local and systemic cardiovascular regulatory Mechanisms	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	Specific Learning Objective					
	1. Mention the different types of cardiovascular control mechanisms					
	2. Enlist the components of neural control mechanisms					
	3. Explain medullary cardiovascular centres and its role in regulation of cardiovascular activity					MCQs Short essay Short answer

	4. Explain autonomic nerve supply to the heart and blood vessels					MCQs Short essay Short answer	
	5. Explain effect of stimulation of parasympathetic and sympathetic nerves on heart and blood vessels					MCQs Short essay Short answer	
	6. Enlist the afferent impulses affecting the medullary cardiovascular centres						
	7. Explain the baroreceptor reflex mechanism					MCQs Short essay Short answer	
	8. Explain the chemoreceptor reflex mechanism					MCQs Short essay Short answer	
	9. Explain CNS Ischaemic response and Cushing's reflex					MCQs Short essay Short answer	
	10. Enlists the vasoconstrictors and vasodilators and explain their roles in regulation of blood flow					MCQs Short answer	
	11. List the local regulatory mechanisms of blood flow						
	12. Explain the mechanism of autoregulation of blood flow					MCQs Short answer	
	13. Explain the role of local metabolites in regulation of blood flow					MCQs Short answer	
	14. Explain the role of substances released from endothelium in cardiovascular regulation					MCQs Short answer	
PY5.9	Describe the factors affecting heart rate, regulation of cardiac output & blood pressure					Lecture, Small group discussion	Written/Viva voce
	Specific learning objectives						
	1. Mention normal heart rate and factors affecting it					MCQs Short answer	
	2. Describe the neural and hormonal regulation of heart rate					MCQs Short essay, Short answer	
	3. Define cardiac output, cardiac index, stroke volume and give normal values					MCQs Short answer	
	4. Define EDV, Ejection fraction and give its normal value					MCQs Short answer	
	5. Mention the factors affecting cardiac output					MCQs Short answer	

	6. Describe the heterometric regulation of cardiac output					MCQs Long essay Short essay	
	7. Define venous return and explain factors affecting it					MCQs Short essay	
	8. Explain the homometric regulation of cardiac output					MCQs Short essay	
	9. Describe the methods of measurement of cardiac output					MCQs Short essay	
	10. Explain heart-lung preparation						
	11. Define Blood Pressure with its normal values						
	12. List the determinants of arterial blood pressure						
	13. Mention the factors affecting blood pressure					Short essay	
	14. Describe the methods of measurement of blood pressure						
	15. Explain short term regulation of blood pressure					MCQs Long essay Short essay	
	16. Explain intermittent regulation of blood pressure					MCQs Long essay Short essay	
	17. Explain long term regulation of blood pressure					MCQs Short essay	
	18. Explain hypertension and hypotension						
PY5.10	Describe & discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation					Lecture, Small group discussion	Written/Viva voce
	Specific learning objectives						
	1. Explain the characteristics and regulation of cutaneous circulation.						MCQs
	2. Explain triple response, dermatographia, axon reflex and reactive hyperemia						MCQs Short essay, Short answer
	3. Describe lymphatic circulation						
	4. Describe functional anatomy of coronary blood vessels						
	5. Explain characteristics features of coronary blood						MCQs
							General Medicine

	flow								Short essay, Short answer	
	6. Describe methods of measurement of coronary blood flow									
	7. Explain regulation of coronary blood flow									
	8. Discuss factors affecting coronary blood flow									
	9. Explain pathophysiology and manifestations of coronary heart disease									
	10. Describe functional anatomy of cerebral blood vessels									
	11. Explain characteristics features of cerebral blood flow								MCQs Short essay, Short answer	
	12. Describe methods of measurement of cerebral blood flow									
	13. Describe regulation of cerebral blood flow								MCQs Short essay, Short answer	
	14. Explain characteristics and regulation of skeletal muscle circulation								MCQs Short essay, Short answer	
	15. Explain splanchnic circulation									
	16. Explain foetal circulation									
	17. Explain pulmonary circulation									
PY5.11	Describe the patho-physiology of shock, syncope and heart failure	K	KH	Y	Lecture, Small group discussion	Written/Viva voce				
	Specific learning objectives									
	1. Define shock. Mention the types and causes of shock.								MCQs Short answer	
	2. Describe the stages and physiological basis of clinical features of shock								MCQs Short essay Short answer	
	3. Explain the different compensatory mechanisms									
	4. Explain physiological basis of management of shock									

	5. Define syncope. Mention the causes for syncope						MCQs Short essay Short answer	
	6. Define and Mention types and causes of heart failure						MCQs Short answer	
	7. Describe the pathophysiology of heart failure.							
PY5.12	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	S	SH	Y		DOAP sessions	Practical/OSP E/ Viva-voce	
	Specific learning objectives							
	1. Demonstrate the recording of arterial pulse and peripheral pulses and write report					Performs		
	2. Demonstrate the measurement of blood pressure using both palpatory and auscultatory method and write report					Performs		
	3. Demonstrate the effect of posture on blood pressure and write report					Performs		
	4. Demonstrate the effect of exercise on blood pressure and write report					Performs		
PY5.13	Record and interpret normal ECG in a volunteer or simulated Environment	S	SH	Y		DOAP sessions	Practical/OSP E/ Viva-voce	General Medicine
	Specific learning objectives							
	1. Identify and explain the parts of electrocardiograph							
	2. Demonstrate placing of ECG leads					Performs		
	3. Demonstrate the recording of ECG							
	4. Calculate heart rate and PR interval in ECG					Performs		
PY5.14	Observe cardiovascular autonomic function tests in a volunteer or simulated environment	S	SH	N			Skill assessment/ viva-voce	
	Specific learning objectives							
	1. Demonstrate the effect of change in posture on blood pressure							
	2. Record the effect of isometric exercise, valsalva maneuver, lying to standing and deep breathing on heart rate.					Observation		
	3. Record heart rate variability					Observation		
PY5.15	Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or	S	SH	Y		DOAP sessions	Practical/OSP E/ viva -voce	

	simulated environment													
	Demonstrate inspection, palpation, percussion and auscultation of precordium and report									Performs				
	Demonstrate the measurement of JVP									Performs				
PY5.16	Record Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	S	SH	Y						DOAP sessions, computer assisted learning			Practical/OSP E, viva-voce	General Medicine
	Specific learning objectives													
	1. Demonstrate recording of arterial pulse using pulse transducer									Observation				
Topic: Respiratory Physiology														
	COMPETENCY													
	The student should be able to:													
PY6.1	Describe the functional anatomy of respiratory tract	K	KH	Y						Lecture, Small group			Written/Viva voce	
	Specific Learning objectives:													
	1. Describe the functional anatomy of respiratory apparatus.												MCQs Short essay, Short answers	
	2. Explain Tracheo bronchial tree -Wiebel's lung model									Chart			MCQs Short essay, Short answers	
	3. Describe the Non respiratory functions of respiratory system												MCQs Short essay, Short answers	
	4. Describe the Pulmonary circulation.												MCQs Short essay, Short answers	
PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs	K	KH	Y						Lecture, Small group discussion, Problem solving			Written/Viva voce	

	<p>Specific Learning objectives:</p> <ol style="list-style-type: none"> 1. Name the muscles of inspiration and expiration. 2. Explain the mechanism of Inspiration and expiration. 3. Describe the Pressure changes during ventilation 4. Draw a neat labeled spirogram & explain the Lung volumes and capacities with its normal Values. 5. Explain alveolar surface tension. 6. Define Surfactant. Mention its source, composition and functions. 7. Explain the pathophysiology of respiratory distress syndrome. 8. Define Compliance and mention its types with normal values. 9. Explain compliance curves. 10. Explain Elastic, viscous and airway resistance and work done during breathing 11. Explain pulmonary and alveolar ventilation. 12. Define dead space and mention its types with normal values. 13. Describe the methods of measurement of dead space. 14. Explain V/P ratio and factors affecting it 15. Define partial pressure of a gas. Mention partial pressure of oxygen and carbon dioxide in atmospheric air, inspired air, expired air, alveolar air and blood at sea level. 			<p>Animated Videos</p>	<p>MCQs, Short answers</p>
				<p>chart</p>	<p>MCQs, Short essay, Short answers</p>
				<p>chart</p>	<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
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					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
					<p>MCQs, Short essay, Short answers</p>
				<p>Problem solving</p>	<p>MCQs, Short essay, Short answers</p>

	16. Define Henry's law and Dalton's law.									
	17. Describe the structure of respiratory membrane, diffusion of gases across the membrane and factors affecting diffusion capacity of lungs.									MCQs, Short essay, Short answers
PY6.3	Describe and discuss the transport of respiratory gases: Oxygen and Carbon dioxide and regulation of respiration	K	KH	Y	Lecture, Small group	Written/Viva voce				
	Specific Learning objectives:									
	1. Explain the Oxygen transport in blood					MCQs Long Essay Short essay, Short answers				
	2. Draw a neat labeled diagram and explain the Oxygen Dissociation Curve.									
	3. Mention the factors affecting Oxygen Dissociation Curve.					MCQs Short essay, Short answers				
	4. Explain Carbondioxide transport in blood					MCQs Short essay, Short answers				
	5. Explain Chloride shift, Bohr effect and Haldane effect					Short essay				
	6. Explain the significance of regulation of respiration.					MCQs Long Essay Short essay, Short answers				
	7. Name the respiratory centers and explain neural regulation of respiration					MCQs Long essay, Short essay, Short answers				
	8. Explain Chemical regulation of respiration					MCQs Long Essay Short essay, Short answers				
PY6.4	Describe and discuss the physiology of high altitude and deep sea Diving	K	KH	Y	Lecture, Small group	Written/Viva voce				
	Specific Learning objectives:									

	2.Explain the pathophysiology & features of Acute and chronic mountain sickness					MCQs Short essay, Short answers	
	3.Describe the physiological changes during Acclimitization					MCQs Short essay, Short answers	
	4.Explain Caisson`s disease/ Decompression sickness and its management.					MCQs Short essay, Short answers	
PY6.5	Describe and discuss the principles of artificial respiration, oxygen Therapy	K	KH	Y	Lecture, Small group	Written/Viva voce	
	Specific Learning objectives:						
	1. Explain different methods of Artificial respiration.					Short answer	
	2.Describe Oxygen therapy and its clinical applications					Short answer	
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis asphyxia; drowning, periodic breathing	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific Learning objectives:						
	1.Define Hypoxia and explain the types of hypoxia.				Problem solving Case based learning	MCQs, Long Essay, Short essay, Short answers	
	2.Define and mention the types of periodic breathing					MCQs, Short answers	
	3.Explain Cheyne-Stoke`s and Biot`s breathing					MCQs, Short essay	
	4.Define and explain dyspnea					MCQs, Short answers	
	5.Define and explain cyanosis					MCQs Short answers	

	6. Define and explain Asphyxia									MCQs, Short essay, Short answers	
PY6.7	Describe and discuss lung function tests & their clinical Significance	K	KH	Y					Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:										
	1. Enlist pulmonary function tests									Short essay/ Short answer	
	2. Explain static and dynamic lung volumes and capacities								Chart	MCOs	
	3. Differentiate between obstructive and restrictive lung disorders based on FVC and FEV1.									Short essay/ Short answer	
	4. Explain the significance and measurement of FRC.									Short essay/ Short answer	
	5. Mention the methods of measurement of diffusion capacity of lungs.										
	6. Blood gas analysis and its significance.										Biochemistry
PY6.8	Demonstrate the correct technique to perform & interpret Spirometry and stethography	S	SH	Y					DOAP sessions	Skill assessment/ Viva Voce	Respiratory Medicine
	1. Identify the parts of spirometer								Performs	OSCE	
	2. Record and interpret the lung volumes and capacities of the normal volunteer									Performs	
	3. Identify the parts of stethograph										
	4. Record and interpret the respiratory movements of the normal volunteer								Demonstration		
PY6.9	Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment	S	P	Y					DOAP sessions	Skill assessment/ Viva Voce	
	Perform clinical examination of respiratory system in a normal volunteer								Performs	OSCE	
	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment									Viva Voce	
PY6.10	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	S	SH	Y					DOAP sessions	Practical/OSPE/ Viva voce	
	1. Record and interpret the PEFr in the normal volunteer								Performs	OSPE	
										Viva Voce	

Topic: Renal Physiology		Number of competencies: (09)					
Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Teaching learning methods	Assessment methods	Integration
PV7.1	Describe structure and function of kidney	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	11. Describe the structure of the kidney with a neat labeled diagram.						
	12. Explain non-excretory functions of kidneys.						
	13. Explain the structure and functions of the nephron.						
	14. Mention the differences between cortical and Juxta-medullary nephrons						
15. Explain renal blood flow and its regulation.							
PV7.2	Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	7. Describe the structure of Juxta glomerular apparatus(JGA) with a neat labeled diagram						
	8. Explain the functions of JGA						
	9. Explain Renin-angiotensin system						

PY7.3	Describe the mechanism of urine formation involving processes of filtration, tubular re-absorption & secretion; concentration and diluting mechanism	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	<p>Specific learning objectives:</p> <ol style="list-style-type: none"> 1. Outline the steps of urine formation 2. Describe Glomerular filtration membrane. 3. Describe the mechanism of glomerular filtration 4. Define glomerular filtration rate. Mention its normal value 5. Describe the factors affecting GFR. 6. Define filtration fraction. Mention its significance 7. Tubular transport- Filtered load, Tubular maximum, Excretion rate. 8. Renal handling of Glucose – Renal threshold, tubular maximum and splay 9. Explain Renal handling of sodium and chloride 10. Explain renal handling of potassium 					
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	
					MCQs Short essay, Short answers	

	11. Explain water reabsorption in renal tubules						MCQs Short essay, Short answers	
	12. Explain renal handling of Calcium, Phosphate and Magnesium						MCQs Short essay, Short answers	
	13. Describe concentration mechanism of urine – Counter current mechanism.						Long essay MCQs Short answers	
	14. Describe acidification of urine – H ⁺ secretion, HCO ₃ reabsorption, acid-base balance.						MCQs Short essay, Short answers	
PY7.4	Describe & discuss the significance & implication of Renal clearance	K	KH	Y	Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:							
	1. Define renal clearance and explain its significance.						MCQs Short answers	
	2. Mention the salient features of the substance suitable for measuring GFR						MCQs Short answers	
	3. Mention the applications of renal clearance – Inulin, creatinine, urea and PAH.				Problem solving		MCQs Short essay, Short answers	
PY7.5	Describe the renal regulation of fluid and electrolytes & acid-base balance	K	KH	Y	Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:							
	1. Describe the role of kidney in water balance							
	2. Describe the role of kidney in sodium and potassium balance							
	3. Describe the role of kidneys in regulation of acid-base balance.							

PY7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Describe the physiological anatomy of urinary bladder.					MCQs Short essay	
	2. Describe the innervations of urinary bladder					MCQs Short essay	
	3. Explain cystometrogram and Micturition reflex.						
	4. Explain the mechanism of voluntary micturition and its reflex control.						
	5. Explain automatic bladder , neurogenic bladder, nocturnal enuresis					MCQs Short answers	
PY7.7	Describe artificial kidney, dialysis and renal transplantation	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Explain Artificial kidney and mention its types.					MCQs Short essay, Short answers	
	2. Describe briefly about the Hemodialysis and peritoneal dialysis						
	3. Mention the indications of renal transplantation						
PY7.8	Describe & discuss Renal Function Tests	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Define obligatory urine volume. Give its normal value.					MCQs Short answers	

	2. Explain the renal clearance tests with its normal values.					Problem solving	MCQs Short essay, Short answers	
	3. Explain renal function tests comprising urine, blood examination, renal clearance tests and miscellaneous tests.						MCQs Short essay, Short answers	
PY7.9	Describe cystometry and discuss the normal cystometrogram	K	KH	Y		Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:							
	1. Explain cystometry.							
	2. Explain cystometrogram with a graph.					chart	MCQs Short essay	
Topic: Endocrine Physiology								
Number of competencies: 06								
Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Teaching learning methods	Assessment methods	Integration	
PY8.1	Describe the physiology of bone and calcium metabolism	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		
	Specific learning objectives:							
	1. List the physiological and biochemical functions of calcium.							Anatomy
	2. Distribution of calcium in the body						MCQs	
	3. Normal serum calcium level. Describe its balance in the body						MCQs	
	4. Name the types of bone. Describe the structural characteristics of different types of bone.						MCQs	
	5. Describe the composition and functions of bone.						MCQs	
	6. Mention the bone cells and their role in bone formation.						MCQs	
	7. Explain bone remodelling						MCQs	

18. Explain pathophysiology of Diabetes Insipidus and SIADH					Short answers	
19. Describe the structure, synthesis, storage and release of oxytocin						
20. Explain the physiological actions of oxytocin					Short essay	
21. Explain the effects of pan hypopituitarism					Short essay	
22. Describe the functional anatomy of thyroid gland						Anatomy
23. Describe the biosynthesis and storage of Thyroid hormones					Short essay	
24. Describe the secretion, transport and metabolism of thyroid hormones						
25. Explain the mechanism of action of thyroid hormone						
26. Explain the physiological actions of thyroid hormone					Long essay Short essay	
27. Explain the regulation of Thyroid hormone					Long essay Short essay	
28. Explain hypothyroidism – Myxoedema & Cretinism					Short essay	
29. Explain hyperthyroidism – Grave's disease					Short answer	
30. Differentiate between pituitary dwarf and hypothyroid dwarf					Short essay' Short answer	
31. Describe the structure, synthesis and secretion of parathyroid hormone					Case based learning	
32. Explain the mechanism of action and physiological actions of parathyroid hormone					Case based learning	
33. Explain the regulation of parathyroid hormone secretion					Case based learning	
34. Describe the structure and synthesis of calcitonin						
35. Explain the mechanism of action and physiological actions of calcitonin					Short essay Short answer	
36. Explain the formation of calcitriol						
37. Explain the mechanism of action and physiological actions of calcitriol					Short answer	
38. Explain the role of hormones in regulation of blood calcium level						
39. Explain hyperparathyroidism					Short essay Short answer	
					Case based learning	

PY8.3	61. Describe the synthesis and secretion of mineralocorticoids						Short essay	
	62. Explain the plasma levels, transport and metabolism of mineralocorticoids						Short essay	
	63. Explain the mechanism of action and physiological actions of mineralocorticoids						Long essay Short essay	
	64. Explain the regulation of secretion of Mineralocorticoids						Short essay	
	65. Explain the synthesis and physiological actions of adrenal sex steroids							
	66. Explain the causes and characteristic features of Cushing's syndrome						MCQs Short essay Short answer	
	67. Explain the characteristic features of hyperaldosteronism - Conn's disease						MCQs Short answer	
	68. Explain aldosterone escape						MCQs Short answer	
	69. Explain adrenogenital syndrome						MCQs Short answer	
	70. Explain the characteristic features of Addison's disease						MCQs Short answer	
	71. Explain adrenal congenital hyperplasia						MCQs Short answer	
	72. Enlist the hormones of adrenal medulla						MCQs	
	73. Describe the structure, storage and secretion of catecholamines							
	74. Explain transport, metabolism and excretion of catecholamines							
	75. Mention different adrenergic receptors and explain the mechanism of action of catecholamines							
	76. Explain the physiological actions of catecholamines						Short essay	
	77. Describe sympathoadrenal medullary axis.							
	78. Explain general adaptation syndrome - fight and flight response.						MCQs Short answer	
	79. Explain Pheochromocytoma						Short answer	
	Describe the physiology of Thymus & Pineal Gland						Written/Viva voce	
							Lecture, Small group discussion	
							Y	
							KH	
							K	

	Specific learning objectives:								
	1. Describe the functional anatomy and functions of thymus								
	2. Describe the functional anatomy of Pineal gland.								
	3. Enumerate the functions of Melatonin								
	4. Enlist the local hormones and enumerate the actions of different local hormones							MCQs Short answers	
PY8.4	Describe function tests: Thyroid gland; Adrenal cortex, Adrenal medulla and pancreas	K	KH	Y	Lecture, Small group discussion	Written/Viva voce			Biochemistry
	Specific learning objectives:								
	1. Enlist the methods of measurement of hormones							MCQs Short answers	
	2. Explain radioimmunoassay and ELISA							MCQs Short answers	Biochemistry
	3. Enlist and explain the thyroid function tests							MCQs Short answers	
	4. Enlist and explain the tests for adrenal gland functions								
	5. Enlist and explain the tests for Endocrine pancreas function								
PY 8.5	Describe the metabolic and endocrine consequences of obesity & metabolic syndrome, Stress response. Outline the psychiatry component pertaining to metabolic syndrome	K	KH	Y	Lecture, Small group discussion	Written/Viva voce			
	Specific learning objectives								
	1. Explain the regulation of food intake and energy balance							MCQs Short answers	
	2. Explain the endocrine and metabolic changes in obesity and metabolic syndrome							MCQs Short answer	
	3. Explain binge eating, bulimia nervosa and anorexia							MCQs Short answer	
	4. Describe sympathoadrenal organization and its role in flight and fight response.							Short essay	
	5. Explain general adaptation response							Short essay	
PY8.6	Describe & differentiate the mechanism of action of steroid, protein	K	KH	Y	Lecture, Small	Written/Viva voce			Biochemistry

									group discussion	
Specific learning objectives										
1.	Define and Classify the hormones									MCQs
2.	Overall view of transport, plasma concentration, half life and degradation of hormones									
3.	Overall view of regulation of secretion of hormones									
4.	Explain characteristics of hormone receptors									
5.	Explain down regulation and up regulation of hormones									MCQs Short answer Short essay
6.	Explain the mechanism of action of protein hormones									
7.	List the various intracellular signaling systems: second messenger systems									Short answer
8.	Explain the structure and function of G protein									Short answer
9.	Explain the second messenger cAMP system									
10.	Explain the second messenger IP3 and DAG pathway									
11.	Explain the role of Intracellular calcium in mechanism of action of hormones									
12.	Explain the action of hormones through tyrosine kinase activation									
13.	Explain the mechanism of action of steroid hormones									Short essay
Topic: Reproductive Physiology										
Number of competencies: 12										
Number	COMPETENCY	Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Teaching learning methods	Assessment Methods	Integration			
PY9.1	The student should be able to: Describe and discuss the sex determination, sex differentiation and their abnormalities and outline the psychiatry and practical implication of sex determination	K	KH	Y	Lecture, Small group discussion		Anatomy			
Specific learning objectives:										
	1. Explain Human chromosomes and gametes									
	2. Explain sex differentiation					MCQs Short essay				
	3. Explain Barr body and its significance					MCQs Short answer				

	4. Describe the gonadal and genital differentiation					MCQs Short essay Short answers	
	5. Explain the chromosomal abnormalities					MCQs Short answers	
	6. Explain the hormonal abnormalities - Pseudohermaphroditism					MCQs Short answers	
	7. Outline the psychiatric and practical implications of sex determination						
PY9.2	Describe and discuss puberty: onset, progression, stages, early and delayed puberty and outline adolescent clinical and psychological association	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG
	Specific learning objectives:						
	1. Define puberty						
	2. Explain the mechanism and control of the onset of puberty						
	3. Outline the physiological changes during different stages of puberty in boys and girls					MCQs Short essay Short answers	
	4. Explain precocious and true puberty					MCQs Short answers	
	5. Describe delayed puberty					MCQs Short answers	
	6. Outline the clinical and psychological association related to puberty						
PY9.3	Describe male reproductive system: functions of testis and control of spermatogenesis & factors modifying it and outline its association with psychiatric illness	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG Anatomy
	Specific learning objectives						
	1. Describe the functional anatomy of the male reproductive system						
	2. Describe the structure and functions of testis						
	3. Describe spermatogenesis and factors regulating it					Long essay Short essay Short answers	
	4. Describe the structure of the spermatozoa						

	5. Describe the biosynthesis, secretion, transport and metabolism of testosterone					MCQs		
	6. Describe the actions of testosterone					MCQs Short essay		
	7. Describe the control of testosterone secretion					MCQs Short essay Short answers		
	8. Explain hypogonadism and hypergonadism in males					MCQs Short essay Short answers		
	9. Explain cryptorchidism and its correction					MCQs Short answers		
	10. Describe the semen composition and analysis					MCQs Short essay Short answers		
	11. Outline the psychiatric illness associated to male reproductive functions				Y		Lecture, Small group discussion	OBG Anatomy
PY9.4	Describe female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle - hormonal, uterine and ovarian changes							
	Specific learning objectives							
	1. Overview of functional anatomy of the female reproductive system					MCQs Short answers		
	2. Explain the functional anatomy of ovary and list its functions					MCQs Short essay Short answers		
	3. Describe the process of oogenesis					MCQs Short essay Short answers		
	4. Describe the biosynthesis, secretion, transport and metabolism of oestrogen					MCQs Short essay Short answers		
	5. Explain the functions of oestrogen					MCQs Short essay Short answers		
	6. Describe the biosynthesis, secretion, transport and metabolism of progesterone					MCQs Short essay Short answers		
	7. Explain the functions of progesterone					MCQs Short essay		

	8. Describe the ovarian changes during normal menstrual cycle with a neat labelled diagram							Short answers	
	9. Define menstrual cycle and mention normal duration							MCQs Short essay Short answers Long essay MCQs	
	10. Describe the different phases of ovarian cycle							Long essay	
	11. Define ovulation and explain the tests for ovulation.							MCQs Short essay Short answers	
	12. Describe the different phases of endometrial cycle							Long essay Short essay	
	13. Explain the cyclical changes in other reproductive organs							MCQs	
	14. Describe the hormonal control of menstrual cycle							MCQs Short essay	
	15. Explain the abnormalities of ovarian functions – hypogonadism in females							MCQs	
	16. Explain amenorrhea, menorrhagia and dysmenorrhea								
PY9.5	Describe and discuss the physiological effects of sex hormones	K	KH	Y	Lecture, Small group discussion	Written/Viva voce			
	Specific learning objectives								
	1. Describe hypothalamohypophysal gonadal axis								
	2. Explain the role of FSH and LH in sexual development							MCQs Short essay Short answers	
	3. Describe the actions of testosterone in fetal life and adult life							MCQs Short essay Short answers	
	4. Describe the actions and functions of estrogen							MCQs Short essay Short answers	
	5. Explain the actions and functions of progesterone							MCQs Short essay Short answers	
	6. Role of Inhibin and relaxin							Short answer	

PY9.6	Enumerate the contraceptive methods for male and female. Discuss their advantages and disadvantages	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG
	Specific learning objectives						
	1. Classify and Enumerate the methods of contraception in male & female					MCQs Short answers	
	2. Describe the mechanism, advantages and disadvantages of natural and barrier methods in male and female					MCQs Short essay Short answers	
	3. Describe the mechanism of action, advantages and disadvantages of oral contraceptives					MCQs Short essay Short answers	
	4. Describe the mechanism of action, advantages and disadvantages of intrauterine devices					MCQs Short essay Short answers	
	5. Explain other hormonal methods of contraception					MCQs Short answers	
	6. Explain the terminal methods in male & female					MCQs Short answers	
PY9.7	Describe and discuss the effects of removal of gonads on physiological functions	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives						
	1. Explain Eunuchoidism						
	2. Explain the effects of removal of testis before and after puberty					MCQs Short essay Short answers	
	3. Explain the effects of removal of ovary before and after puberty					MCQs Short essay Short answers	
	4. Explain the psychological effects of removal of gonads before and after puberty						
PY9.8	Describe and discuss the physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry – disorders associated with it	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG
	Specific learning objectives						

	1. Describe fertilization and implantation					MCQs Short answers	
	2. Explain the formation and functions of placenta					MCQs Short essay Short answers	
	3. Enlist the placental hormones					MCQs Short answers	
	4. Explain the physiological actions of HCG						
	5. Explain foetoplacental unit					MCQs Short essay	
	6. Describe the physiological changes in mother during pregnancy					Long essay Short essay	
	7. Describe the mechanism and control of parturition					MCQs Short essay	
	8. Explain lactogenesis, milk ejection and its control					MCQs Short essay	
	9. Outline the psychological and psychiatric disorders related to pregnancy, parturition and lactation						
PY9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology and (C) sperm motility as per WHO guidelines and discuss the results	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG
	Specific learning objectives						
	1. Interpret a normal semen analysis report					Practical Chart analysis	
PY9.10	Discuss the physiological basis of various pregnancy tests	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG
	Specific learning objectives						
	1. List the various pregnancy tests						
	2. Describe the basis of immunological tests for pregnancy / Gravindex test					MCQs Short answers	
	3. Explain biological tests for pregnancy						
PY9.11	Describe the hormonal changes and their effects during perimenopause and menopause	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG

Specific learning objectives												
	1. Define menopause											
	2. Describe the hormonal changes and their effects in perimenopausal period											
	3. Describe the hormonal changes and their effects during menopause											
PY9.12	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	OBG					
Specific learning objectives												
	1. Describe the causes of infertility in males											
	2. Describe the causes of infertility in females											
	3. Explain IVF and its role in treatment of infertility											
Topic: Neurophysiology												
Number of competencies: 20												
Number	COMPETENCY The student should be able to:	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching learning methods	Suggested assessment methods	Horizontal Integration					
PY10.1	Describe and discuss the organization of nervous system	K	KH	Y	Lecture, Small group	Written/Viva voce	Human Anatomy					
Specific learning objectives:												
	1. Discuss the components of the nervous system											
	2. Describe the organization of central nervous system											
	3. Describe the organization of peripheral nervous system											
	4. Describe the organization of autonomic nervous system											
PY10.2	Describe and discuss the functions and properties of synapse, reflex, receptor	K	KH	Y	Lecture, Small group	Written/Viva voce	Human Anatomy					
Specific learning objectives:												
	1. Define and classify synapse.											
	2. Describe the structure of synapse											

	18. Enlist the types of receptors with examples							MCQs Short answers	
	19. Explain the signal transduction of receptors and properties of receptor potential							MCQs Short essay, Short answers	
	20. Enlist the properties of receptors							MCQs Short essay, Short answers	
	21. Explain the mechanism of Adaptation in receptor							MCQs Short essay, Short answers	
	22. Explain the law of projection-Phantom limb							MCQs Short essay, Short answers	
	23. Explain Weber-Fechner law							MCQs Short essay, Short answers	
	24. Explain Mullers doctrine of specific nerve energies							MCQs Short essay, Short answers	
PY10.3	Describe and discuss somatic sensations & sensory tracts	K	KH	Y			Lecture, Small group discussions	Written/Viva voce	Human Anatomy
	Specific learning objectives:								
	1. Enlist the ascending tracts							MCQs Short answers	
	2. Describe the origin, course, termination and function of dorsal column tract							MCQs, Long Essay Short essay, Short answers	
	3. Describe the origin, course, termination and function of anterior spinothalamic tract							MCQs, Long Essay Short essay, Short answers	
	4. Describe the origin, course, termination and function of lateral spinothalamic tract							MCQs, Long Essay Short essay, Short answers	
	5. Explain sensory homunculus							MCQs Short answers	

	6. Differentiate between sensation and perception. Define sensory unit							MCQs Short answers		
	7. Explain the dermatomes of the body							MCQs Short answers		
	8. Enlist the somatic sensations							MCQs Short answers		
	9. Define pain and classify pain							MCQs Short answers		
	10. Differentiate between somatic and visceral pain							MCQs Short essay, Short answers		
	11. Differentiate between fast and slow pain							MCQs Short essay, Short answers		
	12. Explain the theories of referred pain							MCQs Short essay, Short answers		
	13. Describe the pain pathway of face and explain trigeminal neuralgia							MCQs Short essay, Short answers		
	14. Describe the endogenous pain inhibition systems in CNS							MCQs Short essay, Short answers		
	15. Name the synthetic sensations							MCQs Short answers		
	PY10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium and vestibular apparatus	K	KH	Y	Lecture, Small group discussions	Written/Viva voce	Human Anatomy		
		Specific learning objectives:								
		1. Name the different areas of motor cortex and explain the motor homunculus							MCQs Short essay, Short answers	
		2. Classify the descending tracts							MCQs Short answers	
		3. Describe the origin, course, termination and functions of pyramidal tract							MCQs Long Essay Short essay, Short answers	
	4. Discuss hemiplegia, paraplegia, monoplegia and quadriplegia							MCQs Short answers		

PY10.5	5. Define muscle tone							Short answers MCQs		
	6. Explain motor unit							Short answers MCQs		
	7. Explain the role of stretch reflex in maintaining the muscle tone							Short essay, Short answers		
	8. Explain the role of higher centers in maintaining the muscle tone							MCQs Short answers		
	9. Differentiate hypotonia and hypertonia							MCQs Short essay, Short answers		
	10. Classify postural reflexes							MCQs Short essay, Short answers		
	11. Explain static postural reflexes							MCQs Short essay, Short answers		
	12. Explain static-kinetic postural reflexes							MCQs Short essay, Short answers		
	13. Explain spinal animal, decerebrate rigidity and decorticate rigidity							MCQs Short essay, Short answers		
	14. Differentiate between ischemic and classical decerebrate rigidity							MCQs Short essay, Short answers		
	15. Differentiate between decerebrate and decorticate rigidity							MCQs Short essay, Short answers		
	16. Describe the structure, mechanism of signal transduction and functions of semicircular canals							MCQs Short essay, Short answers		
	17. Describe the structure, mechanism of signal transduction and functions of otolith organs							MCQs Short essay, Short answers		
	18. Explain the pathophysiology of motion sickness and Meniere's disease							MCQs Short essay, Short answers		
	Describe and discuss structure and functions of reticular activating system, autonomic nervous system							Lecture, Small group discussions	Written/Viva voce	Human Anatomy

athetosis, Huntington's disease, hemiballismus, Wilson's disease, Kernicterus								Short essay, Short answers	
15. Describe the functional anatomy of thalamus								MCQs Short essay, Short answers	
16. Classification of thalamic nuclei								MCQs Short essay, Short answers	
17. Describe the connections of thalamus								MCQs Short essay, Short answers	
18. Describe the functions of thalamus								MCQs Short essay, Short answers	
19. Explain thalamic syndrome								MCQs Short essay, Short answers	
20. Describe the functional anatomy of hypothalamus								MCQs Short essay, Short answers	
21. Classification of hypothalamic nuclei								MCQs Short answers	
22. Describe the connections of hypothalamus								MCQs Short essay, Short answers	
23. Describe the functions of hypothalamus								MCQs Short essay, Short answers	
24. Describe the role of hypothalamus in regulation of food intake								MCQs Short essay, Short answers	
25. Describe the role of hypothalamus in water balance								MCQs Short essay, Short answers	
26. Describe the role of hypothalamus in temperature regulation								MCQs Short essay, Short answers	
27. Explain narcolepsy and cataplexy								MCQs Short answers	
28. Describe the functional anatomy of cerebellum								MCQs Short essay, Short answers	
29. Enlist the divisions of cerebellum								MCQs Short answers	
30. Describe the connections and functional neuronal circuits of cerebellum								MCQs, Long Essay Short essay,	

									Short essay, Short answers MCQs	
	3. Explain the factors affecting sleep								Short answers	
	4. Describe the genesis of sleep								MCQs	
	5. Define and explain the EEG waves								Short answers	
	6. Describe the neurophysiological basis of EEG								MCQs	
	7. Explain the EEG changes during sleep								Short essay, Short answers	
	8. Explain sleep disorders								MCQs	
									Short essay, Short answers	
PY10.9	Describe and discuss the physiological basis of memory, learning and speech									Lecture, Small group discussion
	Specific learning objectives:									Written/Viva voce
	1. Define & classify memory								MCQs	
	2. Describe the physiological basis of memory								Short answers	
	3. Describe the physiological basis of amnesia and Alzheimer's disease								MCQs	
	4. Define & classify learning								Short essay, Short answers	
	5. Describe the physiological basis of learning								MCQs	
	6. Describe the development of speech								Short answers	
	7. Enlist speech centres								MCQs	
	8. Enlist the types of speech								Short answers	
	9. Describe the physiological basis of spoken speech								MCQs	
									Short essay, Short answers	

	10. Describe the physiological basis of written speech								MCQs Short essay, Short answers	
	11. Explain speech disorders								MCQs Short answers	
PY10.10	Describe and discuss chemical transmission in the nervous system.(Outline the psychiatry element).	K	KH	Y				Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:									
	1. Describe the chemical transmission of impulse across synapse								MCQs Short answers	
	2. Define & Classify neurotransmitters								MCQs Short answers	
	3. Discuss small molecule neurotransmitters								MCQs Short answers	
	4. Discuss neuropeptide transmitters								MCQs Short answers	
	5. Discuss the role of neurotransmitters in depression, mania , schizophrenia								MCQs Short answers	
PY10.11	Demonstrate the correct clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer or simulated environment	S	P	Y				DOAP sessions	Skill assessment/ Viva voce/OSCE	Human Anatomy
	Specific learning objectives:									
	1. Able to perform, demonstrate and write report of assessment of higher mental functions									
	2. Able to examine, demonstrate and document the findings of assessment of sensory system for light touch, pressure, pain, vibration and position sensations									
	3. Able to examine, demonstrate and write report of assessment of motor system for the bulk, tone, strength of muscles									
	4. Able to examine, demonstrate and write report of techniques for testing coordination of movements									
	5. Able to examine, demonstrate and write report of techniques for gait & equilibrium									
	6. Able to examine, demonstrate and write report of testing for superficial and deep reflexes									
	7. Able to examine, demonstrate and write report of assessment of cranial nerves from 1-12									
PY10.12	Identify normal EEG forms	S	KH	Y				Small	OSPE/Viva	

						group teaching	voce	
	Specific learning objectives:							
		1. Demonstration of recording of EEG						
		2. Identify the normal EEG forms						
PY10.13	Describe and discuss perception of smell and taste sensation							
	Specific learning objectives:							
		1. Describe the functional anatomy of nose and olfactory membrane						Anatomy
		2. Trace the olfactory pathway from olfactory receptors to olfactory areas					Video Chart	MCQs Short essay
		3. Explain the sensory transduction in olfactory receptors					Video	
		4. Mention the factors influencing the olfaction						
		5. Describe the functional anatomy of tongue						Anatomy
		6. Describe the structure of taste buds and the taste receptors.						MCQs Short essay
		7. Trace the taste pathway from taste receptors to gustatory area in cortex					Video Chart	MCQs Short essay
		8. Name the primary taste sensations and explain its characteristics						MCQs Short answers
		9. Explain the sensory transduction in taste receptors for different taste stimuli					Video	MCQs Short essay
		10. Explain the encoding of taste stimuli						
		11. Mention the factors influencing taste sensation						
	12. Compare and contrast sense of olfaction and gustation						MCQs Short essay	
PY10.14	Describe and discuss patho-physiology of altered smell and taste sensation							
	Specific learning objectives:							
	1. Explain hyposmia, anosmia and parosmia							MCQs Short answers

	2. Explain hypoguesia, aguesia and dysguesia					MCQs Short answers	
	3. Explain taste blindness					MCQs Short answers	
PY10.15	Describe and discuss functional anatomy of ear and auditory pathways & physiology of hearing	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Describe the functional anatomy of external ear & its functions						
	2. Describe the functional anatomy of middle ear						
	3. Describe the structure of organ of corti					MCQs Short essay	
	4. Trace the auditory pathway from hair cells to auditory cortex					MCQs Short essay	
	5. Mention the auditory areas and its functions						
	6. Explain the properties of sound stimuli						
	7. Explain the conduction of sound waves in external and middle ear					MCQs Short essay	
	8. Explain the mechanism of impedance matching					MCQs Short essay	
	9. Explain tympanic reflex					MCQs Short essay	
	10. Explain the signal transduction of sound waves in hair cells					MCQs Short essay	
	11. Name and explain the different theories of hearing					MCQs Short essay	
	12. Explain endocochlear potential					MCQs Short essay	
	13. Explain cochlear microphonic potentials					MCQs Short essay	
	14. Explain the genesis of action potential					MCQs Short answer	
	15. Explain the mechanism of encoding of sound stimuli						
PY10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	

Specific learning objectives: 1. Classify deafness 2. Explain the pathophysiology of conductive deafness 3. Explain the pathophysiology of sensorineural deafness 4. Describe how to assess the hearing ability of a person by conducting various tests	K	KH	Y	Lecture, Small group discussion	MCQs	Written/Viva voce
					Short answer	
					MCQs	
					Short answer	
					MCQs	
PY10.17	K	KH	Y	Lecture, Small group discussion	MCQs	Written/Viva voce
					MCQs	
					Short answer	
					MCQs	
					Short answer	
					MCQs	
					Short answer	
					MCQs	
					Long essay	
					Short essay	
					Short essay	
					Short essay	
					Short essay	
					MCQs	
Short essay						
Specific learning objectives: 1. Describe the functional anatomy of eye 2. Describe the formation, circulation, drainage and functions of aqueous humour 3. Define and mention the normal value of Intraocular pressure 4. Enlist and explain the layers of retina 5. Trace the visual pathway from retina to the the visual cortex 6. Mention the visual areas and its functions 7. Explain the lesions in the visual pathway 8. Explain the mechanism of image formation 9. Explain the process of accommodation 10. Explain the errors of refraction 11. Explain presbyopia 12. Explain the structure of photoreceptors and its distribution 13. Explain the visual pigments 14. Explain visual cycle	K	KH	Y	Lecture, Small group discussion	MCQs	Written/Viva voce
					MCQs	
					Short answer	
					MCQs	
					Short answer	
					MCQs	
					Short answer	
					MCQs	
					Long essay	
					Short essay	
					Short essay	
					Short essay	
					Short essay	
					MCQs	
Short essay						

	15. Explain phototransduction in photoreceptors								MCQs Short essay	
	16. Differentiate between potential changes in rods and cones									
	17. Processing of visual stimuli in retina, visual pathway and visual cortex									
	18. Explain the process of encoding of visual stimuli									
	19. Define visual acuity and mention factors affecting it								MCQs Short essay	
	20. Explain the mechanism of colour vision								Long essay MCQs Short essay	
	21. Classify and explain the different types of colour blindness								MCQs Short essay	
	22. Explain dark adaptation and light adaptation								MCQs Short essay	
	23. Explain light reflexes								MCQs Short essay	
	24. Explain physiology of ocular movements									
	25. Explain strabismus & Nystagmus								MCQs Short answers	
PY10.18	Describe and discuss the physiological basis of lesion in visual pathway	K	KH	Y				Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:									
	1. Define and explain factors affecting field of vision									
	2. Discuss the effect of lesion at various levels of visual pathway									
	3. Define and classify blind spot									
PY10.19	Describe and discuss auditory & visual evoke potentials	K	KH	Y				Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:									
	1. Explain auditory evoked potential and its applications									
	2. Explain visual evoked potential and its applications									
PY10.20	Demonstrate (i) Testing of visual acuity, colour and field	S	SH	Y				DOAP	Skill	

	of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment				sessions	assessment/ Viva voce	
	Specific learning objectives: 1. Able to test for far vision, near vision, colour vision and field of vision in a given subject 2. Elicit pupillar reflexes 3. Able to test for hearing ability of a subject by performing various tests for hearing 4. Able to test for taste sensation 5. Able to test for sensation of smell					OSCE Practicals OSCE Practicals OSCE Practicals OSCE Practicals OSCE Practicals	
Topic: Integrated Physiology							
	COMPETENCY	Domain	Level	Core	Teaching	Assessment	Integration
Number	The student should be able to:	K/S/A/C	K/KH/SH/P	(Y/N)	methods	methods	Integration
	Specific learning objectives:						
PY11.1	Describe and discuss mechanism of temperature regulation	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Describe the mechanism of temperature regulation in hot environment					Short assay Short answer	
	2. Describe the mechanism of temperature regulation in cold environment					Short assay Short answer	
PY11.2	Describe and discuss adaptation to altered temperature (heat and cold)	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Describe adaptation to hot temperature					Short assay Short answer	
	2. Describe adaptation to cold temperature					Short assay Short answer	
PY11.3	Describe and discuss mechanism of fever, cold injuries and heat stroke	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						

	1. Explain fever								Short answer	
	2. Explain heat stroke, cold injuries									
PY11.4	Describe and discuss cardio-respiratory and metabolic adjustments during exercise; physical training effects	K	KH	Y			Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:									
	1. Explain the respiratory changes to exercise and trained personnel								Short essay	
	2. Explain the cardiovascular changes to exercise and trained personnel								Short essay	
	3. Explain the metabolic changes to exercise and trained personnel								Short essay	
									Short answer	
PY11.5	Describe and discuss physiological consequences of sedentary lifestyle	K	KH	Y			Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:									
	1. Explain the physiological consequences of sedentary lifestyle								Short answer	
PY11.6	Describe physiology of Infancy	K	KH	Y			Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:									
	1. Explain the physiology of infancy									
PY11.7	Describe and discuss physiology of aging; free radicals and antioxidants	K	KH	Y			Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:									
	1. Explain the physiology of ageing								Short answer	
	2. Explain the role of free radicals and antioxidants in life and ageing									
PY11.8	Discuss & compare cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)	K	KH	Y			Lecture, Small group discussion		Written/Viva voce	
	Specific learning objectives:									

	1. Explain the respiratory changes to isometric and isotonic exercise in resting state									Short essay
	2.. Explain the cardiovascular changes to isometric and isotonic exercise in resting state									Short essay
	3. Explain the respiratory changes to isometric and isotonic exercise in different environmental state									Short answer
	4. Explain the cardiovascular changes to isometric and isotonic exercise in different environmental state									Short answer
PY11.9	Interpret growth charts	K	KH	Y		Small group teaching			Practical/OS PE/Viva voce	
	Specific learning objectives:									
	1. Interpretation of growth charts					Small group teaching				
PY11.10	Interpret anthropometric assessment of infants	K	KH	Y					Practical/OS PE/Viva voce	
	Specific learning objectives:									
	1. Interpretation of anthropometric assessment of infants					Lecture, Small group discussion				
PY11.11	Discuss the concept, criteria for diagnosis of Brain death and its implications	K	KH	Y					Written/Viva voce	
	Specific learning objectives:									
	1. Explain the concept, criteria for diagnosis of brain death					Lecture, Small group discussion				
PY11.12	Discuss the physiological effects of meditation	K	KH	Y					Written/Viva voce	
	Specific learning objectives:									
	1. Explain the physiological effects of meditation									
PY11.13	Obtain history and perform general examination in the volunteer / simulated environment	S	SH	Y		DOAP sessions			Skill assessment/Viva voce	
	Specific learning objectives:									
	1. Obtain the history in the volunteer									
	2. Perform the General examination in the volunteer									
PY11.14	Demonstrate Basic Life Support in a simulated environment	S	SH	Y		DOAP sessions			OSCE	
	Specific learning objectives:									
	1. Demonstrate Basic life support in simulated environment									

Integration

The teaching should be aligned and integrated horizontally and vertically in organ systems in order to provide a context in which normal function can be correlated both with structure and with the biological basis, its clinical features, diagnosis and therapy

2. PRACTICAL

The following list of practical is minimum and essential. Additional exercises can be included as and when feasible and required. All the practicals have been categorized as 'Procedures' and 'Demonstrations'. The procedures are to be performed by the students during practical classes to acquire skills. Some of these would be included in the practical during University examination. Those categorized as "demonstrations" are to be shown to students during practical classes. However, these demonstrations would not be included in the university examinations, but questions based on these would be given in the form of data, charts, problems and case - histories, for interpretation by students.

Procedures to be performed by the students

A. Haematology

1. RBC count
2. WBC Count
3. Differential Leucocyte Count
4. Absolute Eosinophil Count
5. Estimation of haemoglobin
6. Blood grouping
7. Bleeding time
8. Clotting time

B. Human experiments: To be performed on volunteer

1. Mosso's ergometry - at normal condition, after venous occlusion and arterial occlusion.
2. Stethography - at rest, effect of deglutition, exercise, voluntary hyperventilation and break point after breath holding.
3. Spirometry - lung volumes & capacities, MVV and Dyspnoeic Index
4. Peak Expiratory Flow Rate (PEFR) by Wright's mini peak flow meter
5. Recording of Blood pressure on a volunteer
6. Effect of posture & Exercise on blood pressure
7. Recording of ECG in lead II
8. Perimetry – Recording of Visual field

C. Clinical Examination on volunteer

1. General physical examination
2. Examination of radial pulse
3. Clinical Examination of Cardiovascular system
4. Clinical Examination of Respiratory system
5. Clinical examination of abdomen
6. Examination of Sensory system
7. Examination of Motor system

8. Examination of Reflexes
9. Examination of Cranial Nerves
10. Cerebellar function tests

D. Computer assisted learning

I) List of Amphibian nerve - muscle experiments and interpretation of graphs

- Simple muscle twitch
- Effect of various strengths of stimuli on Simple muscle twitch
- Effect of changes in temperature on Simple muscle twitch
- Effect of two successive stimuli on muscle contraction
- Effect of multiple successive stimuli (treppe, clonus, tetanus)
- Study of fatigue in skeletal muscle
- Velocity of nerve conduction
- Effect of load on muscle
- Measurement of isometric contractions using nerve muscle preparation

ii) List of Amphibian cardiac experiments and interpretation of graphs

- Normal cardiogram
- Effect of temperature on frog heart
- Effect of Stannius ligatures
- Properties of cardiac muscle – all or none law, staircase effect, refractory period in a
- beating heart (extrasystole and compensatory pause), refractory period in a quiescent heart

E. Interpretation of - Charts, Problems and Case histories

F. Recommended Demonstrations (Non Core competencies)

1. ESR, Haematocrit, Reticulocyte count, Platelet count, Osmotic fragility, Specific gravity
2. Electromyography (EMG)
3. Recording of Arterial pulse tracing
4. Cardiovascular fitness test - by Harvard's step test or bicycle ergometer or 2km walk
5. Sperm count and motility
6. Audiometry
7. Autonomic function tests
8. Electroencephalogram (EEG)

SKILL CERTIFICATION:**List and number of sessions for skill certification:**

Competencies		
PY4.10	Demonstrate the correct clinical examination of the abdomen in a normal volunteer or simulated environment	1
PY5.12	Recording of blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	1each x 3
PY5.13	Recording and interpreting ECG in a volunteer or simulated environment	1
PY5.15	Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or simulated environment	1
PY6.8	Performing spirometry and interpret spirogram	1
PY6.9	Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment	1
PY10.11	Demonstrate the correct clinical examination of the nervous system sensory system, motor system, reflexes, cranial nerves in a normal volunteer or simulated environment	1 each (total 5)
PY10.20	Demonstrate (i) Testing of visual acuity, colour and field of vision (ii) Tests for hearing (iii) Testing for smell and (iv) taste sensation in volunteer or simulated environment	1 each (total 4)

III. EARLY CLINICAL EXPOSURE (ECE): Needs to be entered in Log book
CLINICAL SKILLS (4 Hospital Visit) - 12 hours (03 Hrs each)

BASIC SCIENCE CORRELATION - 18 hours

Sl No	Competency No	Topics	Integrated department / Case based learning
General Physiology			
1	PY1.6	Body fluids – Oedema & Dehydration	Medicine / Paediatrics
Haematology			
2	PY2.5	Anaemia	Medicine / Paediatrics/ CBL
3	PY2.5	Jaundice	Medicine/CBL
4	PY2.8	Bleeding & Coagulation disorders	CBL
5	PY2.9	Blood banking	Blood bank
Nerve Muscle Physiology			
6	PY3.6	Myaesthesia gravis	Medicine
7	PY3.13	Muscular dystrophies: Myopathies	Medicine

Gastrointestinal system			
8	PY4.10	Clinical examination of abdomen	Medicine
9	PY4.3	Dysphagia	CBL
10	PY4.9	Acid peptic disease	CBL
11	PY4.9	Vomiting	CBL
12	PY4.9	Diarrhoea	CBL
13	PY4.7	Hepatitis	CBL
14	PY4.4	Malabsorption syndrome	CBL
Cardiovascular system			
15	PY5.12	Examination of Pulse & Recording of Blood pressure	Medicine
16	PY5.15	Clinical examination of cardiovascular system	Medicine
17	PY5.6	Arrhythmias	Problem based learning
18	PY5.11	Cardiac failure	CBL
19	PY5.7	Hypertension	CBL
20	PY5.11	Shock	Medicine/ CBL
Respiratory System			
21	PY6.9	Examination of respiratory system	Medicine
22	PY6.7	Pulmonary function testing	Pulmonology
23	PY6.2	Respiratory distress syndrome	CBL
24	PY6.6	Bronchial asthma	CBL
25	PY6.6	COPD	CBL
26	PY6.6	Restrictive disorders	CBL
27	PY6.6	Respiratory failure	CBL
Renal system			
28	PY7.3	Glomerular nephritis	Paediatrics/Medicine/ CBL
29	PY7.3	Nephrotic syndrome	Paediatrics/Medicine/ CBL
30	PY7.7	Visit to dialysis unit	Nephrology
31	PY7.6	Automatic bladder	CBL
Endocrine System			
32	PY8.2	Dwarfism & Gigantism	CBL
33	PY8.2	Diabetes insipidus	CBL
34	PY8.2	Hypothyroidism	Medicine/CBL
35	PY8.2	Hyperthyroidism	Medicine/CBL
36	PY8.2	Hypoparathyroidism	CBL
37	PY8.2	Hyperparathyroidism	CBL
38	PY8.2	Diabetes mellitus	Medicine/CBL
39	PY8.2	Cushing syndrome	Medicine/CBL
40	PY8.2	Addison's disease	CBL

41	PY8.2	Conn syndrome	CBL
42	PY8.2	Phaeochromocytoma	CBL
Reproduction system			
43	PY9.2	Precocious puberty	CBL
44	PY9.12	Oligospermia	CBL
45	PY9.4	Menstrual disorders	OBG
46	PY9.8	Physiology of Pregnancy	OBG
Neurophysiology			
50	PY10.11	Examination of sensory system	Medicine
51	PY10.11	Examination of motor system, Reflexes	Medicine
52	PY10.11	Examination of cranial nerves	Medicine
53	PY10.4	Hemiplegia – UMN lesion	CBL
54	PY10.6	Paraplegia	CBL
55	PY10.6	Quadriplegia	CBL
56	PY10.6	Poliomyelitis – LMN lesion	CBL
57	PY10.6	Brown sequard syndrome	CBL
58	PY10.6	Syringomyelia	CBL
59	PY10.6	Tabes dorsalis	CBL
60	PY10.7	Parkinson’s disease	CBL
61	PY10.7	Cerebellar disease	CBL
62	PY10.20	Examination of visual acuity, field of vision	Ophthalmology
63	PY10.20	Measurement of IOP, Ophthalmoscopy	Ophthalmology
64	PY10.20	Tests of hearing, Otoscopy	ENT
65	PY10.20	Audiometry	ENT

IV. SCHEME OF EXAMINATION

INTERNAL ASSESSMENT: Total Marks: Theory 100 & Practical 100

Summative assessment : 70 marks			
Theory	Marks 70	Practicals	Marks 70
Written paper	70	OSCE/OSPE Experiments Problems, Case histories	20 40 10
Total	70		70
Formative assessment : 30 marks			
Unit tests/seminars/ Tutorials/ Projects/ Viva	20	Practical record	10
Early clinical exposure	10	Skill certification	10
		Attendance/ Discipline	10
Total	30		30

- Regular periodic examinations will be conducted throughout the course. There will
- be three internal assessment examinations
- An average of the marks scored in the three internal assessment examinations will be considered as the final internal assessment marks.
- Learners must secure not less than 40 % marks in theory and practical separately and not less than 50% marks of the total marks (combined in theory and practical) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject.
- The third internal examination is the preliminary examination will be conducted on the lines of the university examination.

UNIVERSITY EXAMINATION

A. Theory: 200 Marks

Type of questions	Number of questions	Marks of each question	Total
MCQs	20	01	20
Long Essay	2	10	20
Short Essay	06	5	30
Short Answer	10	3	30
		Total	100

There shall be two theory papers of 100 marks each and duration of each paper will be of 3 hours. The patterns of questions would be of three types.

- Assessment will be carried out on an objective basis to the extent possible.
- The student must secure at least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass.

Distribution of chapters and suggested marks in parenthesis for Paper I and Paper II in Physiology for University examination are as follows*

PAPER-I	
Subjects	Marks
General Physiology	06
Blood	20
Cardiovascular system	24
Respiratory system	20
Gastrointestinal system	18
Renal system	12

(Note: Marks for Renal & Gastrointestinal system can be interchanged.)

PAPER-II	
Subjects	Marks
Endocrine	20
Special senses	18
Reproduction	12
Central nerve system	28
Muscle- nerve	16
Integrated Physiology	06

(Note: Marks for Endocrines & Reproduction can be interchanged)

- The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. Practicals: 80 Marks

There shall be two practical sessions. Practical I and II, each carrying 40 marks, each practical will be of two hours duration. The distribution of content and marks for the practical would be,

Practical-I 40 Marks

1. Clinical Examination - 15 marks
2. Human experiments - 15 marks
3. OSPE/OSCE - 10 marks

Practical-II 40 Marks

3. Haematology
 - Major - 15 marks
 - Minor - 10 marks
4. Interpretation of case histories/problems/charts - 05 marks
5. OSPE - 10 marks

C. Viva-Voice Examination: 20 Marks

The viva-voice examination shall carry 20 marks and all examiners with conduct of examination.

- | | | |
|---|---|----------|
| Table 1 – GP, Blood, GIT, Renals | - | 05 Marks |
| Table 2 – RS, CVS | - | 05 Marks |
| Table 3 – Endocrines, Reproductive system | - | 05 Marks |
| Table 4 – Nerve – Muscle, Neurophysiology | - | 05 Marks |

VII. LEARNING RESOURCE MATERIALS

TEXT BOOKS

1. INDU KHURANA - Textbook of Physiology for Undergraduates, Elsevier,
2. A.K. JAIN – Textbook of Medical Physiology, Vol. I& II, Avichal Publishers Delhi
3. G.K. PAL - Textbook of Medical Physiology – Ahuja Publishing House
4. GUYTON & HALL - Text of Physiology, Elsevier, 12th (International)Edition

5. K SEMBULINGAM, PREMA SEMBULINGAM – Essentials of Medical Physiology, Jaypee publication
6. CHAUDHARI Sujith K - Concise Medical Physiology, New Central Books, Calcutta.
7. BIJLANI R L - Understanding Medical Physiology -Text book for medical students, Jaypee Brothers, New Delhi

REFERENCE BOOKS

1. GANONG's Review of Medical Physiology, Lange Publications
2. SAMSON WRIGHT'S Applied Physiology, Oxford university press
3. BEST & TAYLOR Physiological basis of Medical practice, Williams & wilkins publications
4. BERNE (Robert M) and Levy (Mathew). Physiology ,Elsevier Publication
5. BORON & BOULPAEP - Medical Physiology,Vol.1 & 2, Elsevier Publication

PRACTICAL MANUALS

1. G.K.PAL – Textbook of Practical Physiology – University Press
2. A.K.JAIN - Manual of Practical Physiology, Avichal Publishers Delhi
3. C.L.GHAI - Textbook of Practical Physiology, Jaypee
4. HUTCHISON's - Clinical Methods, Elsevier Publishers.

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NAME OF SUBJECT: BIOCHEMISTRY

1. GOAL

The broad goal is to teach Biochemistry to undergraduate students to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge acquired in solving clinical problems.

2. OBJECTIVES

a) KNOWLEDGE

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

- I. Describe the molecular and functional organization of a cell and list its subcellular components;
- II. Delineate structure, function and inter-relationships of biomolecules and consequences of deviation from normal;
- III. Summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
- IV. Describe digestion and assimilation of nutrients and consequences of malnutrition;
- V. Integrate the various aspects of metabolism and their regulatory pathways;
- VI. Explain the biochemical basis of inherited disorders with their associated sequelae;
- VII. Describe mechanisms involved in maintenance of body fluid and pH homeostasis;
- VIII. Outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
- IX. Summarize the molecular concepts of body defence and their application in medicine;
- X. Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
- XI. Familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data;
- XII. The ability to suggest experiments to support theoretical concepts and clinical diagnosis.

b. SKILLS:

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

- I. Make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- II. Analyze and interpret investigative data;
- III. Demonstrate the skills of solving scientific and clinical problems and decision making;

c. INTEGRATION

The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of the human body in health and disease.

d. COURSE OUTCOME

At the end of the course, student should be able to understand the biochemical & molecular mechanisms involved in various metabolic pathways in the body and should be able to apply this knowledge in understanding the pathophysiology, diagnosis and management of various diseases.

TEACHING HOURS:

SI No.	Teaching learning method	No. of Hours
1	Large group teaching	80 hours
2	Small group teaching (SGT) (Small group discussions-SGD/Tutorials/Seminars/Case based learning sessions/Integrated teaching sessions/ Practical)	150 hours
3	Self-directed learning (SDL)	20 hours
	TOTAL	250 hours
4	Early clinical Exposure	30 hours

Topic wise distribution of Theory hours		
SL No	Theory Topics	No. of Hours allotted
1	Molecular & functional organization of cell & Cellular components	01
2	Chemistry & metabolism of Carbohydrates,	10
3	Chemistry & metabolism of Lipids	10
4	Chemistry & metabolism of Proteins	08
5	Biological Oxidation	01
6	Intermediary metabolism	01
7	Nutrition & Energy metabolism	05
8	Enzymes	06
9	Vitamins	08
10	Mineral metabolism	04
11	Cardiac Markers, Free radicals & antioxidants,	02
12	Hormonal assay	01
13	Detoxification	01
14	Chemistry & Metabolism of Nucleic acids	03
15	Genetics & Molecular biology Techniques	06
16	Heme metabolism, Normal & abnormal haemoglobins with associated disorders	02
17	Immune system	02
18	Extracellular Matrix	03
19	Acid base balance, Water & Electrolyte balance	04
20	Organ Function tests	04
21	Cancer Biology	02
22	Lab automation, Quality Control, Biomedical waste Management	02

Competency and specific learning objectives

Number	COMPETENCY The student should be able to	Domain K/S/ A/C	Level K/KH /S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Vertical integration	Horizontal Integration
BIOCHEMISTRY								
Topic: Basic Biochemistry		Number of competencies: (01)			Number of procedures that require certification: (NIL)			
BI 1.1	Describe the molecular and functional organization of a cell and its subcellular components.	K	KH	Y	Lecture, Small group discussion	Written assessment/ Viva voce		Physiology
	Specific learning objectives:							
	1. Define cell and list the types of cell					Short essay		
	2. Differentiate between prokaryotic and eukaryotic cell					Short essay		
	3. Discuss the fluid mosaic model with neat labelled diagram					Short essay/Short answer/MCQs , Case reports, Viva voce		
	4. List the subcellular organelles with their function					Short essay		
	5. Types of transport mechanism					Short essay/Short answer/MCQs, Case reports, Viva voce		
	6. Define passive transport and name the types					Short essay/Short answer/MCQs, Case reports, Viva voce		
	7. Describe facilitated diffusion with example					Short essay		
	8. List the transport proteins with clinical importance					Short essay		
	9. Define active transport and name the types with examples					Short essay		

	10. Describe the secondary active transport with examples					Short essay/Short answer/MCQs, Case reports, Viva voce	
	11. Describe vesicular transport					Short essay	
	12. List the glucose transporters with mechanism					Short essay/Short answer/MCQs, Case reports, Viva voce	
	13. Enumerate the clinical significance of glucose transporters					Short essay/Short answer/MCQs, Case reports, Viva voce	
Topic: Enzyme		Number of competencies: (07)			Number of procedures that require certification: (NIL)		
BI 2.1	Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, coenzyme & co-factors. Enumerate the main classes of IUBMB nomenclature.	K	KH	Y	Lecture, case discussion	Written assessment/ Viva voce	
	Specific learning objectives:						
	1. Describe the fundamental concept of enzymes					Short essay	
	2. Define chemical reaction					Short essay	
	3. Describe a role of catalyst in a chemical reaction					Short essay	
	4. Define an enzyme and explain its role as a biocatalyst in biochemical reactions					Short essay/Short answer/MCQs, Case reports, Viva voce	
	5. Define isoenzymes and discuss their functions					Short essay/Short answer/MCQs, Case reports, Viva voce	

	6. Define holoenzymes with examples	K	KH	Y	Practical, lecture	Short essay/Short answer/MCQs, Case reports, Viva voce		
	7. Define, co-enzymes and co factors with examples					Short essay/Short answer/MCQs, Case reports, Viva voce		
	8. Enumerate and discuss about main classes of IUBMB nomenclature with suitable examples					Short essay		
BI 2.2	Observe the estimation of SGOT & SGPT	K	KH	Y	Practical, lecture	Viva voce		
	Specific learning objectives:							
	1. Observe the estimation of SGOT, SGPT and interpret the results in given sample							
BI 2.3	Describe and explain the basic principles of enzyme activity	K	KH	Y	Lecture, case discussion	Written/ Viva voce	General medicine, pathology	
	Specific learning objectives:							
	1. Describe the formation of enzyme/substrate complexes					Short essay/Short answer		
	2. Define the concept of Active sites					Short essay/Short answer		
	3. Describe the mechanism of enzyme activity in terms of Transition state - Activation energy					Short essay/Short answer/MCQs, Case reports, Viva voce		
	4. Describe the theories explain the enzyme catalysed reactions Lock and key theory Induce fit theory					Short essay/Short answer/MCQs, Case reports, Viva voce		
	5. Enumerate the various factors which effect the enzyme activity					Short essay/Short answer/MCQs , Viva voce		

BI 2.4	6. Define Michaelis-Menten equation	K	KH	Y	Lecture, Small group discussion	Short answer/MCQs, Viva voce	Pathology, General Medicine
	7. Define k_m and V_{max} and explain its effect on enzyme activity					Short essay/Short answer/MCQs, Viva voce	
	8. Enumerate the significance of k_m					Short essay/Short answer/MCQs, Viva voce	
	9. Discuss the use of Lineweaver-Burk plots to calculate k_m and V_{max}					Short essay/Short answer/MCQs, Viva voce	
	Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes					Written/Viva voce	
	Specific learning objectives:						
	1. Define enzyme inhibition and mention two main types enzyme inhibition with examples					Long essay/Short essay/Short answer/MCQs, Viva voce	
	2. Describe competitive inhibition with suitable examples					Short essay/Short answer/MCQs, Viva voce	
	3. Describe uncompetitive inhibition with suitable examples					Short essay/Short answer/MCQs, Viva voce	
	4. Describe non-competitive inhibitors with suitable examples					Short essay/Short answer/MCQs, Viva voce	
	5. Describe how gout is treated with Allopurinol					Short essay/Short answer/MCQs, Viva voce	
	6. Describe the antibiotic activity of sulpha drugs with respect to competitive inhibition.					Short essay/Short answer/MCQs, Viva voce	
	7. Describe the anticoagulant activity of warfarin and dicoumoral with respect to competitive inhibition					Short essay/Short answer/MCQs, Viva voce	
	8. Discuss how Succinyl choline acts as a neurotoxin on the principal of competitive inhibition					Short essay/Short answer/MCQs, Viva voce	

	9. Discuss application of Lineweaver-Burk plots in enzyme inhibition.						Short essay/Short answer/MCQs, Viva voce	
	10. Discuss variations of K_m and V_{max} in enzyme inhibition						Short essay/Short answer/MCQs, Viva voce	
BI 2.5	Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.	K	KH	Y	Lecture, Small group discussion		Written/Viva voce	Pathology, General Medicine
	Specific learning objectives:							
	1. Define diagnostic enzymology						Short essay/Short answer/MCQs, Viva voce	
	2. Describe alteration of enzymes in cardiac diseases (CKMB, LDH,SGOT)						Short essay/Short answer/MCQs, Viva voce	
	3. Describe the alteration of enzyme in muscle diseases(CKNAC, LDH,ENOLASE)						Short essay/Short answer/MCQs, Viva voce	
	4. Describe the alteration of enzyme in Pancreatic diseases(Amylase and lipase)						Short essay/Short answer/MCQs, Viva voce	
	5. Describe the alteration of enzyme in liver diseases(SGPT,SGOT,GGT,5-Nucleotidase)						Short essay/Short answer/MCQs, Viva voce	
	6. Discuss the use of organophosphorous compounds on acetyl choline esterase activity						Short essay/Short answer/MCQs, Viva voce	
BI 2.6	Discuss use of enzymes in laboratory investigations (Enzyme-based assays)	K	KH	Y	Lecture, Small group discussion		Written/ Viva voce	Pathology, General Medicine
	Specific learning objectives:							
	1. Discuss the use of Glucose oxidase in estimating blood glucose						Short essay/Short answer/MCQs, Viva voce	

	2. Discuss the use of cholesterol oxidase in estimating cholesterol					Short essay/Short answer/MCQs, Viva voce	
	3. Discuss the use of urease in estimating blood urea levels					Short essay/Short answer/MCQs, Viva voce	
	4. Discuss the use of uricase in estimating serum uric acid level					Short essay/Short answer/MCQs, Viva voce	
	5. Discuss the use of SGOT and SGPT in diagnostics					Short essay/Short answer/MCQs, Viva voce	
	6. Discuss the use of LDH in diagnostics					Short essay/Short answer/MCQs, Viva voce	
	7. Use of enzymes in diagnostics – clinical enzymology					Short essay/Short answer/MCQs, Viva voce	
BI 2.7	Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.	K	KH	Y	Lecture, Small group discussion, DOAP, sessions	Written/ Viva voce	Pathology, General Medicine
	Specific learning objectives:						
	1. Enumerate the normal values of various enzymes in serum					Short essay/Short answer/MCQs, Viva voce	
	2. Elicit the enzyme markers in cardiac disease, liver disease, muscle disorders, pancreatic disorders, bone disorders, brain disorders					Short essay/Short answer/MCQs, Viva voce	
Topic: Chemistry and Metabolism of Carbohydrates		Number of competencies: (10)			Number of procedures that require certification: (NIL)		
BI 3.1	Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	

	Specific learning objectives:							
	1. Define Carbohydrates. Enumerate the biological importance of carbohydrates							Short essay/Short answer/MCQs Viva voce
	2. Classify Monosaccharides with examples							Short essay/Short answer/MCQs Viva voce
	3. Define disaccharides with examples							Short essay/Short answer/MCQs Viva voce
	4. Classify polysaccharides with examples							Short essay/Short answer/MCQs Viva voce
	5. Discuss & differentiate starch & glycogen based on their structure and function							Short essay/Short answer/MCQs Viva voce
	6. Discuss the structure-function relationship of glycosaminoglycans and its tissue distribution							Short essay/Short answer/MCQs Viva voce
	7. Explain the clinical significance of heteropolysaccharides							Short essay/Short answer/MCQs Viva voce

BI 3.2	Describe the processes involved in digestion and assimilation of carbohydrates and storage.	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives: 1. Describe the process of digestion absorption of carbohydrates 2. Discuss about the disorders involved in digestion and absorption of carbohydrates					Short essay/Short answer/MCQs Viva voce Short essay/Short answer/MCQs Viva voce	
BI 3.3	Describe and discuss the digestion and assimilation of carbohydrates from food.	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	
	Specific learning objectives:						
	1. Explain why ingested disaccharides and polysaccharides must be broken down into monosaccharides and describe how this is accomplished					Short essay/Short answer/MCQs Viva voce	
	2. Explain the mechanism of absorption of glucose with a diagram					Short essay/Short answer/MCQs Viva voce	
	3. Draw a diagram of how glucose is transported across intestinal epithelial cells and into the bloodstream and describe the glucose transporters involved					Short essay/Short answer/MCQs Viva voce	
	4. Describe the role of glucose transporters (GLUTs) in the transport of glucose into and out of cells, and tissue specific differences in the expression and regulation of GLUTs					Short essay/Short answer/MCQs Viva voce	

	5. Explain the biochemical basis for the symptoms seen in lactose intolerance						Short essay/Short answer/MCQs Viva voce		
BI 3.4	Define and differentiate the pathways of carbohydrate metabolism, (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt). Specific learning objectives:	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	General Medicine		
	1. Describe the steps, energetics and regulation of glycolysis, Gluconeogenesis, Glycogen metabolism and HMP pathway.					Long essay, Short essay/ Short answer/ MCQs, viva voce			
	2. Describe the Clinical importance of glycolysis, Gluconeogenesis, Glycogen metabolism and HMP pathway					Long essay, Short essay/ Short answer/ MCQs, viva voce			
	3. Describe the roles of hexokinase/glucokinase, phosphofructokinase-1 (PFK-1), and pyruvate kinase in glycolysis and predict the biochemical and potential clinical consequences in deficiencies of these enzymes					Short essay/ Short answer/ MCQs, viva voce			
BI 3.5	Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders. Specific learning objectives:	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	General Medicine		
	1. Discuss the regulation of glycolysis, gluconeogenesis, glycogen					Short essay/ Short answer/ MCQs			

	2. Interpret the lab investigations done in Glycogen storage disorders, Galactosemia, Glucose-6-Phosphate dehydrogenase deficiency, Essential Fructosuria, Hereditary fructose intolerance	K	KH	Y	Lecture, Small group discussion	Short essay/Short answer/MCQs Viva voce	General Medicine	
BI 3.9	Discuss the mechanism and significance of blood glucose regulation in health and disease.							
	Specific learning objectives:							
	1. Discuss the physiological factors and the mechanisms involved in the blood glucose regulation					Long essay, Short essay/Short answer/MCQs Viva voce		
	2. Discuss the hormonal regulation of blood glucose					Long essay, Short essay/Short answer/MCQs Viva voce		
	3. Explain the derangements in blood glucose regulations in abnormal conditions of diabetes mellitus and starvation					Long essay, Short essay/Short answer/MCQs Viva voce		
	4. Explain the importance of blood glucose regulation in normal healthy individual in well fed, overnight fasting and during exercise states					Long essay, Short essay/Short answer/MCQs Viva voce		
	5. Define Diabetes Mellitus. Discuss the types, metabolic					Short essay/Short answer/MCQs		

	derangements , clinical features complications of diabetes mellitus						Viva voce		
	6. Describe the biochemical basis of acute and chronic complications of diabetes mellitus.						Short essay/Short answer/MCQs Viva voce		
BI 3.10	Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism.	K	KH	Y	Lecture, Small group discussion		Written/Viva voce	General Medicine	
	Specific learning objectives:								
	1. State the normal serum levels of glucose in fasting, postprandial and random conditions						Short essay/Short answer/MCQs Viva voce		
	2. Interpret the blood glucose levels as hyperglycemia or hypoglycemia against normal biological reference intervals						Short essay/Short answer/MCQs Viva voce		
	3. List the lab investigations done in diabetes						Short essay/Short answer/MCQs Viva voce		
	4. Mention the principle of Urine Dipstix						Short essay/Short answer/MCQs Viva voce		
	5. Mention the principle of estimation of capillary blood glucose using glucometer						Short essay/Short answer/MCQs Viva voce		
	6. Describe the indications, procedure of Oral Glucose tolerance test and interpretation						Short essay/Short answer/MCQs Viva voce		

	of GTT charts												
	7. Describe the importance of Glycated haemoglobin and its role in monitoring the blood glucose levels											Short essay/Short answer/MCQs Viva voce	
Topic: Chemistry and Metabolism of Lipids													
Number of competencies: (07)													
Number of procedures that require certification: (NIL)													
BI 4.1	Describe and discuss main classes of lipids (Essential/non-essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.	K	KH	Y	Lecture, Small group discussion	Written/Viva voce	General Medicine						
	Specific learning objectives												
	1. Classify lipids based on functions- Structural lipids, storage lipids and derived lipids (cholesterol, hormones)											Short essay/Short answer/MCQs, Viva voce	
	2. Describe the general structure, classification, nomenclature (n-3 and n-6) and dietary sources of lipids: saturated, unsaturated, monosaturated, polyunsaturated fatty acid; cis and trans fatty acids; triglycerides; essential vs non-essential fatty acids?											Short essay/Short answer/MCQs, Viva voce	
	3. Discuss how the structure of fatty acids influences physical (melting temperature) and chemical											Short essay/Short answer/MCQs, Viva voce	

	2. Explain the role of bile acid in lipid digestion						Short essay/Short answer/MCOs, Viva voce	
	3. Explain the importance of lipoproteins in lipid absorption and transport						Short essay/Short answer/MCOs, Viva voce	
	4. Discuss the role of lipoprotein lipases in triglyceride metabolism						Short essay/Short answer/MCOs, Viva voce	

BI 4.3	Explain the regulation of lipoprotein metabolism & associated disorders.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	Specific learning objectives						
	1. Explain the functions of different lipoproteins (chylomicrons, VLDL, LDL, HDL, IDL) in lipid metabolism					Short essay/Short answer/MCOs, Viva voce	
	2. Explain the role of lipoproteins in disorders associated with cholesterol and triglyceride metabolism					Short essay/Short answer/MCOs, Viva voce	
BI 4.4	Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	Specific learning objectives						
	1. Describe the structure and characteristic features of various lipoproteins (VLDL, IDL, LDL, HDL).					Short essay/Short answer/MCOs, Viva voce	

	2. Explain the inter-play of lipoproteins in transport of cholesterol from liver to muscle to peripheral organs and vice versa						Short essay/Short answer/MCQs, Viva voce	
	3. Explain pathogenesis of atherosclerosis.						Long essay, Short essay/Short answer/MCQs, Viva voce	
	4. Discuss the role of LDL and HDL in vascular injury and in atherosclerosis.						Short essay/Short answer/MCQs, Viva voce	
	5. Explain environmental risk factors associated with atherosclerosis.						Short essay/Short answer/MCQs, Viva voce	
BI 4.5	Interpret laboratory results of analytes	K	KH	Y		Lecture, Small group discussion	Written/ Viva voce	General Medicine
BI 4.7	associated with metabolism of lipids							
	Specific learning objectives							
	1. Explain normal and abnormal lipid profile (levels of cholesterol, triglycerides, LDL, HDL and VLDL) in human subjects.						Short essay/Short answer/MCQs, Viva voce	
	2. Explain the cardiovascular disease risk associated with higher levels of LDL and low levels of HDL						Short essay/Short answer/MCQs, Viva voce	
	3. List the normal values of analytes of lipid metabolism in blood						Short essay/Short answer/MCQs, Viva voce	
	4. Discuss how the normal values of analytes vary during disease manifestation						Short essay/Short answer/MCQs, Viva voce	

	5. Discuss which organ might have effected due to lipid metabolism associated disorders						Short essay/Short answer/MCQs, Viva voce	
	6. List the possible treatment options available for treating the identified disorder						Short essay/Short answer/MCQs, Viva voce	
BI 4.6	Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis.	K	KH	Y	Lecture, Small group discussion		Written/ Viva voce	General Medicine
	Specific learning objectives							
	1. Describe the function of prostaglandins in regulation of inflammation						Short essay/Short answer/MCQs, Viva voce	
	2. Explain the therapeutic use of prostaglandins in human reproduction						Short essay/Short answer/MCQs, Viva voce	
	3. Explain the role of eicosanoids in vasodilation and ronchoconstriction						Short essay/Short answer/MCQs, Viva voce	
	4. Discuss the therapeutic use for eicosanoid inhibitors for treatment of asthma and cardiovascular disease.						Short essay/Short answer/MCQs, Viva voce	
Topic: Chemistry and Metabolism of Proteins								
		Number of competencies: (05)			Number of procedures that require certification: (NIL)			
BI 5.1	Describe and discuss structural organization of proteins.	K	KH	Y	Lecture, Small group discussion		Written/ Viva voce	
	Specific learning objectives							

	1. Describe peptide bond and its role in protein formation							Short essay/Short answer/MCQs, Viva voce		
	2. Describe process of denaturation and its application							Short essay/Short answer/MCQs, Viva voce		
	3. Discuss the differences among primary, secondary, tertiary and quaternary structures of proteins							Short essay/Short answer/MCQs, Viva voce		
	4. Discuss the differences between multi-enzyme complexes and multifunctional enzymes							Short essay/Short answer/MCQs, Viva voce		
	5. Describe about proteoglycans and glycoproteins							Short essay/Short answer/MCQs, Viva voce		
	6. List method to determine primary, secondary, tertiary and quaternary structure` of protein							Short essay/Short answer/MCQs, Viva voce		
BI 5.2	Describe and discuss functions of proteins and structure-function relationships in relevant areas eg, hemoglobin and selected hemoglobinopathies	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Pathology, General Medicine	Physiology		
	Specific learning objectives									
	1. Classify the proteins based on functions (Structural, Hormonal, Catalytic, Transport, etc)					Short essay/Short answer/MCQs, Viva voce				
	2. Discuss how structure influences the function of a protein					Short essay/Short answer/MCQs, Viva voce				
	3. Discuss how variations in amino acids (sequence/type) influence the					Short essay/Short answer/MCQs, Viva voce				

	function and subsequently the disease development and manifestations									
	4. Describe primary structure of insulin and how it influences the function of a protein.								Short essay/Short answer/MCQs, Viva voce	
	5. Describe structure of hemoglobin and how it influences the quaternary organization of protein.								Short essay/Short answer/MCQs, Viva voce	
BI 5.3	Describe the digestion and absorption of dietary proteins.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Pediatrics			
	Specific learning objectives									
	1. Describe how the digestion process occur in the human gastrointestinal tract					Short essay/Short answer/MCQs, Viva voce				
	2. Enumerate the various proteolytic enzymes involved in the digestion of proteins					Short essay/Short answer/MCQs, Viva voce				
	3. Describe the absorption of digested amino acids in to the cells					Short essay/Short answer/MCQs, Viva voce				
	4. Discuss how the absorbed amino acids get transported in the circulatory system					Short essay/Short answer/MCQs, Viva voce				
	5. Discuss different disorders (such as Hartnup's Syndrome, Cystinuria etc) associated with the digestion and					Short essay/Short answer/MCQs, Viva voce				

	absorption of proteins and amino acids respectively												
	6. Discuss how to treat diseases associated with protein digestion and absorption												
BI 5.4	Describe common disorders associated with protein metabolism.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Pediatrics						
	Specific learning objectives												
	1. Discuss the metabolic processes and pathways that degrade proteins and amino acids					Long essay, Short essay/Short answer/MCQs, Viva voce							
	2. Enumerate the role of various organs (such as liver, kidney etc) in protein and amino acid metabolism					Short essay/Short answer/MCQs, Viva voce							
	3. Discuss how the urea cycle operates in body and its significance					Short essay/Short answer/MCQs, Viva voce							
	4. Discuss the disorders of protein metabolism such as Albinism, Tyrosinosis, Tyrosinemia, Phenylketonuria, Alkaptonuria, Maple Syrup Urine Disease, Hartnup's Disease, Glycinuria, Primary Hyperoxaluria, Cystinuria, Cystinosis, Homocystinuria, Histidinemia and Hypervalinemia					Short essay/Short answer/MCQs, Viva voce							
	5. Enumerate the various treatment options available for treating protein metabolism associated					Short essay/Short answer/MCQs, Viva voce							

	disorders												
BI 5.5	Interpret laboratory results of analytes associated with metabolism of proteins.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine						
	Specific learning objectives												
	1. Enumerate normal reference interval of blood urea and its importance in interpretation of kidney disease.					Short essay/Short answer/MCQs, Viva voce							
	2. Enumerate screening tests for PKU and their significance including Guthrie test and ferric chloride test.					Short essay/Short answer/MCQs, Viva voce							
	3. Metabolism of homocysteine and its clinical importance					Short essay/Short answer/MCQs, Viva voce							
	4. Metabolism of dopamine, norepinephrine, epinephrine and significance of VMA in interpretation of Pheochromocytoma.					Short essay/Short answer/MCQs, Viva voce							
	5. List Biological Reference range of serum total protein, albumin, total globulin, C reactive protein and enumerate the causes of their increased and decreased levels.					Short essay/Short answer/MCQs, Viva voce							

Topic: Metabolism and homeostasis

Number of competencies: (15)

Number of procedures that require certification: (NIL)

BI 6.1	Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine	
	Specific learning objectives:							
	1. Describe the metabolic adaptation in the fed state.							
	2. Describe the metabolic adaptation in the fasting state.							
	3. Explain the effect of various endocrine factors on major metabolic pathways.							
4. Describe metabolic profile of brain, adipose tissue, skeletal muscle, cardiac muscle and liver during well fed state and fasting.								
BI 6.2	Describe and discuss the metabolic processes in which nucleotides are involved.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
	Specific learning objectives:							
	1. Enumerate the de novo pathways of purine and pyrimidine nucleotide synthesis with respect to (a) precursors, (b) energy cost, (c) acquisition of the ribose moiety, and (d) number of enzymatic steps.					Long essay, Short essay/Short answer/MCQs Viva voce		
	2. Describe the salvage pathways for purines and pyrimidines.					Long essay, Short essay/Short answer/MCQs		

	2. Mention the normal plasma uric acid level. List the causes of hypouricemia and hyperuricemia.							Short essay/Short answer/MCQs Viva voce		
	3. Enumerate the inborn errors of purine nucleotide catabolism, causing immunodeficiency.							Short essay/Short answer/MCQs Viva voce		
	4. Describe the causes and features of orotic aciduria							Short essay/Short answer/MCQs Viva voce		
	5. Describe an inherited disorder caused by deficiency of a purine salvage enzyme.							Short essay/Short answer/MCQs Viva voce		
BI 6.4	Discuss the laboratory results of analytes associated with gout & LeschNyhan syndrome. Specific learning objectives:	K	KH	Y		Lecture, Small group discussion		Written/ Viva voce	General Medicine	
	1. Describe the reaction involved in the formation of deoxythymidylate from deoxyuridylate. Name two inhibitors blocking this reaction.							Short essay/Short answer/MCQs Viva voce		
	2. Describe the clinical features and laboratory investigations associated with gout and Lesch Nyhan syndrome.							Short essay/Short answer/MCQs Viva voce		
	3. Define Hyperuricemia and enumerate its causes.							Short essay/Short answer/MCQs Viva voce		
BI 6.5	Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency	K	KH	Y		Lecture, Small group		Written/ Viva voce	General Medicine	

	Specific learning objectives:		discussion			
	1. Describe the chemistry, sources, daily requirement, absorption and functions of all fat soluble vitamins.			Short essay/Short answer/MCQs Viva voce		
	2. Describe the visual cycle.			Short essay/Short answer/MCQs Viva voce		
	3. Mention the differences between vitamin A and carotenes.			Short essay/Short answer/MCQs Viva voce		
	4. Describe the conversion of vitamin D to its active form.			Short essay/Short answer/MCQs Viva voce		
	5. Describe the causes and features of vitamin D deficiency.			Short essay/Short answer/MCQs Viva voce		
	6. Describe the causes and features of vitamin E deficiency.			Short essay/Short answer/MCQs Viva voce		
	7. Elicit the action of dicumarol.			Short essay/Short answer/MCQs Viva voce		
	8. Describe the sources, daily requirements, functions and deficiency manifestations of all water soluble vitamins.			Short essay/Short answer/MCQs Viva voce		
	9. Describe the biochemical findings in thiamin deficiency.			Short essay/Short answer/MCQs Viva voce		
	10. List two inborn errors that are responsive to high doses of			Short essay/Short answer/MCQs		

	thiamin.							Viva voce	
	11. Describe the role of riboflavin in carbohydrate metabolism.							Short essay/Short answer/MCQs Viva voce	
	12. Describe the biochemical findings in riboflavin deficiency.							Short essay/Short answer/MCQs Viva voce	
	13. Elicit the biomedical importance of avidin.							Short essay/Short answer/MCQs Viva voce	
	14. Describe the biochemical role of folic acid in one carbon metabolism.							Short essay/Short answer/MCQs Viva voce	
	15. Describe the role of folic acid in amino acid metabolism.							Long essay, Short essay/Short answer/MCQs Viva voce	
	16. Describe the reactions requiring vitamin B12.							Short essay/Short answer/MCQs Viva voce	
	17. Describe the inter-relationship between vitamin B12 and folic acid.							Short essay/Short answer/MCQs Viva voce	
	18. Describe folate trap and mention its significance.							Short essay/Short answer/MCQs Viva voce	
	19. Describe sources, daily requirements, functions and deficiency manifestations of ascorbic acid.							Short essay/Short answer/MCQs Viva voce	

	20. Discuss why does vitamin C deficiency cause delayed wound healing and anemia.	K	KH	Y	Lecture, Small group discussion	Short essay/Short answer/MCQs Viva voce		
BI 6.6	Describe the biochemical processes involved in generation of energy in cells. Specific learning objectives:					Written/ Viva voce		
	1. Define high energy compounds.					Viva voce		
	2. List the high energy compounds and describe their biomedical importance.					Short essay/Short answer/MCQs Viva voce		
	3. Describe ATP-ADP cycle.					Short essay/Short answer/MCQs Viva voce		
	4. Explain substrate level phosphorylation?					Long essay, Short essay/Short answer/MCQs Viva voce		
	5. Define free energy change and describe its significance.					Short essay/Short answer/MCQs Viva voce		
	6. Describe electron transport and list the inhibitors of electron transport.					Long essay, Short essay/Short answer/MCQs Viva voce		
	7. Describe the sites, mechanisms and inhibitors of oxidative phosphorylation.					Long essay,Short essay/Short answer/MCQs Viva voce		
	8. Define uncouplers and list them.				Lecture, Small group	Short essay/Short answer/MCQs Viva voce		

		K	KH	Y	discussion	Written/ Viva voce	General Medicine	Physiology
BI 6.7	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these. Specific learning objectives:				Lecture, Small group discussion			
	1. Describe the buffer systems in body and their significance.					Short essay/Short answer/MCQs Viva voce		
	2. Describe the regulation of acid base balance.					Long essay, Short essay/Short answer/MCQs Viva voce		
	3. Describe the disorders of acid-base balance.					Short essay/Short answer/MCQs Viva voce		
	4. Describe the causes and biochemical findings in acidosis and alkalosis.					Short essay/Short answer/MCQs Viva voce		
	5. Describe the normal water balance and its regulation.					Short essay/Short answer/MCQs Viva voce		
	6. Describe the disorders of water balance.					Short essay/Short answer/MCQs Viva voce		
	7. Describe the major electrolyte composition of extracellular and intracellular fluid.					Short essay/Short answer/MCQs Viva voce		
	8. List the factors affecting ADH release.					Short essay/Short answer/MCQs		

BI 6.9	Describe the functions of various minerals in the body, their metabolism and homeostasis. Specific learning objectives:	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine	Physiology
	1. Describe metabolism of copper and zinc. Discuss metabolic importance of ceruloplasmin.					Short essay/Short answer/MCQs Viva voce		
	2. Describe intestinal absorption of iron and various factors involved in its regulation.					Short essay/Short answer/MCQs Viva voce		
	3. Describe the functions of calcium and the regulation.					Short essay/Short answer/MCQs Viva voce		
	4. Describe the functions of all trace elements.					Short essay/Short answer/MCQs Viva voce		
BI 6.10	Enumerate and describe the disorders associated with mineral metabolism. Specific learning objectives:	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine	
	1. Discuss biochemical significance and disease states associated with trace elements.					Short essay/Short answer/MCQs Viva voce		
	2. Differentiate between hemosiderosis and hemochromatosis.					Short essay/Short answer/MCQs Viva voce		
	3. Describe the disorders of copper metabolism.					Short essay/Short answer/MCQs Viva voce		
	4. List the causes and clinical features of hypercalcemia and					Short essay/Short answer/MCQs		

	hypocalcemia.												
	5. List the clinical features and laboratory finding in iron deficiency anemia.												
BI 6.11	Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism. Specific learning objectives:	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	Pathology, General Medicine	Physiology					
	1. Describe biosynthesis and regulation of heme.					Short essay/Short answer/MCQs Viva voce							
	2. Describe the formation and excretion of bilirubin. Explain the changes in serum bilirubin in different types of jaundice.					Long essay, Short essay/Short answer/MCQs Viva voce							
	3. Describe the liver function tests in different types of jaundice.					Short essay/Short answer/MCQs Viva voce							
	4. Describe the defect in different types of popyrias. Mention the major clinical features in these disorders.					Short essay/Short answer/MCQs Viva voce							
	5. Explain enterohepatic circulation.					Short essay/Short answer/MCQs Viva voce							
	6. Elicit the normal serum level of bilirubin.												
	7. Explain physiological jaundice and kernicterus.					Short essay/Short answer/MCQs Viva voce							

Topic: Molecular biology		Number of competencies: (07)			Number of procedures that require certification: (NIL)		
BI 7.1	Describe the structure and functions of DNA and RNA and outline the cell cycle.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	Specific learning objectives:						
	1. Describe biochemistry of cell cycle					Short answer/MCQs, Viva voce	
	2. Describe the Watson-Crick model of DNA structure and list the functions of DNA					Long essay /MCQs, Viva voce	
	3. Discuss the higher organisation of DNA					Short answer/Viva voce	
	4. Describe the structure and function of different types of RNA					Short answer/MCQs, Viva voce	
	5. Discuss DNA is the store house of genetic information					Short answer/MCQs, Viva voce	
	6. Differentiate between DNA and RNA					Short answer/MCQs, Viva voce	
	7. Discuss the central dogma of molecular biology					Short answer/MCQs, Viva voce	
BI 7.2	Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	
	Specific learning objectives:						
	1. Describe the different steps involved in DNA replication mechanism in prokaryotes					Long essay /MCQs, Viva voce	
	2. Differentiate between prokaryotic and eukaryotic DNA replication mechanism					Long essay /MCQs, Viva voce	

	15. Describe the post translational modifications							Long essay/MCQs, Viva voce	
	16. Differentiate between eukaryotic and prokaryotic translation mechanism							Short answer/MCQs, Viva voce	
	17. List the inhibitors of translation and their clinical importance							Short answer/MCQs, Viva voce	
BI 7.3	Describe gene mutations and basic mechanism of regulation of gene expression.	K	KH	Y		Lecture, Small group discussion		Written/ Viva voce	Pediatrics
	Specific learning objectives:								
	1. Define mutation and classify them with examples							Short answer/MCQs, Viva voce	
	2. Enumerate the effects and manifestation of mutations							Short answer/MCQs, Viva voce	
	3. Enumerate the different types of protein motifs for DNA- protein interactions							Short answer/MCQs, Viva voce	
	4. Describe the lac operon and tryptophan operon concept for regulation of gene expression in prokaryotes							Short answer/MCQs, Viva voce	
	5. Describe the regulation of gene expression in eukaryotes							Short answer/MCQs, Viva voce	
BI 7.4	Describe applications of molecular technologies like recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis.	K	KH	Y		Lecture, Small group discussion		Written/ Viva voce	Pediatrics, General Medicine

	Specific learning objectives:								
	1. Describe the steps of recombinant DNA technology							Short answer/MCQs, Viva voce	
	2. Enumerate the enzymes used in recombinant DNA technology							Short answer/MCQs, Viva voce	
	3. Enumerate the vectors used in recombinant DNA technology							Short answer/MCQs, Viva voce	
	4. Discuss about gene cloning and their application in medicine							Short answer/MCQs, Viva voce	
	5. Enumerate the applications of recombinant DNA technology							Short answer/MCQs, Viva voce	
	6. Discuss about gene therapy							Short answer/MCQs, Viva voce	
	7. Discuss about transgenic animal							Short answer/MCQs, Viva voce	
	8. Describe the steps involved in PCR, types and their clinical application							Long essay/MCQs, Viva voce	
	9. Discuss about blotting techniques and their application in molecular medicine							Short answer/MCQs, Viva voce	
	10. Describe hybridoma technology and their application in molecular medicine							Short answer/MCQs, Viva voce	
	11. Discuss about the different types of DNA sequencing methods and their applications							Short essay/MCQs, Viva voce	

BI 7.5	Describe the role of xenobiotics in disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
	Specific learning objectives:							
	1. Define xenobiotics with examples					Short essay/MCQs, Viva voce		
	2. Define detoxification and describe the phases in metabolism of xenobiotics					Short essay/MCQs, Viva voce		
	3. Enumerate the role of cytochrome P 450 enzyme system					Short essay/MCQs, Viva voce		
	4. Discuss detoxification of endogenous and exogenous substance by conjugation with examples					Short essay/MCQs, Viva voce		
BI 7.6	Describe the anti-oxidant defence systems in the body.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
	Specific learning objectives:							
	1. Enumerate the different types of antioxidants with examples					Short essay/MCQs, Viva voce		
	2. Discuss about antioxidant enzymes					Short essay/MCQs, Viva voce		
	3. Enumerate the role of vitamins as antioxidants					Short essay/MCQs, Viva voce		
BI 7.7	Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine, Pathology	
	Specific learning objectives:							

	1. List the sources and generation of reactive oxygen species	Short essay/MCOs, Viva voce					
	2. Discuss the causes for oxidative stress	Short essay/MCOs, Viva voce					
	3. Discuss about free radical scavenger system	Short essay/MCOs, Viva voce					
	4. Discuss about the effect of reactive oxygen species on protein, carbohydrates, lipids and on DNA	Short essay/MCOs, Viva voce					
	5. Describe lipid peroxidation	Short essay/MCOs, Viva voce					
	6. Describe the role of ROS in cancer development and progression	Short essay/MCOs, Viva voce					
	7. Discuss the complications of diabetes mellitus due to oxidative stress	Short essay/MCOs, Viva voce					
	8. Discuss the role of oxidative stress in atherosclerosis	Short essay/MCOs, Viva voce					

Topic: Nutrition		Number of competencies: (05)	Number of procedures that require certification: (NIL)				
BI 8.1	Discuss the importance of various dietary components and explain importance of dietary fibre.	K	KH	Y	Lecture, small group discussion	Written/ Viva voce	General Medicine, Pediatrics, Pathology
	Specific learning objectives						
	1. List the important dietary components of food					Short essay	

	12. Define nitrogen balance and enumerate their types						Short essay/Short answer/MCQs, Viva voce	
	13. Enumerate the factors affecting nitrogen balance						Short essay/Short answer/MCQs, Viva voce	
	14. List the indices used to assess the nutritional value of protein and add a note on amino acid score						Short essay/Short answer/MCQs, Viva voce	
	15. Discuss about limiting amino acid and mutual supplementation						Short essay/Short answer/MCQs, Viva voce	
BI 8.2	Describe the types and causes of protein energy malnutrition and its effects.	K	KH	Y	Written/ Viva voce			General Medicine, Pediatrics, Pathology
	Specific learning objectives							
	1. Classify protein energy malnutrition						Short essay/Short answer/MCQs, Viva voce	
	2. Enumerate the causes for protein energy malnutrition						Short essay/Short answer/MCQs, Viva voce	
	3. Describe aetiology, clinical features, investigation and treatment of kwashiorkor and add a note on biochemical mechanism underlying the disease						Short essay/Short answer/MCQs, Viva voce	
	4. Describe aetiology, clinical features, investigation and treatment of marasmus and add a note on biochemical mechanism underlying the disease						Short essay/Short answer	

	5. Differentiate between kwashiorkor and marasmus						Short essay/Short answer	
	6. Discuss Marasmic Kwashiorkor and its sequelae						Short essay/Short answer/MCQs, Viva voce	
	7. Discuss about treatment of protein energy malnutrition						Short essay/Short answer/MCQs, Viva voce	
	8. Define and list the causes of cachexia due to diseases						Short essay/Short answer/MCQs, Viva voce	
BI 8.3	Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.	K	KH	Y		Written/ Viva voce		General Medicine
	Specific learning objectives							
	1. Define respiratory quotient and list the RQ of carbohydrate, fat, protein and mixed diet.						Short essay/Short answer/MCQs, Viva voce	
	2. Define Basal Metabolic Rate, list the factors affecting BMR, different types of measurements of BMR and normal value of BMR						Short essay/Short answer/MCQs, Viva voce	
	3. Describe Specific Dynamic Action (SDA)						Short essay/Short answer/MCQs, Viva voce	
	4. List the different types of physical activity and add a note on energy requirement of different physical activity						Short essay/Short answer/MCQs, Viva voce	

	13. Discuss about total parenteral nutrition							Short essay/Short answer/MCQs, Viva voce		
BI 8.4	Describe the causes (including dietary habits), effects and health risks associated with being overweight/obesity.	K	KH	Y	Written/ Viva voce				General Medicine, Pathology	
	Specific learning objectives									
	1. Define obesity with respect to body mass index (BMI)							Short essay/Short answer/MCQs, Viva voce		
	2. List the causes for overweight and obesity including genetic causes for obesity							Short essay/Short answer/MCQs, Viva voce		
	3. Discuss about regulators of appetite							Short essay/Short answer/MCQs, Viva voce		
	4. Describe the different steps of prescribing the diet for overweight and obese individual and add a note on atkin's diet							Short essay/Short answer/MCQs, Viva voce		
	5. Enumerate the ill effects associated with overweight and obese							Short essay/Short answer/MCQs, Viva voce		
	6. Discuss the steps to be followed for prevention and treatment of overweight and obese							Short essay/Short answer/MCQs, Viva voce		
BI 8.5	Summarize the nutritional importance of commonly used items of food including fruits and vegetables.(macro-molecules & its importance)	K	KH	Y	Written/ Viva voce				Community Medicine, General Medicine, Pediatrics	

	3. Enumerate the functions of specialised proteins of ECM						Short essay/Short answer/MCQs, Viva voce	
	4. List the functions of proteoglycans						Short essay/Short answer/MCQs, Viva voce	
	5. Describe the salient features of collagen structure and its significance in collagen function						Short essay/Short answer/MCQs, Viva voce	
	6. Describe the role of vitamin C in collagen synthesis						Short essay/Short answer/MCQs, Viva voce	
	7. Describe the Post translation modifications of collagen						Short essay/Short answer/MCQs, Viva voce	
	8. List the Functions of Elastin, fibronectin and Laminin in detail						Short essay/Short answer/MCQs, Viva voce	
BI 9.2	Discuss the involvement of ECM components in health and disease.	K	KH	Y		Written/ Viva voce		General Medicine
	Specific learning objectives							
	1. Describe the role of Fibronectin in cell migration						Short essay/Short answer/MCQs, Viva voce	
	2. Indicate the major constituents of the basal lamina and describe how they interact to form that structure						Short essay/Short answer/MCQs, Viva voce	

	3. Describe the major structural features of laminin, including the types of binding sites of the protein.					Short essay/Short answer/MCQs, Viva voce	
	4. List the disorders associated with abnormal Elastin formation					Short essay/Short answer/MCQs, Viva voce	
	5. Describe the role of collagenase in tumor metastasis					Short essay/Short answer/MCQs, Viva voce	
	6. Mention the defect in Ehler's Danols syndrome and its clinical features					Short essay/Short answer/MCQs, Viva voce	
	7. Describe why consuming Lathyrus sativus (kesari dhal) causes weak bones and joint					Short essay/Short answer/MCQs, Viva voce	
	8. Mention the role of elastin in Scleroderma and Pulmonary Emphysema					Short essay/Short answer/MCQs, Viva voce	
	9. Define Osteogenesis Imperfecta with primary abnormality					Short essay/Short answer/MCQs, Viva voce	
BI 9.3	Describe protein targeting & sorting along with its associated disorders.	K	KH	N	Written/ Viva voce		
	Specific learning objectives						
	1. Discuss briefly the co-translational and post translational modification of proteins in endoplasmic reticulum resulting in sorting of proteins					Short essay/Short answer/MCQs, Viva voce	
	2. Discuss the mechanism involving signal sequences by which proteins are targeted to a specific destination					Short essay/Short answer/MCQs, Viva voce	
	3. Explain the role of Golgi apparatus in protein glycosylation and protein sorting					Short essay/Short answer/MCQs, Viva voce	

	4. Discuss the role of Chaperones and chaperonin system in protein folding						Short essay/Short answer/MCOs, Viva voce	
	5. State the disorders associated with defective protein targeting						Short essay/Short answer/MCOs, Viva voce	
	6. Discuss briefly the pathophysiology of Zellweger syndrome, Refsum's disease and I-cell disease						Short essay/Short answer/MCOs, Viva voce	

Topic: Oncogenesis and immunity		Number of competencies: (05)			Number of procedures that require certification: (NIL)		
BI 10.1	Describe the cancer initiation, promotion oncogenes & oncogene activation. Also focus on p53 & apoptosis	K	KH	Y	Lecture	Obstetrics & Gynaecology, General Surgery, Pathology	
	Specific learning objectives:						
	1. Discuss fundamental knowledge about what is cancer and difference between normal and cancerous cells.						Short essay/Short answer/MCOs, Viva voce
	2. Elicit the cell cycle and their checkpoints. Disruption of the cell cycle and their checkpoints during the development of cancer.						Short essay/Short answer/MCOs, Viva voce
	3. Discuss the hallmark features of cancer cells and the factors (Intrinsic and Extrinsic) causing the initiation and progression of cancer.						Short essay/Short answer/MCOs, Viva voce

	4. Discuss the genetics involved in particular the role of tumor suppressor and oncogenes in the progression of cancer.						Short essay/Short answer/MCOs, Viva voce	
	5. Discuss what is apoptosis, mechanism and its importance						Short essay/Short answer/MCOs, Viva voce	
BI 10.2	Describe various biochemical tumor markers and the biochemical basis of cancer therapy.	K	KH	Y	Lecture, Small group discussion		Written/ Viva voce	Obstetrics & Gynaecology, General Surgery, Pathology
	Specific learning objectives:							
	1. Describe what are tumor markers.						Short essay/Short answer/MCOs, Viva voce	
	2. Enumerate tumor markers expression and activity change with tumor progression.						Short essay/Short answer/MCOs, Viva voce	
	3. Discuss differences in biochemical pathways between normal and cancer cells.						Short essay/Short answer/MCOs, Viva voce	
	4. Define and differentiate Warburg effect, Pasteur effect and their role in tumor cells growth and development						Short essay/Short answer/MCOs, Viva voce	
	5. Discuss the principles and applications of various biochemical methods that can be used in measuring the expression and activity of tumor markers						Short essay/Short answer/MCOs, Viva voce	

	6. Discuss the differences between biomarker and therapeutic targets and understand whether the biomarker can also act as a therapeutic target	K	KH	Y	Lecture, Small group discussion	Short essay/Short answer/MCQs, Viva voce	Obstetrics & Gynaecology, General Surgery, Pathology	
B110.3	Describe the cellular and humoral components of the immune system & describe the types and structure of antibody					Written/ Viva voce		
	Specific learning objectives:							
	1. Explain basics about what is immunity and types of immunity.					Short essay/Short answer/MCQs, Viva voce		
	2. Define and list the components of Cellular and Humoral immunity.					Short essay/Short answer/MCQs, Viva voce		
	3. Enumerate the process of Hematopoiesis (lymphoid and myeloid progenitors) and the different cell types arising from hematopoiesis.					Short essay/Short answer/MCQs, Viva voce		
	4. Explain role of different cytokines in the activation of the humoral and cell based immune systems.					Short essay/Short answer/MCQs, Viva voce		
	5. Explain role of B cells, plasma cells and antibodies and their activation in humoral immunity.					Short essay/Short answer/MCQs, Viva voce		
	6. Enumerate role of T cells (T _H and T _C Cells), MHC molecules in the cell mediated immunity.					Short essay/Short answer/MCQs, Viva voce		

	7. Enumerate correlation between the humoral and cell mediated immune responses.					Short essay/Short answer/MCOs, Viva voce	
	8. Enumerate role of B cells in the production of antibodies.					Short essay/Short answer/MCOs, Viva voce	
	9. Enumerate structure and functions of an antibody.					Short essay/Short answer/MCOs, Viva voce	
	10. Enumerate antibody classes and their biological activities.					Short essay/Short answer/MCOs, Viva voce	
	11. Enumerate practical applications of antibodies in the detection and treatment of cancers.					Short essay/Short answer/MCOs, Viva voce	
BI 10.4	Describe & discuss innate and adaptive immune responses, self/non-self recognition and the central role of T-helper cells in immune responses.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine, Pathology
	Specific learning objectives:						
	1. Definitions of Innate and adaptive immune responses.					Short essay/Short answer/MCOs, Viva voce	
	2. Organs, tissues and cellular components of the innate and adaptive immune responses.					Short essay/Short answer/MCOs, Viva voce	
	3. Understanding the effectors of the innate and adaptive immune system during the state of infection.					Short essay/Short answer/MCOs, Viva voce	
	4. The correlation between the innate and adaptive immune responses at times of antigen invasion into the system.					Short essay/Short answer/MCOs, Viva voce	

	5. Knowledge about what are MHC molecules and their role in self and non-self recognition.							Short essay/Short answer/MCQs, Viva voce	
	6. T _H cells their origin through hematopoiesis, cytokines and other factors involved in the activation of the T _H cells.							Short essay/Short answer/MCQs, Viva voce	
	7. Responses involving T _H cells in immune responses.							Short essay/Short answer/MCQs, Viva voce	
	8. Understand autoimmune disorders							Short essay/Short answer/MCQs, Viva voce	
B110.5	Describe antigens and concepts involved in vaccine development.	K	KH	Y		Lecture, Small group discussion	Written/ Viva voce		Pathology, Pediatrics, Microbiology
	Specific learning objectives:								
	1. Define antigens. Differentiate between antigenicity and immunogenicity.						Short essay/Short answer/MCQs, Viva voce		
	2. Discuss the nature of the immunogen (antigen) contributing to the immunogenicity.						Short essay/Short answer/MCQs, Viva voce		
	3. Describe the terms like immunogen, antigen, epitope, hapten, adjuvant etc.						Short essay/Short answer/MCQs, Viva voce		
	4. Dose and route of administration of an immunogen (antigen).						Short essay/Short answer/MCQs, Viva voce		
	5. Define vaccines, different types of vaccines, Beneficial and adverse effects of vaccines.						Short essay/Short answer/MCQs, Viva voce		

	6. Discuss the practical difficulties faced while developing vaccines and ways to overcome the same.					Short essay/Short answer/MCOs, Viva voce	
	7. Describe the techniques involved in monoclonal and polyclonal antibodies					Short essay/Short answer/MCOs, Viva voce	
	8. Describe the techniques implemented in the production of monoclonal antibodies.					Short essay/Short answer/MCOs, Viva voce	
	9. Describe hybridoma technology					Short essay/Short answer/MCOs, Viva voce	

Topic: Biochemical Laboratory Tests		Number of competencies: (24)			Number of procedures that require certification: (05)				
Number	COMPETENCY The student should be able to	Domain K/S/A/ C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical integrati on	Horizontal Integration
BI11.1	Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal.	K	KH	Y	Lecture, Small group discussion	Viva voce			
	Specific learning objectives:								
	1. Enumerate the commonly used glass wares, apparatus and equipments in the Biochemistry laboratory								
	2. Enumerate the commonly used reagents in Biochemistry laboratory								

	5. List the various methods used to estimate pH in the Biochemistry Laboratory.									
	6. Differentiate between the acidic, neutral and alkaline pH of the various solvents used in the Biochemistry Laboratory									
BI 11.3	Describe the chemical components of normal urine.	K	KH	Y	Lecture, Small group discussion	Viva voce				
	Specific learning objectives:									
	1. List the Organic and Inorganic constituents of Normal Urine.									
	2. Enumerate the normal levels of excretion of various organic and inorganic constituents.									
	3. Describe the physical characteristics of Normal Urine.									
	4. Mention the clinical significance of each of these constituents when excreted in abnormal quantities.									
	5. List the names of the biochemical tests used to identify the various organic and inorganic constituents.									

BI11.4	Perform urine analysis to estimate and determine normal and abnormal constituents	S	P	Y	DOAP	Skill assessment	1	General Medicine	Physiology
	Specific learning objectives:								
	1. Differentiate between Normal and Abnormal Urine by appreciating the physical characteristics of a given sample.				Small group discussion	Viva voce			
	2. List the Normal and Abnormal constituents of Urine and the qualitative tests used to identify them.				Small group discussion	Viva voce			
	3. Identify and name the instrument used to determine the specific gravity of urine.				Small group discussion	Viva voce			
	4. Perform independently the biochemical tests to detect the Normal and Abnormal constituents of urine.				Practical	Viva voce			
	5. Record the findings and interpret the results based on the positive or negative tests in a given urine sample.				Practical	Viva voce			

	1. Define Colorimetry.																			
	2. Enumerate the parts of the colorimeter.																			
	3. Discuss the principle of Colorimetry / Beer – Lambert's Law.																			
	4. Differentiate a Colorimeter and a Spectrophotometer.																			
	5. List the uses of a colorimeter																			
BI11.7	Demonstrate the estimation of serum creatinine and creatinine clearance	S	P	Y		Practical														
	Specific learning objectives:																			
	1. Describe the synthesis of creatinine within the human body.																			
	2. Enumerate the methodology used for estimation of serum and urine creatinine and mention the normal values.																			
	3. List the normal levels of serum and urine creatinine.																			
	4. Define Clearance.																			

	5. Enumerate the different types of clearance.					Lecture, Small group discussion	Short essay/Viva voce		
	6. Describe the procedure for estimation of creatinine clearance and mention the normal value for males and females.					Practical, Small group discussion	Viva voce		
BI 11.8	Demonstrate estimation of serum proteins, albumin and A:G ratio Specific learning objectives:	S	P	Y		Practical	Skills assessment	1	
	1. Enumerate the methodology used for estimation of serum proteins and albumin and mention the normal values.						Viva voce		
	2. Discuss the principle of estimation of protein and albumin.						Viva voce		
	3. Describe the importance of A:G ratio in health and disease.						Viva voce		
	4. Differentiate between Microalbuminuria and Macroalbuminuria.						Viva voce		
BI 11.9	Demonstrate the estimation of serum total cholesterol and HDL- cholesterol Specific learning objectives:	S	P	Y		Practical	Skills assessment		

	1. Enumerate the methodology used for estimation of serum cholesterol and HDL cholesterol.				Practical, Small group discussion	Viva voce			
	2. Discuss the principle of estimation of serum total cholesterol and HDL cholesterol.				Practical, Small group discussion	Viva voce			
	3. Enumerate the normal levels of Total Cholesterol, HDL cholesterol, LDL cholesterol and VLDL cholesterol according to the NCEP ATP III guidelines.				Practical, Small group discussion	Viva voce			
	4. Discuss the clinical significance of Hyper and Hypocholesterolemia.				Small group discussion	Viva voce			
BI 11.10	Demonstrate the estimation of triglycerides	S	P	Y	Practical	Skills assessment			
	Specific learning objectives:								
	1. Enumerate the methodology used for estimation of serum triglycerides.				Practical, Small group discussion	Viva voce			
	2. Discuss the principle of estimation of serum triglycerides.				Small group discussion	Viva voce			

	3. Enumerate the normal levels of Triglycerides according to the NCEP ATP III guidelines.					Small group discussion	Viva voce			
	4. Enumerate the precaution to be taken while drawing the blood sample for Serum triglycerides and interpretation of results of triglycerides in a non-fasting sample.					Small group discussion	Viva voce			
	5. Discuss the clinical significance of Hypertriglyceridemia.					Small group discussion	Viva voce			
BI 11.11	Demonstrate estimation of calcium and phosphorus	S	P	Y		Practical	Skills assessment			
	Specific learning objectives:									
	1. Enumerate the methodology used for estimation of serum calcium and phosphorus.					Practical, Small group discussion	Viva voce			
	2. Discuss the principle of estimation of serum calcium and phosphorus.					Small group discussion	Viva voce			
	3. Enumerate the normal levels of Calcium and phosphorus.					Small group discussion	Viva voce			
	4. Discuss the clinical significance of Hyper & Hypocalcemia and Hyper & Hypophosphatemia.					Small group discussion	Viva voce			

B11.1.12	Demonstrate the estimation of serum bilirubin	S	P	Y	Practical	Skills assessment		
	Specific learning objectives:							
	1. Enumerate the methodology used for estimation of serum bilirubin.				Practical, Small group discussion	Viva voce		
	2. Discuss the principle of estimation of serum bilirubin.				Small group discussion	Viva voce		
	3. Enumerate the normal levels of Total bilirubin, Direct and Indirect bilirubin.				Small group discussion	Viva voce		
	4. Discuss the clinical significance of Hyperbilirubinemia.				Small group discussion	Viva voce		
	5. Classify the different types of Jaundice based on the biochemical findings.				Small group discussion	Viva voce		
B11.1.13	Demonstrate the estimation of SGOT/SGPT	S	P	Y	Practical	Skills assessment		
	Specific learning objectives:							
	1. Enumerate the methodology used for estimation of SGOT/SGPT.				Practical, Small group discussion	Viva voce		
	2. Define Transamination. Give clinically relevant examples				Small group discussion	Viva voce		

	3. Discuss the principle of estimation of SGOT/SGPT					Small group discussion	Viva voce		
	4. Enumerate the normal levels of SGOT & SGPT.					Small group discussion	Viva voce		
	5. Discuss the clinical significance of increased levels of SGOT/SGPT.					Small group discussion	Viva voce		
BI 11.14	Demonstrate the estimation of alkaline phosphatase	S	P	Y		Practical	Skills assessment		
	Specific learning objectives:								
	1. Enumerate the methodology used for estimation of Alkaline Phosphatase.					Practical, Small group discussion	Viva voce		
	2. Discuss the principle of estimation of Alkaline Phosphatase.					Small group discussion	Viva voce		
	3. Enumerate the normal levels of Alkaline Phosphatase.					Small group discussion	Viva voce		
	4. Discuss the various isoenzymes of Alkaline Phosphatase and their clinical significance.					Small group discussion	Viva voce		

BI 11.15	Describe & discuss the composition of CSF	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
	Specific learning objectives:								
	1. Describe the formation of CSF in brief.				Lecture, Small group discussion	Short essay/ viva voce			
	2. Discuss the characteristics of normal CSF.				Lecture, Small group discussion	Short essay/ viva voce			
	3. Describe the procedure for CSF sample collection.				Lecture, Small group discussion	Short essay/ viva voce			
	4. Enumerate the parameters which are analysed in the clinical biochemistry lab in a CSF specimen.				Lecture, Small group discussion	Short essay/ viva voce			
	5. Enumerate a few common conditions which are associated with abnormal CSF analysis.				Lecture, Small group discussion	Short essay/ viva voce			

B11.1.16	<p>Observe use of commonly used equipments/techniques in biochemistry laboratory including:</p> <ul style="list-style-type: none"> •pH meter •Paper chromatography of amino acid •Protein electrophoresis •TLC, PAGE •Electrolyte analysis by ISE •ABG analyzer •ELISA •Immunodiffusion •Autoanalyser •Quality control •DNA isolation from blood/ tissue <p>Specific learning objectives:</p> <ol style="list-style-type: none"> 1. Identify all the instruments commonly used in the clinical biochemistry lab. 2. Enumerate the various techniques being done in clinical biochemistry lab. 3. Describe the principles of these biochemical techniques. 	S	KH	Y	Demonstration	Skill assessment			
							Lecture, Small group discussion	Short essay/ viva voce	
							Lecture, Small group discussion	Short essay/ viva voce	
							Lecture, Small group discussion	Short essay/ viva voce	
B11.1.17	<p>Explain the basis and rationale of biochemical tests done in the following conditions:</p> <ul style="list-style-type: none"> - diabetes mellitus, - dyslipidemia, - myocardial infarction, - renal failure, gout, - proteinuria, 	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine, Pathology		

	3. List the uses of a Spectrophotometer					Lecture, Small group discussion	Short essay/ viva voce		
	4. Differentiate the Spectrophotometer from a Colorimeter.					Lecture, Small group discussion	Short essay/ viva voce		
BI11.19	Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.	K	KH	Y		Lecture, Small group discussion	Written/ Viva voce		
	Specific learning objectives:								
	1. Enumerate the instruments commonly used in the biochemistry laboratory.					Lecture, Small group discussion	Short essay/ viva voce		
	2. Describe the principles involved in the functioning of these instruments.					Lecture, Small group discussion	Short essay/ viva voce		
BI11.20	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.	S	SH	Y		DOAP sessions	Skill assessment	1	
	Specific learning objectives:								
	1. List the abnormal constituents in urine and mention the qualitative tests used to identify them.					Small group discussion	viva voce		

	2. Identify and name the instrument used to determine the specific gravity of urine.				Small group discussion	viva voce			
	3. Perform independently the biochemical tests to detect the abnormal constituents of urine.				Practical	viva voce			
	4. Record the findings and interpret the results of the given urine sample.				Practical	viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/ A/C	Level K/KH/ S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical integration	Horizontal Integration
BI11.21	Demonstrate estimation of glucose, creatinine, urea and total protein in serum. Specific learning objectives:	S	SH	Y	DOAP sessions	Skill assessment	1		
	1. Enumerate the methodology used for estimation of glucose, creatinine, urea and total protein in serum				Practical	Viva voce			
	2. List the biological reference range for the above parameters.				Small group discussion	Viva voce			
	3. Record and interpret the results of the above parameters.				Practical	Viva voce			

	5. Classify the various stages of Chronic Kidney Disease based on eGFR.					Small group discussion	Short essay/Viva voce			
B111.23	Calculate energy content of different food items, identify food items with high and low glycemic index and explain the importance of these in the diet	K	KH	Y		Lecture, Small group discussion	Written/ Viva voce			General Medicine
	Specific learning objectives:									
	1. Define the energy conversion factors such as joule and calorie.					Lecture, Small group discussion	Short essay/Viva voce			
	2. Discuss the calorific value of all the major nutrients					Lecture, Small group discussion	Short essay/Viva voce			
	3. Record the calculation of the energy content of the commonly used food items.					Lecture, Small group discussion	Short essay/Viva voce			
	4. Define Glycemic index. Identify the food items which have low and high glycemic index.					Lecture, Small group discussion	Short essay/Viva voce			
	5. Describe the importance of eating foods with Low Glycemic index.					Lecture, Small group discussion	Short essay/Viva voce			

BI 11.24	Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce	General Medicine
	Specific learning objectives:						
	1. Define Fatty acids. Classify fatty acids based on the nature of hydrocarbon chain with examples for each class.				Lecture	Short essay/Viva voce	
	2. List the food items which have high content of saturated fatty acids, unsaturated fatty acids and trans fats in them.				Lecture	Short essay/Viva voce	
	3. Describe the advantages of Monounsaturated and polyunsaturated fatty acids over the saturated fatty acids in the food items.				Lecture	Short essay/Viva voce	
	4. Define Trans fats and Describe the adverse effects it has on the human health.				Lecture	Short essay/Viva voce	

TOPICS FOR SKILL CERTIFICATION

Sl. No.	Topics (OSPE)
1.	To perform and interpret Benedicts test for reducing substances in the given sample
2.	To estimate capillary blood glucose by using Glucometer
3.	Measurement of Specific Gravity of normal urine using Urinometer
4.	To perform and interpret Heat Coagulation test to detect the presence of albumin in the given sample
5.	To perform Urine dipstick for reducing sugar and protein in the given urine sample

Case based learning Sessions with lab data interpretation - 20 X2=40 hrs

Sl. No	Topic	Suggested Cases for discussion	No. of sessions	Domain/ Level	Assessment Tool
1	Diagnostic enzymology BI2.7, BI11.17	Myocardial infarction Acute pancreatitis	1	K/KH	Case chart discussion
2	Carbohydrate metabolism BI3.8, BI3.10, BI11.17	GTT charts/GST Galactosemia Von gierkes disease	1	K/KH	Case chart discussion
3	Lipid metabolism BI3.10, BI4.7, BI11.17	Diabetes Ketoacidosis Starvation ketoacidosis Dyslipidemia	2	K/KH	Case chart discussion
4	Protein metabolism Inborn errors of metabolism BI5.5, BI11.17	PKU, Alkaptonuria Homocystinuria ,MSUD Albinism	2	K/KH	Case chart discussion
5	Plasma proteins BI5.5, BI11.16, BI11.17	Multiple myeloma	1	K/KH	Case chart discussion
6	Nucleotide metabolism BI6.4, BI11.17	Gout	1	K/KH	Case chart discussion

7	Liver Function test and Hemoglobinopathies BI6.2, BI6.14, BI11.17	Hemolytic Jaundice Hepatic jaundice Post hepatic jaundice Neonatal jaundice Alcoholic hepatitis Sickle cell anaemia	2	K/KH	Case chart discussion
8	Renal function test BI6.14, BI11.17	Normal renal function Renal failure Nephrotic syndrome Acute glomerulonephritis	2	K/KH	Case chart discussion /
9	Thyroid function test BI6.14, BI11.17	Hypothyroidism Hyperthyroidism	1	K/KH	Case chart discussion
10	Vitamin deficiency disorders BI6.5	Vitamin A deficiency Vitamin D deficiency Vitamin C deficiency Niacin deficiency Vitamin B12 deficiency	3	K/KH	Case chart discussion
11	Minerals BI6.10	Iron deficiency anaemia Wilson's disease Goitre	1	K/KH	Case chart discussion
12	Nutritional disorders BI8.2	Kwashiorkor Marasmus	1	K/KH	Case chart discussion
13	Cancer BI10.2	Prostate carcinoma Breast carcinoma	1	K/KH	Case chart discussion
14	Disturbances in acid-base balance BI6.8, BI11.17	Metabolic acidosis Metabolic alkalosis Respiratory acidosis Respiratory alkalosis	1	K/KH	Case chart discussion

**INTEGRATION-
EARLY CLINICAL EXPOSURE (ECE):
CLINICAL SKILLS -**

Suggested cases –

Sl No	Topics	Integration
1	Iron Deficiency anemia and Megaloblastic anemia	• Dept. of General Medicine, OBG
2	Essential Fatty acids vs Trans fats, Lipid Profile & Dyslipidemia	• Dept. of General Medicine
3	Vitamin D, Parathyroid Hormone,	• Dept. of Paediatrics
4	Calcium Metabolism, Rickets	• Dept. of Paediatrics
5	Iodine metabolism and disorders	• Dept. of Paediatrics & Medicine
6	Vitamin A deficiency,	• Dept. of Paediatrics, Medicine, dermatology
7	Vitamin Bcomplex deficiency	• Dept. of Paediatrics, Medicine, dermatology
8	Vitamin C deficiency	• Dept. of Paediatrics, Medicine, dermatology
9	Vitamin K deficiency	• Dept. of Paediatrics, Medicine, dermatology
10	Vitamin K deficiency	• Dept. of Paediatrics, Medicine, dermatology
11	Jaundice,	• Dept. of Gastroenterology
12	Cirrhosis	• Dept. of Gastroenterology
13	Nutrition	• Dept. of Paediatrics, community medicine and Dept. of General Medicine
14	Protein energy malnutrition	• Dept. of Paediatrics

15	Obesity	• Dept. of General Medicine and Dept. of Paediatrics
16	Nutrition in clinically ill patients	• Dept. of General Medicine
17	Nutrition in malignancy patients	• Dept. of oncology
18	Water and Electrolyte Balance, Dehydration/ Hyponatremia	• Dept. of General Medicine
19	Enzyme inhibitors as poisons and drugs	• Dept. of General Medicine
20	Inborn errors of protein metabolism	• Dept. of Paediatrics
21	Inborn errors of carbohydrate metabolism	• Dept. of Paediatrics
22	Inborn errors of lipid metabolism	• Dept. of Paediatrics
23	Inborn errors of lens metabolism	• Dept. of Ophthalmology
24	Disorders of nucleotide metabolism	• Dept. of General Medicine
25	Acid base disorders	• Dept. of General Medicine and emergency medicine
26	Kidney function tests and disorders	• Dept. of General Medicine and nephrology
27	Liver function tests and disorders	• Dept. of General Medicine and gastroenterology
28	Thyroid function tests and disorders	• Dept. of General Medicine and endocrinology
29	metabolic response to injury	• Dept. of Surgery
30	Biochemical investigations in surgical patients	• Dept. of Surgery
31	Nutritional requirements of surgical patients, pregnancy and lactation	• Dept. of Surgery, OBG
32	Depression and biochemistry	• Dept. of Psychiatry

BASIC SCIENCE CORRELATION

Suggested sessions -

1. Biochemical basis of Atherosclerosis and Myocardial Infarction
2. Biochemical basis of Metabolic syndrome

3. Lab evaluation of Hyperammonemia
4. Laboratory Quality control and Quality assurance
5. Critical alerts in biochemistry lab test results.
6. Evidence based laboratory medicine

ASSESSMENT SCHEME OF EXAMINATION

INTERNAL ASSESSMENT:

Theory (100)		Practical (100)	
Internal assessment (70)	Continuous assessment (30)	Internal assessment (70)	Continuous assessment (30)
<ul style="list-style-type: none"> • MCQ's 01*20= 20 • Long es- say (Case based) 1*10 = 10 • Short es- say 3*5= 15 • Short an- swers 5*3 = 15 	<ul style="list-style-type: none"> • Unit test/ seminar/ tutorials/ projects/ small group discus- sion/ viva/ assign- ment=20 • Early clin- ical expo- sure= 10 	<ul style="list-style-type: none"> • OSPE = 20 • Quantita- tive Experi- ments = 20 • Case Dis- cussion= 20 • Spot- ters=10 	<ul style="list-style-type: none"> • Record= 05 • Log book=10 • Skill certification=5 • Professionalism and ethics (punctuality and involvement, reflections, semi- nar, research, extra curricular activity etc)=10

A. Formative assessment

- Assessment of students shall be based day-to-day assessment pertaining to their performance with respect to assignments, preparation for seminar, involvement in discussion in small group teaching & other academic activities
- Minimum of three examinations shall be conducted & average of three is taken into consideration.
- Theory: 100 marks (Theory:70 & Continuous assessment:30)
- Practical: 100 Marks (Practical:70 & Continuous assessment:30)
- 3rd Internal assessment should preliminary/preuniversity examination
- Students must secure 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations
- Students must secure at least 50% marks of the total marks (combined in theory & practical) assigned for Internal assessment to be declared successful at the final university examination
- Internal assessment marks will reflect as a separate head of passing at the summative examination and will not be added to the University marks.

UNIVERSITY EXAMINATION

A. Theory: 200 Marks

There shall be two theory papers of 100 marks each and duration of each paper will be of 3 hours. The patterns of questions would be of three types.

Type of questions	Number of questions	Marks of each question	Total
MCQs	20	01	20
Long Essay	2	10	20
Short Essay	06	5	30
Short Answer	10	3	30
		Total	100

- Assessment will be carried out on an objective basis to the extent possible.
- The student must secure at least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass.

Distribution of chapters and suggested marks in parenthesis for Paper I and Paper II in Biochemistry for University examination are as follows:

SI No	PAPER-I				
	Topics	Marks	Long assay	Short assay	Short answer
1	Molecular & functional organization of cell & Cellular components	05		✓	✓
2	Chemistry, Digestion & absorption & metabolism of Carbohydrates, Intermediary metabolism	15	✓	✓	✓
3	Chemistry, Digestion & absorption & metabolism of Lipids	15	✓	✓	✓
4	Biological Oxidation	10	✓	✓	✓
5	Nutrition & Energy metabolism	10	✓	✓	✓
6	Enzymes	15	✓	✓	✓
7	Vitamins	10	✓	✓	✓
8	Mineral metabolism	10		✓	✓
9	Cardiac Markers, Free radicals & antioxidants,	05		✓	✓
10	Hormonal assay, Detoxification	05		✓	✓
SI No	PAPER-II				

	Topics	Marks	Long assay	Short assay	Short answer
1	Chemistry, Digestion & absorption & metabolism of Proteins	15	✓	✓	✓
2	Nucleotides & Nucleic acid metabolism	05		✓	✓
3	DNA Replication , DNA repair , Eukaryotic transcription and post transcriptional modifications & Translation and post translational modifications Gene mutation & Regulation of gene expression Recombinant DNA technology, gene therapy, PCR DNA Sequencing	15	✓	✓	✓
4	Heme metabolism, Normal & abnormal haemoglobins with associated disorders	15	✓	✓	✓
5	Cellular and humoral components of the immune system, Innate and adaptive immune responses, Antigens and concepts involved in vaccine development	10	✓	✓	✓
6	Acid base balance, Water & Electrolyte balance	15	✓	✓	✓
7	Kidney Function tests, Thyroid Function Test, Liver function tests, Adrenal Function tests & Disorders of Parathyroid gland	10	✓	✓	✓
8	Cancer initiation, Oncogenes, apoptosis, Biochemical Tumor markers, Biochemical basis of Cancer therapy	10	✓	✓	✓
9	Lab automation, Quality Control	05		✓	✓

The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. Practicals: 80 Marks

Candidate has to score 50% to pass.

The distribution of content and marks for the practical would be,

1. Quantitative Experiment	-	20 marks
2. Spotters	-	20 marks
3. OSPE/OSCE	-	20 marks
4. Interpretation of case histories	-	20marks

C. Viva-Voice Examination: 20 Marks

The viva-voice examination shall carry 20 marks and all examiners with conduct of examination.

- Table 1 – 05 Marks (Cell & sub cellular structures, Chemistry & Metabolism of Carbohydrates, Enzymes, Minerals, Biochemistry of Cancer, Free radicals, Detoxification.)
- Table 2 – 05 Marks (Hydrogen ion Concentration, Acids, bases & buffers , acid base balance & its disorders, chemistry & metabolism of Proteins, Vitamins, genetics & protein synthesis, Endocrines.)
- Table 3 – 05 Marks (Isotopes & their applications, chemistry & metabolism of Lipids, biological oxidation, hemoglobin metabolism, biochemical tests for atherosclerosis & MI.)
- Table 4 – 05 Marks (Chemistry & metabolism of Purines & Pyrimidines, Intermediary metabolism, Molecular biology & Genetics, Function tests, Nutrition & energy metabolism, Water & electrolyte balance , Quality control.)

RECOMMENDED BOOKS

TEXT BOOKS: (Recent editions)

- DM Vasudevan. Textbook of Biochemistry for Medical students
- Rafi MD. Textbook of Biochemistry for Medical students
- Lippincotts' Illustrated reviews – Biochemistry
- U Satyanarayana. Biochemistry
- S.K.Gupta. Biochemistry for MBBS
- Pankaja Naik. Biochemistry
- Dinesh Puri. Textbook of Biochemistry
- Namrata Chhabra. Case oriented approach towards Biochemistry
- Divya shanti D'sza, Sowbhagyalakshmi. An easy guide to Practical Biochemistry.
- T.N. Pattabhiraman. Laboratory manual and Practical Biochemistry, 4th edition

REFERENCE BOOKS: (Recent editions)

- Harpers' Illustrated Biochemistry
- Marshall and Bangert. Clinical Chemistry
- Baynes and Dominiczak. Medical Biochemistry
- Bhagavan and Ha. Essentials of Medical Biochemistry with clinical cases
- Stryer. Biochemistry
- James Watson. Molecular biology of gene