SECTION - B
MUHS

CURRICULA I

1. PHASE-I (FIRST M.B.B.S.)

A) Introduction

As per the regulations on graduate medical education the M.B.B.S. course is divided in to phases – I, II, and III. During phase – I
every student shall undergo a period of study of pre-clinical subjects for two semesters. These subjects are

1 – Human Anatomy
2 – Physiology including bio-physics
3 – Biochemistry
4 – Introduction to community medicine including Humanity.

At the end of second term there will be Ist professional university examination.

B) Time distribution :- The first two semesters (approximately 240 teaching days) shall be occupied in the phase I (pre-clinical) subjects and introduction to a broader understanding of the perspectives of medical education leading to delivery of health care.

Following minimum teaching hours are prescribed in various disciplines for two semester

Anatomy	650 hours
Physiology	480 hours
Biochemistry	240 hours
Community Medicine	060 hours
Total	1430 hours

Didactic lectures should not exceed 1/3 of the time schedule, 2/3 schedule should include practicals and group discussions/ seminars / tutorials. Learning processes should include living experiences and problem oriented approaches. Passing in phase –I is compulsory before proceeding to phase-II training.

C) Attendance:

75% of attendance in a subject for appearing in the examination is compulsory provided he/she has 80% attendance in non lecture teaching. i.e. seminars, group discussions, tutorials, demonstrations and practicals.

Internal assessment:

i. Pattern of Examination for formative evaluation (internal assessment) first semester will have one (1) periodical short tests each carrying 25 marks each in Theory & practicals. There will be Terminal examination before the completion of 1 st Semester. The Terminal examination will include one theory paper of 60 marks & practical of 40 marks and viva 20 marks.

-Similarly second semester will have one (1) periodical short tests examination will be at the end of second Semester. It will have Theory 100 marks (2 papers of 50 marks each), Viva 20 marks & Practicals of 40 marks. Detail table is as follows..

ii. Internal Assessment- Total marks 40 (Theory 20 & practical 20)

University examination:

There shall be one main university examination in a year at the end of second semester in the subjects of Anatomy, Physiology and Biochemistry.

Distribution of Marks: As per the following table

Appendix - A

First M.B.B.S. Examination

SN	Subject	Theory /Oral / Practical/ Internal Assessment		Maximum marks in each part of the subject	Minimum marks required to pass in each part of the subject	Minimum marks required to pass in each subject
1	ANATOMY	a) Theory - Paper I		50	50	150
		- Paper II		50		
		b) Oral		20	--	
		c) Theory		100	60	
		d) Practical		40	20	
		e)Internal Assessment	Theory	20	20	
			Practical	20		
2	PHYSIOLOGY	a) Theory - Paper I		50	50	150
		- Paper II		50		
		b) Oral		20	--	
		c) Theory +Oral		120	60	
		d) Practical		40	20	
		e)Internal Assessment	Theory	20	20	
			Practical	20		
3	BIOCHEMISTRY	a) Theory - Paper I		50	50	150
		- Paper II		50		
		b) Oral		20	--	
		c) Theory +Oral		120	60	
		d) Practical		40	20	
		e)Internal Assessment	Theory	20	20	
			Practical	20		

In each of the subjects a candidate must obtain 50% in aggregate with a minimum 50% in theory, 50% in Theory+orals, 50% in practicals and 50% in Internal Assessment.

REVISED INTERNAL ASSESSMENT EXAMINATION SCHEME w.e.f. JUNE 2007 EXAMINATION

YEAR: - First MBBS

SN	Subject	1st Term End			Preliminary Examination		
		Semester	Theory	Practical	Semester	Theory	Practical
			(A)	(B)		(C)	(D)
1.	Anatomy	I	60	40	II	100	40
2.	Physiology	I	60	40	II	100	40
3.	Biochemistry	I	60	40	II	100	40

(B) Calculation Method:-

I) Theory Marks to be sent to the University out of 20 $= \frac{(A)+(C)}{8} = \frac{60+100}{8} = \frac{16}{8} = 20$

II) Practical Marks to be sent to the University out of 20 $= \frac{(B)+(D)}{4} = \frac{40+40}{4} = \frac{80}{4} = 20$

MODEL TIME TABLE

PHASE -.I

MODEL TIME- TABLE

(Subject to modification as per local situation)

First Semester :

Days Time	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon	Anat.	Anat.	Anat.	Anat.	L	Phys-	Phys-	Phys-
Tues	Anat.	Anat.	Anat	Anat.	U	Phys	Phys -	Phys-
Wed	Anat.	Anat.	Anat.	Anat.	N	Bioch	- Bioch	Bioch-
Thurs	Anat.	Anat.	Anat.	Phy.	C	Phys-	Phys-	Phys-
Fri	Anat.	Anat,	Anat.	Bioc.	H	Bioch.	Bioch-	Bioch-
Sat	Anat.	Anat.	Anat.	Phys-		Phys-	Phys	Phys

Second Semester;

Days Time	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4
Mon Anat	Phys.	Phys		Phys	Anat	L	Anat	Anat
Tues Anat.	Phys	Phys		Phys	Anat.	U	Anat.	Anat.
Wed Anat	Bioch	Bioch		Bioch	Bioch	N	Anat	Anat
Thurs	Phys Anat	Phys		Phys	Phys	C-	Anat	Anat
Fri	Bioch Anat	Bioch		Bioch	Anat	H	Anat	Anat
Sat	Phys	Phys		Phys	Phys	Anat	Anat	Anat

NOTE: Community Medicine lecture be arranged in consolation with other preclinical departments in the above things.

SUBJECTWISE SYLLABI:

HUMAN ANATOMY

(i)**Goal:**

The broad goal of the teaching of undergraduate students in Anatomy aims at providing comprehensive knowledge of the gross and microscopic structure and development of human body to provide a basis for understanding the clinical correlation of organs or structures involved and the anatomical basis for the disease presentations.

(ii)**Objectives**

A-Knowledge:

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

(a) Comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body
(b) Identify the microscopic structure and correlate elementary ultrastructure of various organs and tissues and correlate the structure with the functions as a pre requisite for understanding the altered state in various disease processes.
(c) Comprehend the basic structure and connections of the central nervous system to analyse the integrative and regulative functions of the organs and systems. He/she shall be able to locate the site of gross lesions according to the deficits encountered.
(d) Demonstrate knowledge of the basic principles and sequential development of the organs and systems, recognize the critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards. He/she shall be able to explain the developmental basis of the major variations and abnormalities.

B-Skills

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

(a) Identify and locate all the structures of the body and mark the topography of the living anatomy.
(b) Identify the organs and tissues under the microscope.
(c) Understand the principles of karyotyping and identify the gross congenital anomalies.
(d) Understand principles of newer imaging techniques and interpretation of CT scan, sonogram etc.

(e) Understand clinical basis of some common clinical procedures i.e. intramuscular and intravenous injection, lumbar puncture and kidney biopsy etc.

C-Integration

From the integrated teaching of other basic sciences, student shall be able to comprehend and regulation and integration of the functions of the organs and systems in the body and thus interpret the anatomical basis of disease process.

(iii) Detail syllabus of Human Anatomy is given under following heads.

A) General Anatomy

B) Regional Anatomy

I - Upper limb

II - Lower limb

IIII - Abdomen

IV - Thorax

V - Head Face Neck

VI - Spinal Cord & Brain

C) Micro-Anatomy I - General Histology

II - Systemic Histology

D) Developmental Anatomy I - General Embryology

II - Systemic Embryology

E) Genetics

F) Radiological Anatomy, USG, CT, MRI

G) Surface Anatomy, Living Anatomy

H) University Exam pattern, Theory & Practical

I) Books recommended

Detail syllabus of Human Anatomy

A) GENERAL ANATOMY

I) DESCRIPTIVE TERMS

Terms used for describing the position of the body, Anatomical planes, Commonly used terms in Gross Anatomy, Terms used in Embryology, Terms related to limbs, for hollow organs, for solid organs, to indicate the side, for describing muscle, for describing movements

II) General Osteology

Definition, Nutrition & Morphological Classification, Distribution and Functions of bone Appendicular, Axial.

Diaphysis, Metaphysis, Epiphysis, Types of epiphysis

Primary centres, Secondary centers, Law of ossification, Epiphyseal plate, Blood supply of long bone

CARTILAGE

Definition, Types, structure, Distribution, Nutrition

III) General Arthrology

Classification, Synarthrosis, Amphiarthrosis, Diarthrosis.
Cartilaginous. Primary, Secondary

Synovial - Axis of movement, Structure of typical synovial joints

Classification of synovial joints, according to the shape ,axes of movement and morphology

Simple, Compound ,Complex joints,Blood supply & nerve supply.

IV) General Myology

Definition, types: Origin, Insertion, Morphological classification
Actions of muscles, nerve supply
Functional classification, Prime movers, Fixators, Antagonists, Synergists
BURSA, Structure, Functions,types:
LIGAMENTS, Types & functions,Sprains
RETINACULA & APONEUROSES

V) INTEGUMENT

a) Skin - Introduction : Surface area
Types :Thin, Thick, hairy, Functions, innervation
Structure :
Epidermis, Dermis, Appendages

b) SUPERFICIAL FASCIA
Distribution of fat, functions

c) DEEP FASCIA
Features, Modifications, Functions

VI) General Angiology

Arteries: Muscular, Elastic; Arterioles; Capillaries: Sinusoids, Veins - Anastomosis: End arterial; Vasa vasorum, nerve supply of blood vessels

Lymphatic system
Lymph vessels, Central lymphoid tissue, Peripheral lymphoid organs, Circulating lymphocytes - T and B lymphocytes

VII) General Neurology

Structure of nervous tissue,
Neurons:Synapses :Structural – type, Functional types
Classification of neurons : According to polarity and According to relative lengths of axons and dendrites:
Neuroglia:Nerves :Cranial – Spinal, Structure of typical spinal nerve
Autonomic nervous system :Sympathetic :Sympathetic ganglia, postganglionic fibres
Parasympathetic :Cranial outflow, sacral outflow

Level 2: Mechanical properties of bones.

synthesis, histogenesis, growth of Cartilage,Factors limiting range of movement,

Kinesiologically: Sellar, Ovoid, Joint position: Loose-packed, Close-packed
Number and diameter of fibres, Range of contraction, Active insufficiency,Passive insufficiency, shunt, swing, spin
Adventitious bursae - Housemaid's knee, Clergyman's knee, Student's elbow, Weaver's bottom, Porter's shoulder
Clinical correlation, significance of Langer's lines, Tension lines, flexure lines Transplant
Collateral circulation, Functional end arteries, Arteriosclerosis,
Level 3: Effect of hormones on bony growth, Wolff's law, Surface topology of articular surfaces, Spin, Swing, Cartilage Grafts, Kinesiology, Body liver system,Skin grafts,Ischaemia, Infarct,Bursitis

B) Regional Anatomy

I) UPPER LIMB

REGIONS : Mammary gland, Axilla, Cubital fossa, Fascial spaces of the hand

Relations and functional importance of individual structures, Dupuytren's contracture, Hand as a functional unit – grips, Nerve injury, carpal tunnel syndrome, Clavipectoral fascia; Salient features about carpals;

ARTHROLOGY

Shoulder girdle; Shoulder joint; Elbow; Radioulnar joints; Wrist; Carpometacarpal joint of thumb; Bones taking part

Classification of joints, Movement with muscles causing movements,
midcarpal joint, metacarpophalangeal joints,
interphalangeal joints

Fall on the outstretched hand

Level 2 Axilla: Collaterals Lymph nodes (breast) Axillary sheath cervico-axillary canal, Abscess drainage, Palm: comparative anatomy (thumb, palmaris brevis), position of rest and of function, collaterals, Fascial spaces: Surgical significance

OSTEOLOGY

Identification; Anatomical position; Parts; Joints formed; Development; identification of individual carpals in and articulated hand)

Clavicle: Line of force transmission, commonest site of fracture

Humerus: fractures -

Colles' fracture, Smith's fracture

Carpals, Metacarpals, Phalanges: Carpal tunnel syndrome, fracture scaphoid

Surgical approaches, Subluxation of head of radius, carrying angle

MYOLOGY:

Muscles of upper limb, attachment, Nerve supply, Actions

Applied aspects: Volkmann's ischaemic contracture

Quadrangular and triangular spaces, Triangle of auscultation

ANGIOLOGY: Axillary, Brachial, Radial, Ulnar Arteries, veins, lymphatics

Commencement, Termination, Main area of distribution and drainage, Anastomosis –

Applied aspects, Artery : Damage to vessels, Raynaud's disease, Veins: Thrombosis, Lymphatics: Lymphangitis (red streaks), lymphadenitis,

NEUROLOGY:

A. Nerves

Axillary, median, ulnar, musculocutaneous, radial, Origin, course, distribution, Root value

B. Plexus: Brachial

Applied aspects: Nerve injury at various sites - Tendon reflex - Winging of scapula, Erb's palsy, Klumpke's palsy, Crutch palsy, ulnar paradox

II) LOWER LIMB

REGION: boundaries, major contents**;** Gluteal, femoral triangle; Adductor canal, compartments of thigh, leg**;** Popliteal fossa, Adductor canal , Sole, Arches of foot,; Gluteal IM injections

Femoral hernia

blood supply to head of femur**;** Fracture neck of femur, mechanics movement of joints; hip and knee, Trendelenburg test; Knee joint : derangement, injuries to cruciate ligaments, menisci; (tear - bucket handle type); Ankle : Sprain

mechanism of venous return, varicose veinsz

Applied aspects of Adductor canal, popliteal aneurysms

OSTEOLOGY: Identification, region, anatomical position; parts, joints formed,

For tarsals - identification of individual tarsals in an articulated foot.

Level 2

Applied aspects: Bony specialization for bipeds, walking and transmission of weight,

Fracture, femoral torsion, neck shaft angle, bone grafts

ARTHROLOGY

Hip, knee, ankle, subtalar, Tibiofibular

Hip joint : dislocation, congenital, traumatic, surgical approaches to joints (anatomical basis), traumatic effusion, bursitis

MYOLOGY

Attachments, nerve supply, actions of: Muscles of lower limb

calf pump, antigravity muscles

ANGIOLOGY

Artery: Femoral, profunda femoris, popliteal, dorsalis pedis, Commencement, termination, main area of supply, course, relations & applied

Vein: Venous drainage of lower limb, long and short saphenous veins, Communication and valves. Varicose

Lymphatics: Inguinal group of lymph nodes
Lever 2 :intermittent claudication, clinical significance of anastomosis: around knee, venous thrombosis

NEUROLOGY
a. Plexus: Lumbar and sacral, Location, Formation, Distribution
b. Nerves: Root value of sciatic, femoral, obturator, tibial, common peroneal nerves; Origin, course, distribution; sciatica, foot drop
Level 2 : Pes cavus, equinovarus, clawing of toes

III) ABDOMEN

i) ANTERIOR ABDOMINAL WALL

Rectus sheath, quadrants and regions, Testes, epididymis, spermatic cord, scrotum
Level 2: Surgical incisions of abdomen types of inguinal herniae
Peritoneum, Lesser Omentum, Omental Bursa, Epiploic Foramen, Testes
Morphology, blood supply, lymphatic drainage

25. SPERMATIC CORD
Definition, beginning, end, course and contents, coverings, vasectomy

ii) Abdominal organs : Morphology relations blood supply, lymphatics nerve supply & applied Anatomy of following organs
STOMACH,SPLEEN, LIVER:,BILIARY APPARATUS, PANCREAS, SMALL INTESTINE,LARGE INTESTINE AND VERMIFORM APPENDIX,KIDNEYS, URETERS,SUPRARENAL GLANDS
Level 2: peptic ulcer ,Splenic circulation, splenic vascular segments,liver, biopsy, Support of liver,Gall stones **,**Duct system of pancreas **,**Surgical approach to kidney , stones (Renal), Ureter,Sites of constrictions, Hydronephrosis, pheochromocytoma

Level 3: Gastroscopy, Achlorhydria,Splenectomy ,Liver transplant,Pancreatitis, diabetes,Renal transplant,Stones in ureter, Cushing's disease

iii) Pelvic Viscera :- Morphology, relations, blood supply nerve supply & applied anatomy
URINARY BLADDER & URETHRA, UTERUS, OVARIES AND UTERINE TUBES, PROSTATE, RECTUM AND ANAL CANAL, UROGENITAL DIAPHRAGM (UGD)

Level 2: Supports and micturition, stones in bladder ,Ovarian cyst, enlargement complications, Fistula, Fissure, piles

Level 3: cystoscopy, Hysterectomy,cancer, Supports of rectum

iv) Perineum – Ischiorectal fossa, pudendal canal, perianal spaces Urogenital
diaphragm, male urethra, penis – perineal pouches
Level 2: Ischiorectal hernia

v) MYOLOGY
Anterior abdominal wall, Rectus sheath, Psoas major, Quadratus lumborum, Thoracoabdominal diaphragm, pelvic diaphragm, Thoracolumbar fascia, perineal spaces & muscles
Level 3: Psoas abscess

vi) OSTEOLOGY
Level 2: Pelvis - types
(various diameters), lumbar vertebrae, anatomical basis of disc prolapse, nerve compression
Level 3: Sacralization, Lumbarization
ARTHROLOGY
Movements of lumbar vertebrae, lumbosacral, sacroiliac, sacrococcygeal joints

vii) ANGIOLOGY :- Origin, course, termination, relations, branches & applied
anatomy of
PORTAL VEIN
Level 2: portasystemic communications
Level 3: Portasystemic communications in detail**;** Development
INFERIOR VENA CAVA,ABDOMINAL AORTA,INTERNAL ILIAC ARTERY

viii)NEUROLOGY,LUMBAR PLEXUS,SACRAL PLEXUS

IV) THORAX
i) THORACIC WALL,THORACIC INLET
Boundaries and contents
THORACIC OUTLET, Boundaries and contents, major openings and levels, Typical intercostal space, Boundaries and contents, muscles Atypical intercostal space, Movements of respiration

Level 2: importance and minor openings in outlet, Accessory muscles of respiration

Level 3: Applied aspects: Barrel chest, pectus excavatum, rickety rosary

ii) MEDIASTINUM

Divisions and major contents

Level 2: Mediastinitis, mediastinoscopy

SUPERIOR AND POSTERIOR MEDIASTINA, LIST OF STRUCTURES

Boundaries and contents:

Level 2 : Superior mediastinal Syndrome, Course, relation and branches / area of drainage

Level 3: Coarctation of aorta, aneurysm, developmental anomalies

iii)PLEURA

Pleural reflections, recesses, innervation

Level 2: importance of recesses

Level 3: pleural effusion

LUNGS

Gross description including lobes, fissures and bronchopulmonary segments

Level 2: relations, blood supply, nerve supply

Level 3: Postural drainage, surgical importance, of bronchopulmonary segments, foreign body inhalation

iv)PERICARDIUM & HEART

Divisions of pericardium and sinuses

Level 2: referred pain

Level 3: Pericardial effusion

HEART

Anatomical position, location, surfaces and borders, interior of all chambers, conducting system of heart; vessels of heart

Level 2: Relations, nerve supply - foramen ovale, patent IV septum, over-riding aorta, referred pain, functional end arteries - coronaries

Level 3: PDA, Fallot's tetralogy, etc.

v)OSTEOLOGY

IDENTIFICATION and parts of VERTEBRAE , RIBS – and STERNUM

Level 2: Identification of T1, T9, T10, T11, T12, vertebrae and atypical ribs - 1, 2, 11, 12. relations, attachments, ossification

Level 3: Fracture ribs, flail chest, compression fracture of vertebra

V) HEAD-FACE NECK

i) REGIONS AND ORGANS, FASCIAE OF THE NECK **TRIANGLES OF NECK**

Level 2 Spaces and spread of infections, axillary sheath **,** Relations of contents, Damage to accessory nerve, sialogram, approach to gland, bidigital palpation of submandibular gland**,**Dangerous area of face, squint

Level 3: surgical neck incisions, external jugular vein - air embolism, LN biopsy, JVP, pulse, Frey's syndrome

GLANDS

Thyroid, Parathyroid, Parotid, Submandibular, sublingual, Pituitary
Morphology, capsule, relations, nerve supply, blood supply

FACE

Muscles, nerve supply - blood supply

SCALP,PALATE,TONGUE,LARYNX, PHARYNX, ORBIT, EYEBALL,STYLOID APPARATUS,NASAL CAVITY, EAR,INTERNAL EAR,MIDDLE EAR,EXTERNAL EAR,MENINGES

ii) OSTEOLOGY

Identification, anatomical position, parts, foramina in the skull, structures passing through them, norma basalis, verticalis, frontalis, lateralis, occipitalis and interior of cranial cavity
Foetal skull; Mandible: Age changes
Level 2: Fontanelles, Dental formula
Level 3: Fractures of the skull, Age of dentition, cervical rib, disc herniation

iii) ARTHROLOGY

TM JOINT
Level 2: Dislocation

iv) MYOLOGY

Sternomastoid, Digastric, Mylohyoid, Hyoglossus, Muscles of facial expression, mastication, larynx, pharynx, tongue, palate and, Extra-ocular muscles
Level 2 Relations, development
Level 3 facial nerve palsy

v) ANGIOLOGY

ARTERIES

Origin, parts, course, relations, branches of:
Subclavian, Internal carotid, External carotid, Vertebral, Lingual, Facial, Maxillary
Level 2: Sub-branches, distributions
Level 3: Subclavian steal syndrome, Subclavian-axillary anastomosis

VEINS

External and internal Jugular veins, venous drainage of face

VENOUS SINUSES

Names, locations, drainage, classification
EMISSARY VEINS, CAVERNOUS SINUS, LYMPHATIC DRAINAGE OF HEAD FACE NECK

vi) NEUROLOGY

Cranial nerves,Nucleus, course, relations, branches, distribution, reflex pathways & applied anatomy, PLEXUS: Cervical, Brachial, PARASYMPATHETIC GANGLIA, CERVICAL SYMPATHETIC CHAIN

VI) NEUROANATOMY

i) SPINAL CORD

Gross features: Extent (child / adult), enlargements, conus medullaris, filum terminale, spinal meninges Tracts Ascending and Descending

Level 2: Spinal segments, vertebral correlation, significance of enlargements
nuclei of grey matter at upper & lower cervical, mid-thoracic, Lumbar & sacral levels
Clinical correlation of lesions

Level 3: anomalies,lamination, syringomyelia, PID, tumours, TB, trauma, dislocation, myelography

ii) MEDULLA OBLONGATA

Gross features: Motor decussation: Sensory decussation: Inferior olivary nucleus Cranial nerve nuclei

Level 2: Tuber cinereum, pontobulbar body, Order of neurons, Details of nuclei and organisation of white matter
Level 3: medullary syndromes-Bulbar palsy, increased ICT, Arnold-Chiari malformation,

iii) PONS

Cross sections at the level of:

- Facial colliculus, Trigeminal nucleus

General features: Peduncles, Floor of the fourth ventricle
Level 2: Relations
Level 3: Tumours, pontine haemorrhage

iv) CEREBELLUM

Gross features: Division, Lobes, relations, internal structure -
Level 2: connections of,cerebellar cortex and intracerebellar nuclei, white matter classification, Purkinje neuron,
Level 3: dysfunction,-dysequilibrium, ataxia, hypotonia
Nuclei: Names of nuclei and important connections
Peduncles : Important tracts in the peduncles
Functions : Of archicerebellum, paleocerebellum & neocerebellum

v) MIDBRAIN

General features :
relations, contents of interpeduncular cistern, connections of red nucleus
Level 2: Weber's syndrome, Benedikt's syndrome
Level 1 :T.S. at inferior colliculus, TS at superior colliculus

vi) CEREBRUM

CORTEX, WHITE MATTER, BASAL NUCLEI, LIMBIC LOBE
Surfaces, borders, major sulci, gyri, poles, lobes, major functional areas, interior - gray and white matter
Gray - cortex - granular / agranular, striate, Basal nuclei - names, White matter - classification with examples; Components of limbic lobe
Level 2: handedness, Connections of limbic lobe

vii) DIENCEPHALON

Dorsal thalamus Epithalamus Metathalamus Hypothalamus Subthalamus
Boundaries, parts, relations (gross), cavity, major nuclei, gross connections

viii) VENTRICULAR SYSTEM

Parts, boundaries, foramina, correlation with parts of brain
Level 2: Choroid fissure, recesses, Queckenstedt's test
Level 3: Hydrocephalus, VA shunt

ix) BLOOD SUPPLY OF BRAIN

Circle of Willis, subarachnoid space, arteries, veins
Level 2: blood brain barrier, Hemiplegia
Level3: End arteries, CSF formation

x) MENINGES

Cerebral and spinal meninges, folds of dura, contents of subarachnoid spaces, arachnoid villi and granulations, direction of flow of CSF, lumbar puncture **Cisterns,** Definition, terminology, cisterna magna

Level 2: cisternal puncture, Queckensted's test, vertebral venous plexus, choroid plexus
Extracerebral and intracerebral communication, CSF block,
Level 3: Epidural space

C) MICROANATOMY

I) GENERAL HISTOLOGY

i) MICROSCOPE,

Light microscope: parts, magnification, resolution,Electron microscope,
Level 2 Micro techniques, H and E staining
Level 3: Polarizing microscope, phase contrast, scanning EM

ii) CYTOLOGY

Cell,Cytoplasm and nucleus,Cytomembranes,Unit membrane, **Cell organelles**
Mitochondrial DNA, mitochondrial myopathy

Level 2 Specialisations of cell surface, Sarcoplasmic reticulum of muscle, Primary and secondary lysosomes, residual bodies, Effect of colchicine and anticytotic drugs on spindles preventing mitosis, Endocytosis, exocytosis, movement of microvilli; Cell mitotic activity
Level 3 Lysosomal storage disease
NUCLEUS - Structure, nuclear envelope, chromatin, Barr body, nucleolus

iii) Epithelial

Definition, Classification, Structure of various types & subtypes of epithelia
Level 2: Nutrition, Renewal, Innervation,
Level 3: Metaplasia;
Surface modifications,Cilia; Microvilli; Stereocilia; Cell junction and junctional complexes;
Glands, Classification; Unicellular and Multicellular; Exocrine, Endocrine, Amphicrine. Exocrine: Simple, Compound; Apocrine, Merocrine, Holocrine; Tubular, alveolar, tubuloalveolar; Serous; Mucous; Mixed

iv) Connective tissue, classification, structure, fibres, ground substance,
loose areolar tissue, adipose tissue
Level 2 : Glycosaminoglycans
Level 3 : Scurvy, oedema, inflammation

v) Bone & Cartilage
Bone, Compact, Cancellous, Developing bone; ossification, Woven, lamellar bone
Cartilage, Classification, types, Perichondrium, functions
Level 2: Growth: Interstitial, Appositional; Bone callus, Osteomalacia , Osteoporosis , Osteoma
Level 3: Chondroma

vi) Muscle
Skeletal muscle Plain muscle Cardiac muscle Intercalated disc, syncitium; Sarcomere, I and A bands, myofibrils, myofilaments,; Sarcoplasmic reticulum,
Level 2: Innervation, Red fibres, white fibres
Level 3: Hypertrophy, Hyperplasia ,Rigor mortis , Myasthenia gravis

vii) Nervous
Neurons, types; Neuroglia, types; Myelinated nerve fibre *LS*; Non-myelinated nerve fibre; Peripheral nerve ; Nodes of Ranvier; Synapses;

viii) Vessels
Large sized artery Medium sized artery, Arteriole;Capillary,
Sinusoid;Medium sized vein;
Level 2: Atherosclerosis, Aneurysm, Infarcts, clotting
Lymphoid tissue
T cells, B cells;Mucosa Associated Lymphoid Tissue;Humoral immunity, Cell mediated immunity;Lymph node *section*; Thymus, Spleen, Tonsil
Level 2: Blood-thymus barrier, Open and closed circulation in the spleen
Level 3: Organ transplantation, Graft rejection, Autoimmune disease

II) SYSTEMIC HISTOLOGY

Basic organization, salient features, Identification
Structure and function correlation, individual features

i) Integumentary system
Skin – Types; Epidermis and dermis; various cells, Appendages of skin
Level 2: Renewal of epidermis
Level 3: Albinism, melanoma, Acne

ii) Alimentary system

a) Oral tissues

Lip, Tongue, taste buds, Papillae; Tooth, Developing tooth, Salivary glands

Level 2: Striated duct, ion transport

b) GI Tract

Basic organization - 4 layers;Oesophagus with glands Stomach - Fundus, Chief cells, Parietal cells, intrinsic factor; Stomach – Pylorus Duodenum Brunner's glands; Small intestine - with Peyer's patch, Appendix, Large intestine

Level 3: Pernicious anaemia, ulcer, gastritis, Hirschsprung's disease or megacolon

c) Glands

Pancreas: Exocrine, islets of Langerhans; Liver, Hepatic lobule, portal lobule,;portal acinus; Gall bladder

Level 2: Liver as an endocrine gland

Level 3: Diabetes mellitus, Cirrhosis of liver, liver regeneration, Chalones

iii) Respiratory system

Olfactory mucosa; Epiglottis; Trachea, Lung, Bronchus, bronchiole, alveolar duct, sac, alveoli, pulmonary type I and II cells

Level 2: Double spirally arranged bronchial smooth muscle

Level 3: Bronchial asthma, Hyaline membrane disease, Heart failure cells

iv) Urinary system

Basic organization; Nephron - Parts, podocytes, Collecting system; Kidney - Cortex, Medulla Ureter; Urinary bladder, Urethra

Level 2: Juxtaglomerular apparatus

v) Male reproductive system

Basic organization; Gonads, Tract, Accessory glands; Testis; Epididymis ; Vas deferens; Prostate ; Penis; Seminal vesicle

Level 2: Stages of spermatogenesis

Level 3: Immotile sperm

Female reproductive system

Basic organization; Gonads, Tracts, Accessory glands; ; Ovary - with corpus luteum; Fallopian tube; Uterus ; Cervix; Vagina, Mammary gland Active , Passive

Level 2: Stages of maturation of ovarian follicle , Phases of menstruation Colostrum, IgA, Placenta*:* Maternal unit, Foetal unit, Umbilical cord*:* Wharton's jelly

vi) Endocrine system:

Pituitary; Adenohypophysis; Neurohypophysis; Thyroid ; Follicular, parafollicular cells; Parathyroid ; Chief cells, oxyphil cells; Adrenal; Pancreas; Testis ; Ovary

Level 2: Hypothalamo-pituitary Portal system

Level 3: Pheochromocytoma

vii) Nervous system

A. Central

Basic organization; Cerebrum; Cerebellum; Spinal cord; Cervical; Thoracic; Lumbar; Sacral;

B. Peripheral

Sensory ganglia; Autonomic ganglia (sympathetic ganglion); Peripheral nerve

Special senses

I. Visual: Eyeball

Cornea ; Sclerocorneal junction ; Canal of Schlemm; Lens ; Retina ; Optic nerve

Level 3: Kerattoplasty, eye donation, glaucoma, retinal detachment

2. Auditory:

Internal ear; Cochlea ; Semicircular canals; Vestibule;

3. Olfactory

Nasal cavity

4. Gustatory

Tongue with taste buds

D) DEVELOPMENTAL ANATOMY

I) GENERAL EMBRYOLOGY

i) Introduction: Stages of human life phylogeny Ontogeny, Trimester, Viability,

Terms of reference: e.g. Cranial, Rostral, Caudal, Dorsal, Ventral, Lateral, Medial, Median, Planes of section

Level 3: The law of recapitulation, "Critical period", malformations, USG, Amniocentesis Chorionic Villus Biopsy, Fetoscopy, etc Teratology History of Embryology

ii) Gametogenesis: Menstrual cycle other reproductive cycles, Germ cell Transport and Fertilisation, Sperm capacitation, Methods of contraception, Sex determination

Level 3: Teratogenic influences; Fertility and Sterility, Surrogate motherhood; Social significance of “Sex-ratio”,

iii) Cleavage, Blastocyst, Cytotrophoblast, Syncytiotrophoblast
Implantation: Normal sites, Abnormal sites,; Placenta praevia, Extra-embryonic Mesoderm and Coelom; Bilaminar disc - Prochordal plate
Level 2: "abortion"; Decidual reaction, Chorionic Gonadotropins - Pregnancy test,

iv) Primitive streak Notochord, Neural tube and its fate Neural crest cells - their fate, Development of somites, Intra-embryonic coelom, Foetal membranes :Chorionic villi, Amnion, Yolk sac, Allantois
Level 2: Congenital malformations, Nucleus pulposus, Sacrococcygeal teratomas, Neural tube defects, Anencephaly
Level 3: Signs of pregnancy in the first trimester, Role of teratogens, Alpha-fetoprotein levels

v) Folding of the embryo: Derivatives of germ layers,
Pharyngeal arches
Level 2: Thalidomide tragedy, Estimation of Embryonic Age - Superfoetation & superfoecundation

vi) Fetal membranes: Formation Functions, fate of: Chorion ; Amnion; Yolk sac; Allantois; Decidua; Umbilical cord; Placenta - Physiological functions; Foetomaternal circulation, Placental barrier, Twinning: monozygotic, dizygotic
Level 2: Placental hormones, Uterine growth, Parturition, Estimation of fetal age,

Level 3: Types of cord attachments, Chorion villus biopsy and Amniocentesis;
Uses of amniotic membranes, Trophoblastic tumours - Rh incompatibility, Haemolytic disease of newborn,

II) Systemic Embryology

i) Cardiovascular System - Venous System; Heart - Chambers - Septa - Truncus -
Aortic arches - Fetal circulation - Changes at birth, ASDs, VSDs, PDA, Fallot's Tetralogy.
Level 2: Veins, abnormalities, Surgical corrections

ii) The Respiratory System: Development of Larynx, Trachea, Bronchi, Lungs; Tracheo-oesophageal Fistula
Level 2: malformations
Level 3: Respiratory Distress Syndrome; Premature births

iii) The Alimentary System: Foregut: Oesophagus, Stomach, (Lesser sac); Duodenum - Hepatobiliary apparatus, Pancreas, Spleen, Portal vein; Midgut : Rotation and Fixation, Caecum and Appendix, Meckel's diverticulum; Hindgut : Cloaca; Rectum and Anal Canal

Level 2: Malformation - Tracheo-oesophageal fistulae; Congenital Hypertrophic Pyloric Stenosis; Atresia; Omphalocele, Hernia; Malformations - Fistulae, Situs inversus; Nonrotation; Mixed rotation of gut

iv) **The Urogenital System**, Development of Kidneys and Ureters; Cloaca - Urinary Bladder and Urethra; Suprarenal gland; Genital System - Testis and Ovary; Ducts and associated glands; External genital organs, Mesonephric and paramesonephric ducts, Uterine tube, Uterus and vagina
Level 2: congenital malformations; Ambiguous genitalia and Hermaphroditism ; Remnants and Vestiges of Ducts and Tubules

v) **Integument:** Development of mammary gland, skin & appendages

vi) Pharyngeal arches, nerves, muscles, cartilage, development of face, palate

vii) **Endocrine :** Glands, Adrenal, Thyroid, Parathyroid, Pituitary

viii) **The Nervous System**: Neural Tube: Spinal Cord and Brain i.e., Forebrain, Midbrain and Hindbrain, Hypophysis cerebri; Neural Crest : Peripheral Nervous System,
Level 2: correlation Spina bifida; Anencephaly, Hydrocephalus, Retinal detachment; glaucoma; Coloboma iris,
Level 3: Myelination of tracts shortening of spinal cord, Neural Tube Defects
Organs of the special senses - Eye and Ear
Ear - Internal ear -; External and middle ear - anomalies of the Ear

E) GENETICS

i) Introduction – Mendelism, Laws Genetic code
Level 2: Evolution, Eugenics and Polygenic inheritance, Radiation and mutation , Sex chromatin, Population genetics

ii) **Cytogenetics**
Structure and function of chromosomes, Cell cycle, Cell divisions, Spermatogenesis, Oogenesis

iii) **Molecular genetics** (Normal)
Gene, Genetic code, Structure and types of DNA, Structure of RNA

iv) Inheritance: Single gene inheritance, Multifactorial inheritance, Polygenic inheritance, Mitochondrial inheritance, Pedigree charts with symbols

Genetic basis of variation

Mutation, Polymorphism, Multiple allelism
Level 2: Types, Factors influencing mutational load

Developmental genetics
chromosomes; Lyon's hypothesis; Hermaphroditism and pseudohermaphroditism; teratogenesis

Gonadal dysgenesis, Adrenogenital syndrome Androgen insensitivity

Level 3: Counselling

Pedigree charting
Chromosomal basis of disease: Numerical, Structural abnormalities Down's, *Cri-du-chat,* Turner's, Klinefelter's
Level 2: Dermatographics
Level 3: Counselling

Prenatal diagnosis
Maternal Serum Sampling; Fetal USG; Fetal Amniocentesis; Fetal Chorion Villus Sampling
Level 2: (cordocentesis); Foetoscopy
Level 3: Eugenics

F) Radiological Anatomy

I) Introduction

Principles of plain radiograms and CT scan.

Identification of gross anatomical features in plain and contrast radiographs.

Identification of gross anatomical features in normal CT scan especially of the Abdomen and Head-Face-Neck-Brain regions.

Diagnostic procedures. Technical details (e.g. dye) are not necessary.

Level 2 : Estimation of age if epiphyseal line seen.

II) UPPER LIMB – X-Ray of

Shoulder region
Arm
Elbow region
Fore arm
Wrist and hand

III) LOWER LIMB

Hip region
Thigh
Knee region
Leg
Ankle region
Foot

IV) ABDOMEN

Plain X-ray
Ba meal
Ba meal follow through
Ba enema
Oral cholecystogram
Intravenous urogram
Cystogram
Ascending pyelogram
Abdominal Aortogram
Hystero-salpingogram
Myelogram
CT abdomen

V) THORAX

Plain X-ray
Ba swallow
Bronchogram
CT mediastinum
High resolution CT lung

VI) **HEAD-NECK**

X-ray skull plain
Carotid angiogram
Vertebral arteriogram
CT Scan Brain

NECK

Plain X-ray cervical region

G) SURFACE ANATOMY

I) SURFACE MARKING:

II) LIVING ANATOMY:

i) Upper Limb

(BONY) LANDMARKS(PALPATION OF):
Clavicle, Spine of scapula, Inferior angle, Coracoid process, Epicondyles of humerus, Olecranon process of ulna; Head and styloid processes of radius and ulna, Heads of metacarpals (knuckles), Pisiform, Hook of Hammate

JOINTS (DEMONSTRATION OF MOVEMENTS):
Shoulder girdle, Shoulder joint, Elbow joint, Radio-ulnar joints, Wrist joint, 1st carpo-metacarpal joint, MP and IP joints

MUSCLES (DEMONSTRATION OF ACTION)
Principle of testing: Trapezius, Serratus anterior, Latissimus dorsi, Pectoralis major, Deltoid, Biceps Brachii, Brachioradialis, Brachialis, Extensors at the elbow, Supinators, Wrist extensors, Wrist flexors, Small muscles of the hand

NERVES: Dermatomes, Ulnar
Ulnar nerve thickening in Leprosy

VESSELS (PALPATION OF): Axillary artery, Brachial artery, Radial artery
OTHERS: Axillary groups of lymph nodes; Anatomical snuff-box (boundaries)

ii) Lower Limb

(BONY) LANDMARKS (PALPATION OF): Anterior superior iliac spine, Iliac crest, Tubercle of the iliac crest, Ischial tuberosity, Greater trochanter, Adductor tubercle, Head and neck of fibula, Lateral and medial malleoli, Tibial tuberosity, Subcutaneous surface of tibia, Patella
JOINTS (DEMONSTRATION OF MOVEMENTS): Hip , Knee , Ankle , Subtalar Joints
MUSCLES (DEMONSTRATION OF ACTION): Hip-Flexors, Extensors, Abductors, Adductors
Knee: Flexors, Extensors,
Ankle: Dorsiflexors, Plantar flexors
Subtalar: Invertors, Evertors
NERVES: Dermatomes, Sciatic, Tibial, Common peroneal, Femoral, Obturator
Thickening of common peroneal nerve in Leprosy

VESSELS (PALPATION OF): Femoral, Popliteal, Dorsalis pedis, Posterior tibial
OTHERS: Ligamentum patellae, Inguinal lymph nodes
TENDONS: Semitendinosus, Semimembranosus, Biceps femoris, Iliotibial tract

iii) **ABDOMEN**
(BONY) LANDMARKS (PALPATION OF): Anterior superior iliac spine, Pubic tubercle
JOINTS (DEMONSTRATION OF MOVEMENTS): Intervertebral
MUSCLES (DEMONSTRATION OF ACTION): Obliques, Transversus abdominis, Rectus abdominis
NERVES: Dermatomes
OTHERS: Enlarged liver, spleen, kidneys, Abdominal quadrants and regions; Position of superficial and deep inguinal rings; Renal angle; McBurney's point;
Level2: Murphy's sign

iv) **THORAX (BONY) LANDMARKS(PALPATION OF):** Sternal angle, Counting of rib spaces, locating thoracic spines
JOINTS (DEMONSTRATION OF MOVEMENTS): Intervertebral
MUSCLES (DEMONSTRATION OF ACTION): Respiratory movements
NERVES: Dermatomes
OTHERS: Apex beat, Apices of the lungs, Triangle of auscultation

v) HEAD FACE NECK - **(BONY) LANDMARKS (PALPATION OF):**
Nasion, Glabella, Inion, Mastoid process, Suprameatal triangle, Zygoma, Zygomatic arch, Angle of mandible, Head of mandible,
JOINTS (DEMONSTRATION OF MOVEMENTS): Temporomandibular joint
MUSCLES (DEMONSTRATION OF ACTION): Of Mastication, Of Facial expression
Cranial nerves (I to XIII) testing
(PALPATION OF): Superficial temporal artery, Facial artery
(PALPATION OF**):** Symphysis menti, Hyoid bone, Thyroid cartilage, Cricoid cartilage, Tracheal rings, Suprasternal notch, Transverse process of atlas, Spine of C_7
(DEMONSTRATION OF MOVEMENTS): Atlanto-occipital joint, Cervical joints
(DEMONSTRATION OF ACTION): Sternocleidomastoid, Neck flexors and extensors
(PALPATION OF): Common carotid artery, External carotid artery
OTHERS: Thyroid gland, Cervical lymph nodes, (Horizontal and vertical), Midline structures in the neck

NOTE :- Level 2 and 3 mentioned in the above syllabus includes the topics " desirable to know" (level-2) and " Nice to know" (level-3. The remaining topics fall under the group " Must Know" (level-1.

H) University Exam. Pattern

I) Theory Examination Pattern (In Anatomy)

ANATOMY PAPER 1-includes gross anatomy, systemic histology and systemic embryology of the region

above diaphragm.

ANATOMY PAPER 11-Includes the gross anatomy, systemic histology and systemic '1 embryology of the region below diaphragm. It also includes General histology, General 1 embryology, general anatomy & genetics.

NATURE OF EACH QUESTION PAPER

Faculty with Year : ***FIRST MBBS***

Subject : **ANATOMY**

Paper : ***I***

Total Marks : ***50*** ***Time*** : ***2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the circle once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (10 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 20	20 X ½	10

Section "B" & "C" (40 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

6)

Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

Faculty with Year **:** ***FIRST MBBS***

Subject **:** **ANATOMY**

Paper **:** ***II***

Total Marks **:** ***50*** ***Time*** **:** ***2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the circle once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (10 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs :20	20 X ½	10

Section "B" & "C" (40 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

II) Practical Exam. Pattern:

Marks for viva - 20

i) Axial Skeleton ...10 marks } Total 20 marks
ii) Appendicular skeleton ...5 marks } of viva
iii)Embryology models …5 marks

Practical marks ..40

iv) Soft parts dissected body, organs, viscera, brain ...20 marks }
v) Histology -spotting …..6marks 10 marks
-one slide for discussion …..4marks
vi) Radiology ...5 marks

vii) Surface living anatomy ….5 marks

I) Anatomy books recommended

1) Gray's Anatomy
2) Sahana's Human Anatomy
3) Chouraia's Human Anatomy 3 volumes
4) Cunningham's manual of Practical Anatomy
5) Regional Anatomy by R. J. Last
6) Human Histology by Inderbir Singh
7) Atlas of Human Histology- DIFORE
8) Surgical Anatomy- McGregor
9) Histolgoy- by ham,
10) Human Embryology – Inderbir Singh,
11) Medical Embryology – Langman,
12) Surface Anatomy & Radiology – Halim Das,
13) General Anatomy by – Chowrisia
14) Text book of Neuroanatomy – Inderbir Singh
15) Central Nervous System – Podar Bhagat
16) Clinical anatomy for medical students – Richard Snell
17) J.S.P. Lumbley at all – M.C.Q's in Anatomy

FIRST M.B.B.S. - SYLLABUS

HUMAN PHYSIOLOGY

I) GOAL

The broad goal of the teaching of undergraduate students in physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and diseases.

II) EDUCATIONAL OBJECTIVES:

1)At the end of the course, the student will be able to: describe the normal functions of all the organ systems, their regulatory mechanisms and interactions of the various systems for well-coordinated total body function.

2)Understand the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis).

3)Explain the physiological aspects of normal growth and development.

Analyse the physiological responses and adaptation to environmental stresses.

4)Comprehend the physiological principles underlying pathogenesis and treatment of disease.

5)Correlate knowledge of physiology of human reproductive system in relation to National Family Welfare Program.

III) SKILL :

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

1) Conduct experiments designed for study of physiological phenomena.
2) Interpret experimental/investigative data.
3) Distinguish between normal & abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

IV) INTEGRATION :

At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

V) COURSE CONTENT :

Theory

List of topics.

A) GENERAL PHYSIOLOGY. (5 hours)

Must know.

- Introduction to Physiology
- Branches of Physiology
- Functional organization of human body.
- External and internal environment
- Homeostasis, Biofeedback mechanisms

Cell Physiology:

- Transport across cell membrane.

B) HEMATOLOGY : (15 hours)

Must know

- Composition of blood
- Functions of blood
- Plasma proteins: Types, concentration, functions.
- Erythrocytes: Morphology, functions, normal count physiological variations in normal count & anaemia, polycythemia.
- Haemopoesis: general concepts
- Erythropoiesis: stages, Sites, regulation, reticulocyte & its clinical significance.
- Haemoglobin: Functions, normal values, physiological variations.
- Fate of erythrocytes: life span, Catabolism of Hb, bilirubin metabolism, jaundice.
- Physiological basis of anaemia, nutritional anaemia.
- Polycythemia: Primary & secondary.

- Leukocytes: differences between R.B.C. & W.B.C., types of W.B.C.s normal count & differential W.B.C. count, physiological variations, properties, functions of W.B.C.s,,

  Granulopoiesis – stages, regulation,

  Lymphopoiesis.

  Pathological variations in total & differential W.B.C. count.

- Immunity: definition, concept of antigen & antibody, types of immunity- Innate & Acquired, & their mechanism, cell mediated & humeral immunity, B lymphocytes, T lymphocytes & their types.

  Primary & secondary response, basis of vaccination.

- Blood groups: Landsteiner's law,

  ABO System – type A & B antigen, ABO system & inheritance, relation to transfusion, cross matching major & minor.

  Rh System – inheritance, Rh incompatibility & blood transfusion, Erythroblastosis foetalis.

- Blood transfusion: indications, storage of blood & changes during storage, transfusion reactions.

- Monocyte - macrophage system: Classification, functions, functions of spleen.

- Hemostasis: definition, basic mechanisms of Hemostasis,

- Platelets:structure, normal count & variations, functions, role in platelet plug formation, Hemostasis & clot retraction.

- Blood coagulation: Coagulation factors in plasma, basic mechanism of blood clotting, intrinsic & extrinsic pathways & difference between two pathways, role of calcium in coagulation, role of vitamin K, fate of clot.

  Anticoagulants – commonly used & their mechanism of actions, blood coagulation tests – bleeding time, clotting time.

  Haemophilia.

- Body fluid compartments: role of water in body & its distributions, different body fluid compartments & composition of their fluid.

- Blood volume: normal value, physiological & pathological variations, blood volume regulation in detail (To be taken at end of lectures on C.V.S, kidney and endocrines)

Desirable to know

- Physical properties of blood.
- Plasma proteins: Plasmapheresis, role of liver in plasma protein synthesis, relationship of diet & plasma protein synthesis.
- R.B.C.: advantages of biconcave shape.
- Bone marrow structure and cellular elements.
- Common Haemoglobinopathies (Hbs, Hbc, Thalassaemia)
- Method of determination of life span of R.B.Cs.
- Types of jaundice.
- Polycythemia – effects on haemodynamics,.
- Immunity: Antibody structure & types, antigen – antibody reactions.
- Blood group: M. N. system, other blood groups.
- Thrombocytosis, thrombocytopenia purpura.
- Anticoagulants: used in vitro & in vivo.
- Other blood coagulation tests.
- Classification of haemorrhagic diseases, D.I.C.
- Measurement of: total body water, blood volume, plasma volume, I.C.F. volume.

Nice to know

- Blood component therapy.
- Effects of splenectomy.
- Plasmin system.

C) NERVE (5 hours)

Must know:

- Distinctive histological features relevant to functions of nerve fibers.
- Classification of nerve fibers: based on structure, diameter, functions and only for sensory nerves.
- R.M.P. definition, production & maintenance, method of measurement, significance.
- Action potential: definition,

  Phases – depolarization, repolarisation, ionic basis of depolarization & repolarisation.

  Production & propagation of A.P.,

  Properties of A.P., significance.
- Properties of nerve fibers.
- Strength duration curve: chronaxie and factors affecting it.
- Factors affecting conduction in a nerve.

Desirable to know:

- Experimental techniques to study the mechanism of production of R.M.P. & A.P.: patch clamp, voltage clamp
- Methods of recording of A.P.

D) MUSCLE (7 hours)

Must know.

- Classification of muscles,
- Structure of skeletal muscle:

  Electronomicroscopic structure, muscle proteins – contractile, regulatory, structural & enzymatic.

  Sarcoplasmic tubular system: concept of sarcoplasmic triads & their functions.
- Neuromuscular transmission: Physiologic anatomy, events, N-M blocking & its clinical significance, applied aspect – myasthenia gravis.

- Excitation – contraction coupling.
- Molecular basis of skeletal muscle contraction: sliding filament theory, power stroke – corss bridge cycle, role of calcium.
- Energetics: fuel used by skeletal, muscle at rest & in exercise, metabolic pathways involved to yield A.T.P.,

  Oxygen debt: definition, types (lactic, alactic), incurring of debt, repaying the debt, significance.
- Properties of skeletal muscle: excitability, refractory period (absolute, relative), conductivity, contractility – types (isometric, isotonic), effects of summations (multiple motor unit summation, frequency summation & tetanizibility), all or none law, extensibility & elasticity, fatiguability.
- Factors affecting development of tension in the muscle:
  a) number of motor units contracting- type of muscle, number of muscle fibers in each unit activated, supraspinal influences.
  b) length – tension relationship
  c) frequency of stimuli, duration of stimulation
  d) load
  e) type of contraction
  f) Chemical composition of muscle fibers and ions.
- E.M.G. (in brief)
- Skeletal muscle circulation.
- Smooth muscle: structure, distribution, types molecular mechanism of contraction, properties, regulation, and disorders.

Desirable to know

- Heat liberated during various phases of contraction, Fenn effect.
- Recording of muscle activity.

Nice to know

- E.M.G. details.

E) RESPIRATORY PHYSIOLOGY (15 hours)

Must know:

- Physiologic anatomy
- Functions of respiratory system, non respiratory functions of lung
- Mechanics of respiration:

Ventilation :

Inspiratory & expiratory muscles, intraplural pressure, lung & thoracic compliance, factors affecting compliance, work of breathing, surface tension forces & role of surfactant, airway resistance, elastic resistance.

- Lung volumes and capacities. Measurement, physiological & significance (tidal volume, vital capacity, forced vital capacity – details)
- Pulmonary ventilation, alveolar ventilation, alveolar dead space, - applied aspect,

Maximum breathing capacity & breathing reserve.

Diffusion of Gases :

- Exchange of respiratory gases at alveolar – capillary membrane, factors affecting diffusion.

Gas Transport :

- Transport of oxygen, role of Haemoglobin, oxygen dissociation curve & factors affecting it.
- Transport of carbon dioxide

Control of Breathing :

Neural control – higher centers, reflexes.

Chemical control – central & peripheral chemoreceptors role of CO_2, O_2, H^+

Pulmonary Circulation

- Characteristics
- Ventilation perfusion ratio
- Respiratory adjustment in exercise.
- Hypoxia: types & high altitude hypoxia.

- Artificial respiration:
- Pulmonary function tests - principles

Desirable to know.

- Method of determination of dead space, residual volume, functional residual capacity.
- Oxygen therapy: indications, hazards of hyperbaric oxygen & use.

Nice to know

- Concept of P_{50}
- Positive pressure breathing.

F) CARDIOVASCULAR PHYSIOLOGY (20 hours)

Must know:

- Introduction, functions & importance of the system.
- General organization.
- Structure of heart, pericardium, myocardium, endocardium, nerve supply, Histology, details of cell junctions, syncytium, contractile & conducting fibers.
- Properties of cardiac muscle: excitability, conductivity, contractility, autorhythmicity, all or none law, long refractory period.
- Junctional tissues of heart, pacemaker potential, action potential of cardiac muscle.
- Generation & conduction of cardiac impulse.
- ECG: lead arrangement, normal waves & their significance with reference to lead II
- Cardiac cycle: pressure – volume changes, heart sounds & their clinical significance, correlation of pressure, volume, ECG, heart sounds in cardiac cycle.
- Heart rate & its regulation.
- Haemodynamics - def.,blood flow, resistance
- Cardiac output: normal values, physiological variations, factors affecting cardiac output – details, regulation, measurement – principles.

- Blood pressure:

  Normal levels, measurement, determinants, short term & long term regulation - details.
- Capillary circulation, tissue fluid formation.
- Lymphatic system: Anatomy & structure, formation of lymph, composition of lymph, functions of lymphatic system, lymphflow & factors affecting it.
- Regional circulation: Physiologic anatomy, factors affecting, special features: coronary, cerebral , skin, portal
- Adaptation of cardiopulmonary system to various grades of exercise.
- Hemorrhagic shock – stages & compensatory mechanisms, effects on body, physiological basis of treatment in brief.

Desirable to know:

- Ion channel & receptors (physiological, pharmacological & clinical significance)
- E.C.G. – electrical axis of heart, heart blocks, arrhythmias, ischaemia, infarctions.
- Heart sounds: murmurs & their clinical significance.

Nice to know

- Experimental methods of studying cardiovascular physiology,
- Patho physiology of oedema

G) RENAL PHYSIOLOGY (10 hours)

Must know:

- General introduction, structure & functions of kidney.
- Renal circulation: special features from functional point of view.
- Concept of clearance: to study renal physiology, for :

a) GFR – Inulin, Creatinine, basic principle of radioisotope method.

b) Renal blood flow – PAH

c) Concentration & dilution of urine – free water.

- Formation of urine:

1) Glomerular stage – GFR (definition, dynamics, factors affecting & measurement))

2) Tubular stage – Reabsorption & secretion.

   a) Sodium, potassium, glucose : details
   b) Handling of water – concentration & dilution of urine.
   c) Secretion of H^+

3) Role of kidney in acid – base balance.

- Physiology of micturition: basic reflex & control, cystometrogram.
- Artificial kidney: basic principles of dialysis.

Desirable to know:

- Experimental studies for renal functions.

Nice to know

- Disorders of micturition.

H) BODY TEMPERATURE REGULATION: (2 hours)

Must know:

- Homeothermia – Balance between heat gain & heat loss.
- Regulation of body temperature,

Desirable to know:

- Hyperthermia, Hypothermia.

I) ALIMENTARY SYSTEM: (12 hours)

Must know:

- General introduction & organizational plan, innervations and blood supply.

Salivary secretion:

- General principles & basic mechanisms of secretion composition ,and functions of saliva, mechanism & regulation of salivary secretion.

Mastication and deglutition:

- Three phases of deglutition- physiologic anatomy, mechanism & control

Gastric secretion:

- Functional anatomy, histology, functions of stomach, composition of gastric juice, cellular mechanism of gastric secretion of acid, pepsin, intrinsic factor, other enzymes, phases of gastric secretion, regulation of gastric secretion.
- Gastric Motility:

  Electrical activity of stomach, pylorus, emptying of the stomach-pyloric pump, regulation & factors promoting & inhibiting emptying.

Pancreatic secretion:

- Structure, composition & mechanism of secretion of electrolytes & enzymes, regulation of secretion.
- Liver & gall bladder:

  Microscopic structure, functions of liver, composition of bile, cellular mechanism of bile formation, enterohepatic circulation of bile salts, control of secretion, concentration & storage of bile in gall bladder. filling & evacuation of gall bladder functions of gall bladder

  Intestinal secretion:

- Structure, innervations.
- Composition & mechanism of secretion of small intestinal juice, regulation of secretion.
- Secretion of large intestine: mucous, water, electrolyte.
- Motility of small intestine:

  Structure & innervation electrical activity of smooth muscle, resting membrane potential, slow waves, spike potentials, rhythmic segmenting contractions, peristalsis, control – neural & hormonal, functions of ileocecal valve.
- Motility of large intestine:
- Structure & innervation,'mixing & mass movements, defecation reflex' and its control
- G.I. hormones: in brief.

Digestion & absorption:

Digestion & absorption of - carbohydrate,
- Proteins
- Fats

absorption of water, electrolytes and vitamins.

Desirable to know:

- Gastric mucosal barrier, experiments to study regulation of gastric juice secretion, disorders of secretion, peptic ulcer., inhibitors of gastric secretion
- Effects of vagotomy, abnormal gastric motility vomiting.
- Barium meal studies, endoscopy, biopsy.
- Pathophysiology of small intestinal motility, paralytic ileus, diarrhea, obstruction.
- Pathophysiology of colonic motility, irritable bowel syndrome, drugs, constipation.
- Pancreatic function tests.
- Gall stone, effects of removal of gall bladder

Nice to know

- Disturbances of esophageal motility, spasm, achalasia, hiatus hernia.
- Methods for study of intestinal absorption.
- Effects of hepatectomy.

J) NUTRITION: (2 hours)

Must know:

- concept of balanced diet
- factors affecting caloric requirements
- requirements of various nutrients, sources, daily needs.
- nutrition under special conditions – pregnancy, lactation, growing child.

K) ENDOCRINE SYSTEM (10 hours)

Must know:

- Introduction
- Endocrine functions of Hypothalamus – releasing hormones, Mechanism of hormone action
- Anterior pituitary hormones:
  functions, regulation, disorders.
  posterior pituitary hormones,ADH, Oxytocin. functions, regulation, disorders.
  Thyroid:
  hormone: synthesis, fate, functions, regulation, disorders.
- Parathyroid:
  hormone: synthesis, functions, regulation, disorders – tetany.
- Adrenal cortex: and medulla.
  hormone: secretion, functions, regulation, disorders
- Pancreatic hormones:
  secretion, functions, regulation, disorders.

Desirable to know:

- Radioimmuno assays.

Nice to know

- Experimental studies.

L) REPRODUCTIVE PHYSIOLOGY: (8 hours)

Must know:

- Sex chromosomes, sex determination, sex differentiation
- Functional anatomy of reproductive system.
- Puberty: changes in males & females and its control.
- Spermatogenesis: stages & regulation

Semen analysis.

- Testosterone: actions & regulation.
- Male sexual act.
- Menstrual cycle & ovarian cycle:

Phases & hormonal regulation.

- Menopause.
- Ovulation: indicators & importance
- Fertilization, implantation of ovum.
- Functions of placenta
- Physiology of pregnancy;
- Maternal changes during pregnancy
- Parturition: in brief – stages and mechanism.
- Lactation: initiation & maintenance and control.

advantages of breast-feeding.

- Contraception: to be taken as integrated topic.

Desirable to know:

- Sex chromosomes: Barr bodies.
- Development of genitals & gonads

Nice to know

- Precocious & delayed puberty.

M) SPECIAL SENSES (8 hours)

Must know:

- Eye:

Functional anatomy of eye, optics, microscopic structure of retina with retinal circuits, image formation,

Photochemistry of vision (photopic & scotopic vision, dark & light adoption),

Pupillary reflexes, Accommodation reaction, Errors of refraction and their correction, Colour vision – physiological & neural basis, accepted theory

of colour vision, classifications, basis of colour blindness and tests of colour blindness, significance.

Visual pathway – processing of information at different levels in visual pathway, organisation of visual cortex. Effects of lesion at different levels in visual pathway,

Movements of eyeballs: functions & control.

- Ear:

Physics of sound, decibel system,

Functions of external ear,

Functional anatomy of middle ear, functions of middle ear in detail, assessment of functions of middle ear, Functional anatomy of cochlea, functions of inner ear, place principle, theories of hearing.

- Audiometry,

Auditory pathway & important features, auditory cortex (role in hearing & speech development)

- Taste:

Functional anatomy of taste buds, different taste modalities, pathway, factors affecting taste sensation,

- Smell:

Functional anatomy of receptors, primary olfactory sensations, pathway, factors affecting smell sensation,

Desirable to know:

- Resolution of images,
- Electrophysiology of internal ear: cochlear micro phonics.

Nice to know

- Electrophysiology of retina.
- Theories of hearing.

N) CENTRAL NERVOUS SYSTEM: (50 hours)

Must know

- Outline of nervous system.

1) General nervous system:

Synapse: definition, physiological anatomy, sequence of events of synaptic transmission, properties, (state the property & its significance), significance of synaptic transmission, applied aspect.

Neurotransmitters – in brief.

Receptors: definition, classification (basis of each classification with example), properties (state each property with underlying mechanism & significance), significance (homeostasis, conscious awareness of environment, tone posture, protection).

Sensations: different modalities, classification with examples and significance

- sensation of touch, pain proprioception : details of each

Reflexes: definition, classification (basis of classification with example), reflex arc & its components, properties (state each property with basis & importance)

Stretch reflex – definition, muscle spindle (details with innervation, role of gamma motor neurons) role of supra spinal control – in brief, functions of stretch reflex (regulation of muscle tone) inverse stretch reflex.

Polysynaptic reflexes: withdrawal reflex.

2) Tracts:

Ascending & descending tracts: details of each tracts – (situation & extent in spinal cord, origin, course & termination, collaterals, somatotopic arrangement, functions, applied aspect, tests)

Ascending tracts: Basic plan of somato sensory pathway for conscious Sensation, pathway from head, face region.

Descending tracts: pyramidal tracts – details., extra pyramidal tracts, differences between UMN & LMN lesions.

2) Sections at various levels in CNS :

a) Spinal transection – spinal animal.

Complete – 3 stages – spinal shock, stage of recovery, stage of reflex failure – details of each stage.

Incomplete. Transection

Hemisection

b) Low midbrain section – decerebrate animal : Decerebrate rigidity. (Classical & ischaemic with mechanisms, characteristics features, physiological significance)

c) High midbrain section – High decerebrate animal.

d) Thalamic or Decorticate animal.

3) Posture - & Equilibrium.

Definition, classification of postural reflexes.

(Details of each reflex and its function.)

regulation of posture (integrating centers at various levels of CNS)

vestibular apparatus : Physiologic anatomy, mode of function of utricle & saccule and semicircular canals, vestibulo occular & vestibulo spinal reflexes.

4) Thalamus :

Functional classification of Thalamic nuclei, with connections of different nuclear groups, functions of thalamus, thalamic syndrome.

5) Hypothalamus :

Functional classification of different hypothalamic nuclei, connections in brief, functions in details.

6) Limbic system :

Parts of limbic system, connections in brief, functions.

7) Reticular formation :

Introduction, anatomy in brief, functional divisions.

(A)Ascending reticular activating system – details with connections & role in sleep wakeful cycle, applied aspect.

(B) Descending reticular system – role in regulation of muscle tone by pontine & medullary regions.

(C) Visceral centres.

8) E. E. G. :

Definition, different waves, characteristics & functional significance of each wave, physiological variation, clinical application in brief.

9) Sleep & Wakefulness :

Concept of alertness & wakefulness with their physiological basis, Definition of sleep, stages of sleep correlated with EEG, sleep cycle – types of sleep, salient features of NREM & REM sleep, physiological effects of sleep on different systems of the body, Neurophysiological mechanisms of sleep, functions of sleep.

10) Cerebellum :

Introduction, functional classification, intracortical circuit, deep cerebellar nuclei, connections of different lobes, functions of cerebellum, cerebellar function tests, effects of lesion in brief.

11)Basal Ganglia :

Introduction, classification of nuclei, connections, intracortical circuits, functions, lesions - Pa rkinsonism.

12) Cerebral Cortex :

Gross anatomy & divisions, concept of Broadmann's mapping with diagram, Parietal lobe – anatomical & functional divisions, details of each functional part as regards connections, topographic organisation, functions. Frontal lobe – excitomoter Cortex – anatomical & functional parts, details of each part as regards connections, topographic organisation, functions.

Prefrontal Cortex – different areas, connections in brief, functions, effects of lobectomy.

13) speech –

Afferent and efferent mechanisms and role of cortical centers in speech, concept of cerebral dominance, development of speech, vocalization.

14) Memory :

Definition, stages, types, physiological basis, factors affecting, applied – amnesias in brief.

15) Learning :

Definition, types with examples, stages, factors influencing, role of motivation (positive & negative reinforcement, reward & punishment), physiological basis – role of different parts of CNS, structural, biochemical changes.

16) Conditioned reflexes :

Definition, difference between unconditioned & conditioned reflexes, development of conditioned reflexes, properties, significance.

17) Autonomic nervous system :

Organization and functions of Parasympathetic & Sympathetic and their control.

18)CSF :

Introduction, composition, normal CSF pressure, formation & circulation, functions, applied aspect – brief, blood brain barrier, blood CSF barrier.

19)“ Physiology of Brain Death & changes after that ” (This topic included vide Academic Council Resolution No. 303/2008 dated 29/07/2008)

Introduction of “ Brain Death and Organ Donation” topic in subjects of Physiology , Preventive & Social Medicine, Psychiatry, Medicine & Surgery

Desirable to know :

General nervous system :

Neurotransmitters – details, susceptibility of synapse to hypoxia drugs etc., Mechanisms of referred pain, differences between superficial & deep pain, central analgesia system, supraspinal control of stretch reflex – details.

Thalamus - applied aspects – effects of lesions.

Hypothalamus - applied aspects – effects of lesions

Reticular formation – effects of lesion

EEG – Method of recording, abnormal patterns.

Basal Ganglia – lesions, involuntary movements.

Cerebellum – Embryology, evolution, effects of stimulation & ablation.

Cerebral cortex – effects of stimulation & ablation in different regions.

Speech – aphasias.

Nice to know

Experimental studies – effects of stimulation & ablation.

Sleep, wakefulness – effects of sleep deprivation, disorders.

Books recommended:

1) Textbooks of Physiology :

Guyton	-	Textbook of Physiology
Ganong	-	Review of Medical Physiology
S. Wright	-	Applied Physiology

2) Reference Books :

Best and Taylor	-	Physiological basis of medical practice
Berne & levy.	-	Principles of Physiology
Dr. V.G. Ranade	-	Laboratory Manual and Journal of Physiology Practicals

(A)Haematology

Hb% R. B. C. W. B. C. Differential, B.T.C.T. Blood group, ABO system Rh typing, Blood Indices

(B)Clinical examination and Human experiments

Stethography, Spirometry, Ergography, Perimetry, Tests for physical fitness, Clinical examination of all systems.

(C)Demonstrations

Reticulocyte count. Platelet count, P. C. V., E. S. R, fragility, peripheral blood smear, bone marrow slides,

E.M.G. S.D. curve, conduction velocity of nerve (Human), E.C.G., E.E.G., Audiometry, H.R.T. (Human reaction time)

Visit to blood bank, wards to show common disorders or video tapes (list given in appendix I), X-rays (list given in appendix II)

Animal experiments on frogs,

a) Skeletal muscle:

effect of graded stimuli,

simple muscle twitch

genesis of tetanus,

effect of load on skeletal muscle

fatigue.

"Velocity of Nerve Impulse & Effect of Two Successive Stimuli in Skeletal Muscle" (his two expt. Is added in new syllabus vide academic council resolution No. 64/2009 dated 28/04/2009)

Introduction of " Velocity of Nerve Impulse &Effect of Two Successive Stimuli in Skeletal Muscle Topic in 1st MBBS Practical Syllabus

b) Cardiac muscle.

normal cardiogram, effect of temperature,

properties of cardiac muscle,

effect of vagal stimulation and phenomenon of vagal escape.

effect of drugs (Acetyl choline, Adrenaline, Nicotine) on frog's heart.

perfusion of isolated frogs heart with effects of Na^+ , K^+ and Ca^{++},

- and demonstration of Starling's law

Museum to be developed

Historical land marks, Nobel laureates

VII) EVALUATION :

a) Theory – systems to be included are

Paper I

Cardiovascular, Respiratory, Gastrointestinal, Endocrines, Reproduction, Acclimatization to hypoxia, Temperature regulation, Exercise physiology

Paper II

Cell membrane and transport systems across the cell membrane, Homeostasis Nerve and Muscle Physiology, Blood, Excretory, C.N.S. and special senses.

Duration of each paper : 2 Hours & 30 minutes

(30 minutes – **Section** A – M.C.Q.

2 hours – **Section B** & C)

MCQ Section A will be given to the candidate at the beginning of the examination. After 30 minutes, Section A will be collected. Paper containing Section B and Section C will then be handed over to the candidate. Section B and Section C are to be written in separate answer sheets.

Marks : Total marks for each paper : 50

NATURE OF QUESTION PAPER

Faculty with Year : ***FIRST MBBS***

Subject : **PHYSIOLOGY**

Paper : ***I***

Total Marks : ***50*** ***Time*** : ***2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (10 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 20	20 X ½	10

Section "B" & "C" (40 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

Faculty with Year	***:***	***FIRST MBBS***			
Subject	***:***	**PHYSIOLOGY**			
Paper	***:***	***II***			
Total Marks	***:***	***50***	***Time***	***:***	***2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
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Section "A" : MCQ (10 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 20	20 X ½	10

Section "B" & "C" (40 Marks)

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1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
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Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

C) PATTERN OF VIVA VOCE AND PRACTICAL EXAMINATION

There shall be separate batches of students for viva and Practicals.

(i) Viva examination (orals) Total marks 20 Duration – 20 minutes.

Four Examiners (5 minutes with each examiner)

(ii)Two Examiners for topics of paper I systems to be distributed,

Two Examiners for topics of paper II systems to be distributed,

(B) Practical examinationTotal marks 40

3 Exercises:

Exercise	(1) Clinical examination	… 20 marks,
	4 sub questions each of 5 marks,	
	(i) C.V.S.	…5
	(ii) R.S.	…5
	(iii) C.N.S. & Special senses	…5
	(iv) Abdomen	…5
Exercise	(2) Haematology	…10 marks,
Exercise	(3) Short exercise	…10 marks,

Sub questions each having 2 marks,

Calculations,

Interpretation of graphs,

Charts,

Data analysis and interpretation

Photographs on-endocrine disorders,

Neurological disorder,

APPENDIX I

List of common disorders to be shown during word visits or using video tapes.

1. Generalised Oedema

2. Anaemia
3. Jaundice
4. Hepatomegaly
5. Splenomegaly
6. Ascites
7. Myxoedema
8. Cretinism
9. Hyperthyroidism
10. Dwarfism
11. Acromegaly
12. Facial nerve paralysis
13. Hemiplegia
14. Paraplegia
15. Parkinsonism
16. Cerebellar dysfunction.

APPENDIX II

List of X-rays to be shown along with clinical examinations to improve understanding.

1. Normal X-ray chest
2. Consolidation of lung
3. Pleural effusion showing mediastinal shift
4. Collapse of lung / cavity in lung
5. Hyper inflated lungs in emphysema
6. Left ventricular hypertrophy showing shift of apex beat
7. Barium meal follow through – oesophagus, stomach, small and large intestine.

APPENDIX III

Topics to be asked as applied questions in theory .

A brief history and diagnosis to be provided.

1. Erythroblastosis foetalis
2. Haemophilia, purpura
3. Myasthenia gravis
4. Peptic ulcer
5. Oedema
6. Jaundice and anaemia – due to mismatched transfusion
7. Myxoedema
8. Cretinism
9. Hyperthyroidism
10. Tetany
11. Acromegaly, Gigantism
12. Respiratory distress syndrome
13. Parkinsonism
14. Asthma
15. Hemiplegia
16. Spinal cord injury
17. Deafness
18 Hemorrhagic shock
19 Cushing's syndrome
20 Dwarfism

HUMAN BIOCHEMISTRY

Human Biochemistry – Phase I M.B.B.S.

i) Goal :-

The broad goal of the teaching of undergraduate students in biochemistry is 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.

ii) Objectives :-

a) Knowledge

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

1) describe the molecular and functional organization of a cell and list its subcellular components;
2) delineate structure, function and inter-relationships of biomolecules and consequences of deviation from normal;
3) summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
4) describe digestion and assimilation of nutrients and consequences of malnutrition;
5) integrate the various aspects of metabolism and their regulatory pathways;
6) explain the biochemical basis of inherited disorders with their associated sequelae;
7) describe mechanisms involved in maintenance of body fluid and pH homeostasis;
8) outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine.
9) Summarize the molecular concept of body defences and their application in medicine;
10) Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
11) familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of given data;
12) suggest experiments to support theoretical concepts and clinical diagnosis;

b) SKILLS

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

1) make use of conventional techniques / instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
2) analyze and interpret investigative data;
3) demonstrate the skills of solving scientific and clinical problems and decision making.

c) INTEGRATION

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

1. Total no. of teaching hours allotted to Human Biochemistry – 240 hrs.

2. **Theory examination**:

There will be TWO papers, each of two and half hours duration. Each paper will be of 50 marks with one compulsory question on applied biochemistry.
Each paper will consist of FIVE questions.

3. Paper wise distribution of theory topics :
Structural formulae are not obligatory.

Paper- I (50 marks) 2 ½ hours duration.

1 Molecular and functional organization of a cell and its sub-cellular components.
2. Chemistry of enzymes and their clinical applications.
3. Chemistry and metabolism of proteins and related disorders.
4. Chemistry and metabolism of purines and pyrimidines and related disorders.
5. Chemistry and functions of DNA and RNA , Genetic code ; Protein biosynthesis &.regulation (Lac-operon)
6. The principles of genetic engineering and their applications in medicine.
7. Chemistry and Metabolism of haemoglobin.
8. Biological oxidation.
9. Molecular concept of body defence and their applications in medicine.
10. Vitamins and Nutrition.

PAPER - II (50 marks) 2 ½ hours duration.

1. Chemistry and metabolism of carbohydrates and related disorders.
2. Chemistry and metabolism of lipids and related disorders.
3. Mineral metabolism: Water and electrolyte balance & imbalance.
4. Acid base balance and imbalance.
5. Integration of various aspects of metabolism and their regulatory pathways. Starvation metabolism.
6 Mechanism of hormone action.
7 Environmental biochemistry.
8 Liver function tests, Kidney function tests, Thyroid function tests.
9 Detoxification mechanisms.
10 Biochemical basis of cancer and carcinogenesis.
11 Radioisotopes.
12 Investigation techniques : (LCD-Topics) Colorimeter, Electrophoresis, Chromatography & Flame photometer. PH measurement

5 NATURE OF QUESTION PAPER - Theory

Faculty with Year : ***FIRST MBBS***

Subject : **BIOCHEMISTRY**

Paper : ***I***

Total Marks : ***50*** ***Time*** : ***2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (10 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 20	20 X ½	10

Section "B" & "C" (40 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

Faculty with Year	***:***	***FIRST MBBS***
Subject	***:***	**BIOCHEMISTRY**
Paper	***:***	***II***
Total Marks	***:***	***50*** ***Time : 2 ½ Hours***

Section "A" (10 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
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Instructions:-

1) All questions are compulsory.
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3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : SAQ (24 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions (any six out of seven)** ***(two should be based on Applied Aspects)*** a) b) c) d) e) f) g)	6 X 4	24

Section "C" : LAQ (16 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Solve any two out of three:** ***(Long answer question only)*** a) b) c)	2 X 8	16

6. PRACTICAL :

Practical examination in Biochemistry will be of
TWO hours duration 40 marks

B) Exercise

Q.1. : One quantitative experiment from group A 20 marks
(15 marks for expt. & 5 marks for table viva)

Q.2. : One qualitative/ quantitative experiment from 15 marks
group B.(10 marks for expt. & 5 marks for table viva

Q.3. Spot identification from group C. 5 marks.

Group A :

Blood sugar, Blood urea; Serum total protein, Albumin and A/G ratio, Alanine amino transaminase(SGPT), Aspartate amino transaminase(SGOT) , Alkaline phosphatase, Serum amylase, Serum total bilirubin, Serum uric acid, Serum calcium, CSF sugar.

Group B :

Creatinine in urine, Serum cholesterol, Serum phosphorus, CSF protein, Tests for monosaccharides (Ben edict, Barfoed,Selivanoff, Nylander, rapid furfural) , Tests for disaccharides, Colour reactions of proteins, Precipitation reactions of proteins, Normal Organic constituents of urine, Abnormal constituents of urine, S. Creatinine.

Group C :

Identification of slide under microscope,
Use of reagent.
Significance of test.
Use of Instrument /Appliances.
Identification of Hb - derivative.
Identification of GTT , Electrophoretogram and chromatogram.

Candidate will be allowed to use flow chart for quantitative exercise only.
There will be table viva on Q.1 & Q.2 exercise.

(7). SYLLABUS FOR PRACTICAL

1. Tests for monosaccharides.
2. Tests for disaccharides.
3. Colour reactions of proteins.
4. Precipitation reactions of proteins.
5. Spectroscopic examination of Hb -derivatives (Oxy Hb; deoxy Hb; meth-Hb).
6. Estimation of blood sugar.
7. Estimation of blood urea.
8. Estimation of i) Serum creatinine, ii) Creatinine in urine..
9. Determination of serum total protein ,albumin and A/G ratio.
10. Estimation of total serum bilirubin.
11. Estimation of serum cholesterol.
12. Estimation of serum calcium.
13. Estimation of serum phosphorus (Inorganic)
14. Estimation of S.G.P.T(ALT).
15. Estimation of S.G.O.T (AST).
16. Estimation of serum alkaline phosphatase.
17. Estimation of serum amylase.
18. Urine ; Physical characteristics and normal constituents (organic)
19. Urine report; Physical characteristics and Abnormal constituents.
20. C.S.F.- Sugar & Protein.
21. Serum uric acid.

Lecture –cum- Demonstrations :

1. pH- measurement,
2. Colorimetry.
3. Electrophoresis.
4. Chromatography.
5. Flame photometry.

APPOINTMENT OF EXAMINERS:

There shall be at least four examiners. Out of whom not less than 50% must be an external examiners. Of the four examiners, the senior most internal examiner will act as Chairman/Convenor. The Chairman will make distribution of . Practical & viva-voce, so that all examiners will examine each candidate.

Theory.

Paper I.	50 marks.
Paper II.	50 marks.
TOTAL	100 marks.

Theory – viva. 20 marks
(paper I & II – 10 marks each.)

Practical :

Q.1. Quantitative.	20 marks.
Q.2. Qualitative/Quantitative.	15 marks.
Q.3. Spotting.	5 marks.
Total	40 marks.

Internal assessment

Theory	20 marks.
Practical	20 marks.
Total	40 marks.

Standard of passing : A candidate must obtain 50% in aggregate with Minimum of 50% in theory & 35% in internal assessment is considered eligible to appear for theory examination. However for passing total 50% in aggregate .

DETAILS OF SYLLABUS FOR HUMAN BIOCHEMISTRY.
Structural formulae are not obligatory.
Must know:

1. **Chemistry of carbohydrates:** classification and biochemical importance, chemistry and functions of monosaccharides(excluding isomerism), disaccharides and polysaccharides including Glycosaminoglycans (mucopolysaccharides).

2. **Chemistry of Lipids:** classification and biological importance of triacyl glycerol, phospholipids, glycolipids, fatty acids (PUFA), prostaglandin, steroids and lipoproteins.

3. **Chemistry of proteins:** general nature of amino acids, various ways of classification of amino acids, biologically important peptides, classification, properties and biological importance of proteins. Structural

organization of proteins, Plasma proteins-functions, clinical significance of various fractions, methods of separation (only principle).

4. **Enzymes :** General nature, classification of enzymes, specificity and mode of action of enzymes, factors affecting enzyme activity. Enzyme inhibitions (Kinetic not required).Clinical importance (Diagnostic, therapeutic and as a Laboratory reagent) of enzymes and isoenzymes.

5. **Biological oxidation:** General concept of oxidation and reduction. Role of enzymes and co-enzymes. Electron transport chain. Substrate level and Oxidative phosphorylation, Role of uncouplers and inhibitors.

6. **Haemoglobin:** Chemistry and functions of haemoglobin . Types of normal and abnormal hemoglobins.(HbS, M,Thalassemia). Haemoglobin derivatives.

7. **Vitamins:** General nature, classification, sources,active forms and metabolic role, deficiency manifestations, daily requirement and hypervitaminosis.

8. **Nutrition:** Balance diet for normal adult, Quality of dietary protein, SDA, protein energy malnutrition (Kwashiorkor and Marasmus).

9. **Carbohydrate Metabolism:** Biochemical aspects of digestion and absorption of carbohydrates. Synthesis and break down of glycogen, Glycolysis, Rapoport Lumbering cycle, Citric acid cycle, Gluconeogenesis, HMP shunt pathway and its biological significance,Uric acid pathway (significance only). Metabolism of Galactose and Galactosemia. Blood sugar level and its regulation, oral GTT and glycosuria, Biochemistry of diabetes mellitus.

10. **Protein Metabolism:** Biochemical aspects of digestion and absorption of proteins. Fate of amino acid in the body (Deamination, Transmination, Transdeamination,Decarboxylation), Fates of ammonia (Urea cycle, glutamine formation), Metabolism of aromatic and sulphur containing amino acids and their inborn errors. Metabolism of Glycine.

11. **Lipid Metabolism:** Biochemical aspects of digestion and absorption of Lipids. Beta oxidation, biosynthesis of saturated fatty acids only, cholesterol biosynthesis, transport (role of HDL & LDL) Excretion, Ketogenesis, Ketolysis and Ketosis. Adipose tissue metabolism, Lipolysis and re-esterification, fatty liver and atherosclerosis.

12. **Chemistry and Metabolism of purines:**, nucleosides, nucleotides. Biologically important free nucleotides, Biosynthesis of purines(sources of ring & regulatory steps only, conversion of IMP to GMP & AMP) and salvage pathway, Biosynthesis of pyrimidines, Breakdown of purines and pyrimidines, Gout, Lesch- Nyhan Syndrome

13. Metabolic interrelationship of carbohydrates, lipids and proteins metabolism.

14. **Hormones :** General characteristics and Mechanism of hormone action. cAMP the second messenger, phosphotidyl inositol /calcium system as second messenger.

15. **Chemistry of nucleic acids:** structure and function of DNA and RNA, Genetic code, DNA Replication, Transcription, Translation, chain initiation, chain elongation , chain termination, Inhibitors of protein biosynthesis.

16. Molecular Mechanism of gene expression and regulation 1) Lac-operon model, Mutations.

17. **Mineral Metabolism :** Study of (i) Calcium and phosphorous (ii) sodium, potassium & chloride; (iii) magnesium, copper & iodine; (iv) Iron, (v) manganese, selenium, zinc & fluoride. Their importance in body in brief.

18 Water and electrolyte balance and imbalance.

19. Acid base balance and imbalance.

20 **Haemoglobin Metabolism :** Synthesis and break down of haemoglobin, porphyria (in brief), Fate of bilirubin, different types of Jaundice.

21 **Function tests:** (i) Liver function tests, (ii) Kidney function tests & (iii) Thyroid function tests.

22 **Detoxication mechanisms:** (Bio- transformation) oxidation, reduction, conjugation, hydrolysis.

Desirable to know :

1. Introduction of Biochemistry as a basic science for the study of medicine, It's importance in clinical practice.

2. Molecular and functional organization of a cell and its sub cellular components.

3. **Genetic engineering :** Recombinant DNA , Restriction endonuclease, Chimeric molecule, and Gene library. Applications of recombinant DNA technology in relation to medicine.

4. **Molecular concept of body defence and their applications:**
i) Immunoglobulins- structure & functions, ii) Free radicals, enzymatic and non-enzymatic antioxidants .

5. **Radioisotopes :** Uses of radioisotopes (therapeutic, diagnostic) and hazards.

6. Metabolic changes during starvation.

Nice to know:

1. **Environmental Biochemistry:** Definition, chemical stress, air & water pollution.

2. **Biochemistry of cancer** : carcinogens, and outline mechanism of carcinogenesis.

TOPICS OF THE LECTURES AND APPROXIMATE NUMBER OF LECTURES, HUMAN BIOCHEMISTRY - FIRST PHASE- M.B.B.S.
Lectures.

1.	Introduction to Biochemistry, Cell structure and function.	1
2.	Chemistry of Carbohydrates.	4
3.	Chemistry of Proteins.	4
4.	Chemistry of Lipids.	4
5.	Chemistry of Nucleo proteins.	2
6.	Enzymes.	6
7.	Biological oxidation.	2
8.	Chemistry and functions of Haemoglobin; abnormal haemoglobin.	2
9.	Carbohydrate Metabolism.	6
10.	Protein Metabolism.	6
11.	Lipid Metabolism.	6
12.	Integration of metabolism and metabolic changes during starvation.	2
13.	Mechanism of hormones action.	1
14.	Vitamins (Fat & Water soluble)	6
15.	Nutrition.	2
16.	Purines and Pyrimidine metabolism.	2

17.	Chemistry and functions of Nucleic acids.; Protein biosynthesis, Gene expression,mutations.	5
18.	Genetic engineering and it applications.	2
19.	Biochemistry of cancer.	1
20.	Radioisotopes.	1
21.	Haemoglobin metabolism, liver function tests,Detoxification mechanisms.	3
22.	Kidney function tests,Thyroid function tests	2
23.	Mineral Metabolism.	4
24.	Water and Electrolyte Balance.	2
25.	Acid base balance,	2
26.	Environmental Biochemistry.	1
27.	Molecular concept of body defence.	2

BOOKS RECOMMENDED:

TEXT BOOKS ;

1. Medical Biochemistry - U.Satyanarayan.
2. Biochemistry for Medical students by D.M.Vasudevan & Shree Kumari.
3. Medical Biochemistry by M.N. Chatterjea and Rana Shinde.
4. Text Book of Medical Biochemistry by Ramakrishnan, Prasannan & Rajan.
5. Medical Biochemistry by Debajyoti Das.
6. Biochemistry by A.C.Deb.

REFERENCE BOOKS:

1. Biochemistry by Pankaja Naik
2. Harper's Biochemistry.
3. Medical Biochemistry by N.V.Bhagwan.
4. Biochemistry by L.Stryer.
5. Biochemistry by Orten & Neuhans.

Introduction of "Communication Skills, Professionalism & Ethics in Medical Education Modules" TOPIC in 2nd &3rd MBBS Syllabus

Curricula for II M.B.B.S.

Pathology

1. Goal

The goal of teaching pathology is to provide undergraduate students comprehensive knowledge of the causes and mechanisms of disease, in order to enable them to achieve complete understanding of the natural history and clinical manifestations of the disease.

2. Educational objectives

(a) Knowledge

At the end of one and half years, the student shall be able to -

i. describe the structure and ultrastructure of a sick cell, the mechanisms of the cell degradation, cell death and repair.
ii. Correlate structural and functional alterations in the sick cell.
iii. Explain the Patho physiological processes which governs the maintenance of homeostasis, mechanism of their disturbances and the morphological and clinical manifestation associated with it.
iv. describe the mechanisms and patterns of tissue response to injury to appreciate the Pathophysiology of disease processes and their clinical manifestations.
v. Correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.
vi. Develop an understanding of neoplastic change in the body in order to appreciate need for early diagnosis and further management of neoplasia.
vii. Understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.

(b) Skills

At the end of one and half years, the student shall be able to -

i. Describe the rationale and principles of technical procedures of diagnostic laboratory tests.
ii. Interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.
iii. Perform simple bedside tests on blood, urine and other biological fluid samples.
iv. Draw a rational scheme of investigations aimed at diagnosing and managing common disorders.

v. Recognise morbid anatomical and histopathological changes for the diagnosis of common disorders.

(c) Integration

At the end of one and half years, the student shall be able to integrate the causes and mechanisms of disease most prevalent in India with their natural history for the understanding of their clinical course and management.

3. Total duration of teaching 3 Semesters (III, IV and V) **Minimum 315 working days.**

Total number of teaching hours allotted to the discipline 300 hrs

Distribution of teaching hours

A) Theory (lectures & tutorials) …..101
….. 58
Total …..159

B) Practicals …..110

C) Revision & Evaluation (Internal) ……31

4. Syllabus

a. ***Learning methods***

Distribution of teaching hours

DIVISIONS	**A) LECTURES** (1 hr)	**B) TUTORIALS** (2 hrs)	**C) PRACTICALS** (2 1/2 hrs)
1. General Pathology	35	07	12
2. Haematology	15	04	07
3. Systemic Pathology	47	13	18
4. Clinical Pathology	03	04	05
5. Autopsy	01	01	02
TOTAL	101	29x2	44x2.5

b. & c. Sequential organization of course contents

The Broad area of study shall be:-

General Pathology (including general neoplasia)
Systemic Pathology (including systemic neoplasia)
Haematology
Clinical Pathology

A) GENERAL PATHOLOGY : (n=35)

1. Definitions and causes of diseases:-

Must know**:-** Able to recall common definitions in Pathology and causes of cell injury.

2. Modes of cell injury:-

Must know**:-** Able to appreciate mechanisms of cell injury & relate them to the morphological changes.

3. Necrosis & gangrene:-

Must know**:-** Able to recognize types of necrosis and gangrene at gross and microscopic levels.

Desirable to know**:-** Apoptosis and its relevance.

4. Intracellular accumulations and alterations:-

Must know**:-** Able to list the types of intracellular accumulations & alterations in reversible cell injury along with alterations in cell organelles and cytoskeleton.

5. Cellular Adaptations/ Growth disturbances:-

Must know**:-** Define the various growth disturbances and appreciate the clinical significance of each.

6. Acute inflammation:-

Must know**:-** Define and describe changes occurring in acute inflammation and integrate the changes with morphological patterns of injury.

7. Chemical mediators of Inflammation:-

Must know**:-** Definition, Classification, description of each type, role of acute chronic inflammation.

8. Chronic inflammation (including granulomatous):-

Must know**:-** differentiate it from acute inflammation, describe aetiology, patterns and systemic effects of granulomas.

9. Regeneration and repair (general):-

Must know**:-** Define & describe regeneration and repair and understand the mechanisms and list factors modifying repair.

10. Repair in specialized tissues:-

Must know**:-** Describe repair in fractures and parenchymal organs and list modifying factors and complications.

11. Oedema:-

Must know**:-** Define oedema, classify and describe pathogenesis & correlate morphology with clinical significance with emphasis on transudate and exudate.

12. Shock:-

Must know**:-** Define, classify and understand pathogenesis, recognize the of mediators and stages of shock.

13. Thrombosis:-

Must know**:-** Describe etio-pathogenesis, fate, morphology and effects of thrombosis.

14. Embolism and Infarction:-

Must know**:-** Enumerate types of embolism and infarction, recognize morphological changes and correlate clinical significance.

15. Hyperaemia and Haemorrhage:-

Must know**:-** Definitions, morphology of acute and chronic congestions, clinical significance of haemorrhage.

16. Disturbances of pigment metabolism:-

Must know**:-** State the type of pigment disturbances and describe the changes associated with common disturbances like lipofuscin, melanin, Hemosiderin and Bilirubin.

17. Disturbances of Mineral metabolism:-

Must know**:-** Describe the types and morphological changes of calcification.
Desirable to know**:-** Disturbances of other minerals like zinc etc.

18. Genetic disorders:-

Must know**:-** Normal karyotype, classification of genetic disorders, types of genetic change, Down's syndrome, Klinefelter's syndrome, Turner's syndrome
Desirable to know**:-** Lysosomal storage disorders, glycogen storage diseases, methods of disease diagnosis.

19. Hypersensitivity reactions:-

Must know**:-** Classify, differentiate between different types of Hypersensitivity reactions.
Desirable to know**:-** Be conversant with transplant rejections.

20. Autoimmune diseases:-

Must know**:-** Understand mechanisms of autoimmunity and diagnose common autoimmune diseases; overview of SLE.

21. Amyloidosis:-

Must know**:-** Definition, physical characters, chemical characters, classification, pathogenesis morphology, clinical correlation and lab diagnosis.

22. AIDS:-

Must know**:-** Understand the natural history of the disease and recommend relevant investigations in the management.

23. Typhoid fever:-

Must know**:-** Correlate Pathogenesis with morphology and clinical features of the disease.

24. Syphilis:-

Must know**:-** Classify and describe lesions in various stages of syphilis

25,26,27 (3 lectures) Tuberculosis:-

Must know**:-** Appreciate the importance of tuberculosis in the present day Context, its Pathogenesis & basic histopathology. List and describe the various pulmonary lesions of tuberculosis. Describe changes in various organs in TB and understand their functional correlation, sequelae, lab diagnosis and TB in AIDS.

28. Leprosy:-

Must know**:-** Classify, differentiate between different types of leprosy and describe the diagnostic histologic features and sequelae.

29. Fungal diseases:-

Desirable to know**:-** Classification and be conversant with relevance of fungal diseases in the world with emphasis on opportunistic fungal infections.

30. Malaria:-

Must know**:-** Identify, morphological features in vivax and falciparum malaria and recommend lab investigations in the management.

31 & 32. Neoplasia - Nomenclature and classification:-

Must know**:-** Define important terms, classify and differentiate benign from malignant neoplasms.

Desirable to know**:** Precancerous conditions

33. Neoplasia - Carcinogenesis:-

Must know**:-** Understand carcinogenesis and analyse the mechanism of genetic changes in carcinogenesis.

34. Neoplasia - Biology and Lab diagnosis:-

Must know**:-** Understand the tumour host interactions in neoplasia and recommend the diagnostic workup for detection of cancer.

35. Neoplasia - Spread, grading and staging:-

Must know**:-** Biology of tumour growth, metastases, types, mechanisms, clinical correlations, grading of cancer and staging of cancer.

B) HAEMATOLOGY : (n=15)

1. Introduction to haematology and hemopoiesis:-

Must know**:-** Understand the importance of haematology in clinical practice and enumerate the stages of hemopoiesis.

2. Anaemias (general):-

Must know**:-** Definition, classify anaemia by various methods, clinical features and lab approach to anaemias.

3. Iron deficiency anaemia:-

Must know**:-** Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis.

4. Megaloblastic anaemia:-

Must know**:-** Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis.

5. Haemolytic anaemia:-

Must know**:-** Definition, classification, Pathogenesis and haematological features.

6. Haemoglobinopathies:-

Must know**:-** Definition, classification, Lab diagnosis of Thalassaemia and Sickle cell anaemia.

7&8. Haemorrhagic disorders:-

Must know**:-** Classify haemorrhagic disorders, describe clinical distinction between Purpuras and Coagulation disorders and laboratory screening tests for haemorrhagic disorders. Normal coagulation and fibrinolytic mechanism. Describe etio-pathogenesis, clinical significance and lab diagnosis of haemophilia and DIC.Describe etio-pathogenesis, morphological features (haematological and morbid anatomical) clinical significance and lab diagnosis of ITP.

9. Leukocytic disorders:-

Must know**:-** Leukocytosis, Leukopenia and Leukemoid reactions.

10. Acute Leukaemias:-

Must know**:-** Classify and differentiate different types of acute Leukaemias.

11. Chronic Leukaemias:-

Must know**:-** Definition, general features, classification, aetiology, haematological change, morbid anatomy, clinical course and lab. investigations.

12. Paraproteinemia:-

Desirable to know**:-** Understand the relevance of paraproteinemia's and integrate the various diagnostic modalities with the diagnosis.

13. Aplastic Anaemias:-

Desirable to know**:-** Aplastic anaemias and Agranulocytosis.

14. Blood groups:-

Must know**:-** Appreciate the relevance of blood groups in haematology and transfusion medicine. Erythroblastosis foetalis

15. Blood Transfusion:-

Must know**:-** Indications, selection of blood donors, autologous transfusions, complications of blood transfusions, investigation of suspected transfusion reactions.

C) SYSTEMIC PATHOLOGY : (n=46)

1. Atherosclerosis:-

Must know**:-** Definition, etiopathogenesis, gross and microscopic description, complications and clinical correlation.

2. Hypertension:-

Must know**:-** Relate the mechanisms of the disease to the clinical course and sequelae.

3. Other diseases of blood vessels:-

Must know**:-** Develop an index of suspicion for vasculitides and aneurysms.

4. Ischaemic heart disease:-

Must know**:-** Incidence, risk factors, Pathogenesis, morphological changes, clinical course, complications and investigations.

5. Congenital heart disease:-

Desirable to know**:-** Correlate the anatomical malformations of disorders to the clinical consequences of the disease.

6. Rheumatic heart disease:-

Must know**:-** Incidence, etiopathogenesis, morbid anatomy, histopathology, lesions in the organs, clinical course and sequelae.

7. Endocardial and pericardial diseases:-

Must know**:-** Infective endocarditis - Pathogenesis, morphology, differential diagnosis of cardiac vegetations, aetiology and basic morphology of different forms of pericarditis.

8. Cardiomyopathies:-

Desirable to know**:-** Recognize the disorders as part of differential diagnosis in primary myocardial diseases.

9. Pneumonias:-

Must know**:-** Aetiology, classification, gross, histopathological description in different forms and complications.

10. Lung Abscess and Bronchiectasis:-

Must know**:-** Etiopathogenesis, morphological appearances and complications.

11. Chronic Bronchitis and Emphysema:-

Must know**:-** Pathogenesis, types of emphysema, definition of chronic bronchitis, morbid anatomy and cardiac sequelae.

12. Occupational lung diseases:-

Must know**:-** Types, etiopathogenesis, gross anatomical differences between different forms and sequelae.

13. Tumours of lung and pleura:-

Must know**:-** Classification, aetiology, gross appearances, histological description of important forms, natural history, pattern of spread, Para neoplastic syndromes and secondary Pathology.

14. Lesions of oral cavity and salivary glands:-

Must know**:-** Differential diagnosis of swelling of salivary glands, oral cancer - etiopathogenesis, gross and histopathological descriptions.

15. Gastritis and Peptic Ulcer:-

Must know**:-** Definition of peptic ulcer, etiological factors, gross and microscopic appearances and sequelae.

Desirable to know**:-** Overview of aetiology and types of gastritis.

16. Ulcers of Intestines:-

Must know**:-** Etiological classifications, Morphological appearances of typhoid, tubercular, amoebic ulcers and bacillary dysentery. Differential diagnosis of different forms of ulcers.

17. Idiopathic Inflammatory Bowel disease:-

Must know**:-** Enumerate similarities and differences between the two component disorders viz., Crohn's disease and ulcerative colitis.

18. Tumours of upper GIT:-

Must know**:-** Etiopathogenesis, morphological features of carcinoma oesophagus, classification and morbid anatomy and histopathology of gastric carcinomas.

Desirable to know**:-** Overview of carcinoid tumours of GIT.

19. Tumours of lower GIT:-

Must know**:-** Pathology of carcinoma colon.

Desirable to know**:-** Intestinal polyps & GI stromal tumours.

20. Viral Hepatitis:-

Must know**:-** Aetiology, clinical source and enzymology, salient histological features and sequelae.

21. Alcoholic liver disease:-

Must know**:-** Pathogenesis, morphological manifestations and correlation with clinical features.

22. Cirrhosis:-

Must know**:-** Etiopathogenesis, classification, important histological features and differential diagnosis.

23. Tumours of liver, Pancreas and gall bladder:-

Must know**:-** Pathology of Hepatocellular carcinoma.

Desirable to know**:-** Pathology of tumours of Pancreas and gall bladder.

24. Diabetes mellitus:-

Must know**:-** Classification, pathogenesis of system involvement, sequelae and complications.

25. Acute nephritis and rapidly progressive GN:-

Must know**:-** Understand and integrate clinical and pathologic features of these syndromes.

26. Nephrotic syndrome:-

Must know**:-** Integrate clinical and pathological features of this disorder.

27. Renal failure:-

Must know**:-** Definitions, criteria, aetiology, systemic manifestations and investigations.

28. Pyelonephritis and interstitial Nephritis:-

Must know**:-** Aetiology, Pathogenesis of Pyelonephritis acute and chronic morphological features and clinical correlation.

29. Tumours of kidney and Pelvis:-

Must know**:-** Classification, Morphological features, clinical course including Para neoplastic syndromes of common tumours.

30. Tumours of testis and Prostate:-

Must know**:-** Classification, salient morphological features of most common tumours and clinical course.

31. Tumours of Cervix and Uterus:-

Must know**:-** Etiopathogenesis, salient morphological features, dysplasia and role of cytological screening.

32. Tumours of Ovary and trophoblastic tissue:-

Desirable to know**:-** Classification and morphological description of important types.

33. Non-neoplastic and Neoplastic lesions of the breast:-

Must know**:-** Classification, morphological features and grading of carcinoma breast and differential diagnosis of breast swellings.

34. Non-neoplastic lesions of lymph nodes and Spleen:-

Must know**:-** Aetiology, differential diagnosis, morphological features of common causes of lymphadenopathy, common causes and appearances of splenomegaly.

35. Hodgkin's Lymphoma:-

Must know**:-** Definition, classification, salient diagnostic features and clinical course.

36. Non-Hodgkin's Lymphoma:-

Must know**:-** Definition, classification, salient diagnostic features and clinical Correlation.

Desirable to know**:-** Extra nodal lymphomas.

37. Tumours of skin - Non-pigmented:-

Must know**:-** Classification, morphological features of most common types and natural history.

38. Tumours of skin - Pigmented:-

Must know**:-** Classification, morphological features of common naevi, natural history of malignant melanoma.

39 &40. Soft tissue tumours :-

Must know**:-** Classification, morphological features of lipomatous, fibrous and blood vessel tumours. Morphological features of neural, muscle and fibro histiocytic tumours.

41. Non-neoplastic lesions of bone and joints:-

Must know**:-** Etiopathogenesis and morphological changes of common arthritis and osteomyelitis.

42 & 43. Tumours of bone, cartilage and joints:-

Must know**:-** Classification, radiological and pathological features of important bone tumours (Osteosarcoma, Osteochondroma, GCT and Ewing's sarcoma).

44. Inflammatory and neoplastic conditions of CNS:-

Must know**:-** Morphological features and differential diagnosis of meningitis.

Desirable to know**:-** Classification, morphological features of important CNS tumours, clinical course and sequelae (Meningioma and Gliomas).

45. Lesions of Thyroid:-

Must know**:-** Differential diagnosis of thyroid nodule.

46. Myopathies:-

Desirable to know**:-** Differential diagnosis of common muscle disorders.

D) CLINICAL PATHOLOGY : (n=3)

1. Differential diagnosis of Jaundice:-

Must know**:-** The differential diagnosis and laboratory investigations in jaundice

2. Renal function tests:-

Must know**:-** Laboratory approach to a case of renal dysfunction

1. Diabetes mellitus:-

Must know:- Laboratory diagnosis of Diabetes mellitus

E) AUTOPSY : (n=1)

Must know:- Indications and techniques of medical autopsies

Tutorials

GENERAL PATHOLOGY:

1. Cell injury and cell death
2. Cellular accumulations
3. Inflammation and repair
4. Circulatory disturbances
5. Immunological disorders
6. Infections
7. Neoplasia

HAEMATOLOGY:

1. Anaemias
2. Leukaemias
3. Interpretation of haematological case charts and identification of instruments
4. Haemorrhagic disorders

SYSTEMIC PATHOLOGY:

1. Atherosclerosis and IHD
2. Rheumatic heart disease
3. Pneumonias
4. Tumours of lung
5. Oral cancer
6. Peptic Ulcer
7. Cirrhosis
8. Glomerulonephritis
9. Carcinoma Breast
10. Carcinoma Cervix
11. Bone Tumours
12. Museum specimens
13. Museum specimens

CLINICAL PATHOLOGY:
1. Glucose Tolerance Test
2. Renal Function Tests
3. Differential Diagnosis of Meningitis
4. Identification of needles and instruments used in clinical pathology

AUTOPSY:
CPC of common diseases like 1. Tuberculosis 2. Myocardial infarction 3. Carcinoma/sarcoma 4. Hypertension by students (2 or 3)

d. Term-wise distribution

1st term: 1. General Pathology 2. General Neoplasia 3. Haematology & Transfusion Medicine
2nd term: 1. Systemic Pathology 2. Systemic Neoplasia 3. Clinical Pathology
3rd term: Tutorials & Revision.

e. Practicals: Total hours, number & contents

Total hours : 110 Number : 44

Contents :

A) GENERAL PATHOLOGY: (n=12)

1. Microscopy and tissue processing
2. Identify the common types of cells by light microscopy
3. Intracellular accumulation
4. Acute inflammation
5. Chronic inflammation and Repair
6. Thrombosis, embolism, infarction and gangrene
7. Oedema and congestion
8. Disturbances of pigment metabolism
9. Tuberculosis
10. Leprosy
11. Amyloidosis
12. Disturbances of growth (Atrophy, hypertrophy, hyperplasia, metaplasia, Dysplasia, hypoplasia)

B) HAEMATOLOGY: (n=7)
1. Collection of specimen, anticoagulants and common haematological tests (Hb)
2. Common Haematological Counts (TLC, DLC) & Interpretation of ESR
3. Haemopoiesis
4. Investigations in Anaemia
5. Investigations in Leukaemia
6. Investigations in haemorrhagic disorders
7. Blood Banking

C) SYSTEMIC PATHOLOGY: (n=18)

1. Diseases of blood vessels (Atherosclerosis, syphilitic aortitis)
2. Diseases of Heart (IHD & RHD)
3. Pneumonias
4. Tumours of lung
5. Diseases of kidney
6. Gross and Microscopic features of peptic ulcer and duodenal ulcer
7. Gross and Microscopic features of other intestinal ulcers
8. Tumours of GIT
9. Diseases of Liver
10. Lymphomas
11. Diseases of male and female genital system

12 &13. Tumours of breast

14. Tumours of skin (Pigmented)
15. Tumours of skin (non-pigmented)
16. Soft tissue tumours
17. Tumours of bone
18. Diseases of thyroid

D) CLINICAL PATHOLOGY: (n=5)

1. Urine RE - Carryout a bedside routine urine examination and interpret the results.
2. Pregnancy test and Semen Analysis - (Practical demonstration).
3. Common cytological preparations (lecture demonstration).
4. CSF examination.
5. Serous effusion examination.

E) AUTOPSY: (n=2)

1 & 2) To study and describe five autopsy reports.

For the batches joining in June 2001 and later

List of Slides and Specimens that should be shown during the Pathology Practical Classes

These are grouped under two headings: The students

1) must see (M)
2) desirable to see (D)

Please note that this will be applicable for the batch which will be joining Pathology term in June / July 2001 and later.

DRAWING SLIDES:

HISTOPATHOLOGY:

1. Kidney cloudy change (M)
2. Fatty change liver (M)
3. Uterus - leiomyoma with hyaline change (M)
4. Kidney - amyloid (M)
5. Lymph node - caseous necrosis (M)
6. Kidney - infarct (Coagulation necrosis) (M)
7. Acute ulcerative appendicitis (M)
8. Pyogenic meningitis (M)
9. Lepromatous leprosy - skin (M)
10. Tuberculoid leprosy - skin (M)
11. Actinomycosis (M)
12. Granulation tissue (M)
13. Ileum - typhoid ulcer (M)
14. Tuberculous lymphadenitis (M)
15. Amoebic colitis (M)
16. Lung - haemosiderin pigment or CPC (M)
17. Liver - CPC (M)
18. Artery - recent / organised thrombus (M)
19. Hashimoto's thyroiditis (D)
20. Skin - papilloma (M)
21. Squamous cell carcinoma (M)
22. Adenocarcinoma - Colon (M)
23. Lymph node - metastasis (M)
24. Skin - capillary haemangioma (M)
25. Cavernous haemangioma (M)
26. Benign cystic teratoma (Dermoid cyst) (M)
27. Stomach - chronic peptic ulcer (M)
28. Liver - Viral hepatitis (Massive/ sub-massive necrosis) (D)
29. Liver- portal and biliary cirrhosis (M)
30. Lung - lobar and broncho pneumonia (M)
31. Lung - fibrocaseous tuberculosis (M)
32. Heart - rheumatic myocarditis (D)
33. Heart - healed infarct (M)
34. Aorta - atherosclerosis (M)
35. Kidney - crescentic glomerulonephritis (M)
36. Kidney - chronic glomerulonephritis (M)
37. Kidney - chronic pyelonephritis (M)
38. Kidney - RCC (D)
39. Benign prostatic hyperplasia (M)
40. Testis - seminoma (M)
41. Uterus - leiomyoma (M)
42. Products of conception (M)
43. Hodgkin's lymphoma (M)
44. Brain - tuberculous meningitis (M)
45. Brain - meningioma (D)
46. Bone - osteogenic sarcoma (M)
47. Bone - chondroma (M)
48. Bone - osteoclastoma (M)

49. Skin - melanoma and nevus (M)
50. Breast - fibroadenoma (M)
51. Breast - carcinoma (M)
52. Thyroid - colloid goitre (D)
53. Thyroid - papillary carcinoma (D)
54. Skin - basal cell carcinoma (M)

HAEMATOLOGY:

1. Acute blast cell leukaemia (M)
2. Chronic myeloid leukaemia (M)
3. Eosinophilia (M)
4. Iron deficiency anaemia (M)
5. Haemolytic anaemia (M)
6. Macrocytic anaemia (M)
7. Leucocytosis (M)
8. Various biochemical charts - LFT , GTT , CSF, etc (M)

LIST OF SPECIMEN:

1. Cell injury and adaptation (Degeneration)

a) Liver - fatty change (M)
b) Kidney - cloudy change (M)
c) Aorta - atheroma (M)
d) Atheroma with calcification (D)
e) Kidney stones (M)

2. Amyloidosis

a) Kidney - amyloidosis (M)
b) Spleen - amyloidosis (M)

3. Necrosis and Gangrene

a) Kidney - infarct (M)
b) Spleen - infarct (M)
c) Intestine - gangrene (M)
d) Foot - gangrene (M)
e) Lymph node - caseation (M)

4. Acute inflammation

a). Lobar pneumonia (M)
b) Kidney - abscess (D)
c) Liver - abscess (D)
d) Mycetoma - foot (D)
e) Acute appendicitis (M)
f) Purulent meningitis (M)
g) Fibrinous pericarditis (M)

5. Chronic inflammation

a) Syphilitic aortitis (D)

6. Repair

a) Heart - healed infarct (M)

7. Specific inflammation

a) Ileum - typhoid (M)
b) Amoebic colitis (M)
c) Amoebic liver abscess (M)

8. Chronic specific granulomatous inflammation

a) Intestine - TB ulcer (M)
b) Brain - TB meningitis (M)
c) Lymph node - TB (M)
d) Lung - miliary TB (M)
e) Fibrocaseous TB (M)

9. Pigment disorders

a). Liver and spleen - Prussian blue reaction (D)
b). Liver and spleen - malaria (M)
c). Skin - melanoma (any site) (M)

10. Disorders of vascular flow and shock

a). Liver - CPC (M)
b). Lung - CPC (M)

11. Thrombosis embolism and infarction

a) Thrombus - artery / vein (M)
b) Infarction - kidney / spleen / brain (M)
c) Intestine gangrene (M)

12. Immunopathology

a) Heart - Rheumatic carditis (M)
b) Kidney - acute glomerulo nephritis (M)
c) Thyroid - Hashimoto's thyroiditis (D)

13. Growth disorders

a) Heart - LVH (M)
b) Kidney - atrophy and compensatory hypertrophy (M)

c) Kidney - Hydronephrosis (M)

14. Neoplasm

a) Papilloma skin (M)
b) Adenomatous polyp (M)
c) Fibroadenoma - breast (M)
d) Squamous cell carcinoma - skin (M)
e) Adenocarcinoma - colon (M)
f) Metastasis - lung (M)
g) Leiomyoma - uterus (M)
h) Soft tissue - lipoma (M)
j) Haemangioma - any site / type (M)
k) Melanoma (M)
l) Dermoid cyst (M)
m) Teratoma (M)

15. Alimentary System

a) Oesophagus carcinoma (M)
b) Stomach - chronic peptic ulcer (M)
c) Perforated peptic ulcer (M)
d) Stomach - carcinoma (linitis plastica) (M)
e) Intestine - TB ulcer (M)
f) Colon - Amoebic colitis / bacillary colitis / carcinoma ulcerative / carcinoma
polypoidal growth (M)

16. Liver

a) Acute diffuse necrosis (D)
b) Amoebic abscess (M)
c) Micronodular / macronodular / mixed cirrhosis (M)
d) Hepatoma (M)
e) Metastasis (M)

17. Respiratory system

a) Lung - lobar / bronchopneumonia (M)
b) Bronchogenic carcinoma (M)
c) Lung - abscess (D)
d) Fibrocaseous TB (M)

18. Cardiovascular System

a). Rheumatic endocarditis (D)
b) Fibrinous pericarditis (M)
c) Mitral stenosis (M)
d) Aortic stenosis (M)
e) Bacterial endocarditis (M)
f) Recent myocardial infarct (D)
g) Healed myocardial infarct (M)
h) Atheroma aorta (M)
j) Atheroma with complications (M)

19. Urinary System

a) Flea bitten kidney (M)
b) Large white kidney (M)
c) Shrunken granular kidney (M)
d) Acute pyelonephritis (M)
e) RCC (D)
f) Wilm's tumour (D)
g) Papillary carcinoma - Urinary bladder (D)

20. Male Reproductive System

a) SCC - penis (M)
b) Seminoma - testis (M)
c) Teratoma - testis (M)
d) Benign prostatic hyperplasia (M)

21. Female Reproductive System

a) Uterus - leiomyoma (M)
b) Carcinoma cervix (D)
c) Ovary - cyst adenocarcinoma (D)
d) Ovary - dermoid cyst (D)

21. Lymphoreticular System

a) Lymph node - TB Lymphadenitis (M)
b) Lymph node - lymphoma (M)
c) Spleen - infarct (M)

22. Central Nervous System

a) Brain - purulent meningitis (M)
b) Brain - tuberculous meningitis (M)
c) Tuberculoma (D)
d) Meningioma (D)
e) Glioma (D)
f) Haemorrhage - CVA (D)

23. Bone lesions

a) Chronic osteomyelitis (D)
b) Osteoclastoma (M)
c) Osteogenic sarcoma (M)
d) Multiple myeloma (D)

24. Skin lesions

a) Squamous cell carcinoma (M)
b) Basal cell carcinoma (D)
c) Melanoma - skin (any site) (M)

25. Diseases of Endocrine organs

a) Breast - fibroadenoma (M)
b) Breast - carcinoma (M)
c) Thyroid - multinodular goitre (M)
d) Thyroid - solitary nodule / adenoma (M)

f. Books recommended:
a) Text book of Pathology by Robbins
b) Text book of General Pathology Part I & II by Bhende and Deodhare
c) Clinical Pathology by Talib
d) Text book of Pathology by Harsh Mohan
e) Text book of Pathology by Muir
f) Haematology De Gruchi
g) IAPM text book of Pathology

Reference books:
a) Anderson's text book of Pathology Vol I & II
b) Oxford text book of Pathology Vol. I, II & III
c) Pathology by Rubin and Farber
d) Pathologic basis of Disease Robbins

5. Evaluation

Methods
Theory, Practicals and Viva

Pattern of Theory Examination including Distribution of Marks, Questions, Time.

Nature of Question Paper

Faculty with Year : ***SECOND MBBS***

Subject : **PATHOLOGY**

Paper : ***I***

Total Marks : ***40*** ***Time*** : ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

Faculty with Year **:** ***SECOND MBBS***

Subject **:** **PATHOLOGY**

Paper **:** ***II***

Total Marks **:** ***40*** ***Time*** **:** ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

Direction:- Only short answer questions may be permitted from the portions marked as "Desirable to know"

c. Paper wise distribution of theory topics and number of questions:-

A)
Paper I:- General Pathology inclusive of general neoplasia
Haematology inclusive of transfusion medicine.

Out of 3 LAQs in Section C, 2 questions should be from General Pathology and General Neoplasia and one question should be from Haematology inclusive of transfusion medicine.

B)

Paper II:- Systemic Pathology inclusive of systemic Neoplasia and Clinical Pathology.

Out of 3 LAQs in Section C, 2 questions should be from Systemic Pathology and Systemic Neoplasia and one question should be from Clinical Pathology.

d. Marking scheme

Each paper of 40 marks as shown in the above table.

e. Nature of practicals and duration

Practicals	**Marks 26**
a. 10 Spots 2 minutes each (4 specimen, 1 instrument, 3 histopathology slides, 1 haematology slide and 1 chart) Identification - 1/2 mark Specific short question - 1/2 mark } together 1 mark for each spot	10
b. Urine Examination - Physical and two abnormal constituents	05
c. Histopathology slides : Diagnosis and discussion	03
d. Haematology examination	
i) Peripheral blood smear stain and report	03
ii) Hb/TLC/Blood group	05
Total	26

f. Viva : duration and topic distribution

Viva consists of two tables; on each table the student will face 2 examiners for 5 minutes each :

Table - I General and Systemic Pathology - 7 marks

Table - II Clinical Pathology and Haematology - 7 marks

Total 14 marks

Number of Students for Practical Examination should not exceed more than 30 / day

(4 for general Pathology, 4 for Systemic Pathology, 7 for Clinical Pathology including hematology)

g. Plan for internal assessment

The time table for internal assessment will be as follows :

Theory	15
Practical	15

Scheme of internal assessment

From the batches which have joined before June 2001

Examination Head	**Semester/term wise distribution**	**Total No of marks**
Theory	III Semester	
	a). Mid-term test (MCQ) single best response	30
	b). III Semester examination	80
	IV Semester	
	a). Mid-term (MCQ) single best response	30
	b). IV Semester examination	80
	V Semester	
	a). Prelims examination	80
	Total theory	300 (reduced to out of 15)

Practicals	III Semester examination	40
	IV Semester examination	40
	Prelims examination	40

	Total Practicals	120
		(reduced to out of 12)

Journal	Year ending	03
	Total internal assessment	30

From the batches joining in June 2001 and later

Examination Head	**Semester/term wise distribution**	**Total No of marks**
Theory	III Semester Term ending examination	50
	IV Semester Term ending examination	50
	V Semester a). Prelims examination	80
	Total theory	180 (reduced to out of 15)
Practicals	III Semester examination	40
	IV Semester examination	40
	Prelims examination	40
	Total Practicals	120 (reduced to out of 12)
Journal	Year ending	03
	Total internal assessment	30

Vth semester

Prelims examination on the basis of University pattern (Theory, practical and viva) : Minimum 4 weeks gap between Prelims and University examination.

For the terminal theory examination 28 MCQs (1/2 mark each), 10 SAQs (option of 10 of any 12; 2 marks each) and 2 LAQs (option of 2 of any 3; 8 marks each) will be administered. The total time will be 2 hours 30 mins. This will be followed by practicals (total time 1 ½ hours). To familiarize the students with the `viva' methodology, the marks for the practical may be kept 20 while 20 marks may be given for the viva on theory topics (total 40 marks).

Prelim pattern will be as per the University exam with 2 papers in theory, each of 2 hours duration.

2. MICROBIOLOGY

1. Goal

The goal of teaching Microbiology is to provide understanding of the natural history of infectious diseases in order to deal with the etiology, pathogenesis, pathogenicity, laboratory diagnosis, treatment, control and prevention of these infections and infectious diseases.

2. Educational objectives

(a) Knowledge

The student at the end of one and half years should be able to: -

i. *state the etiology, pathogenesis and methods of laboratory diagnosis and apply that knowledge in the diagnosis, treatment, prevention and control of communicable diseases caused by microorganisms.*
ii. understand commensal, opportunistic and pathogenic organisms of human body and describe host parasite relationship.
iii. know and describe the pathogenesis of diseases caused by microorganisms.
iv. state the sources and modes of transmission of pathogenic and opportunistic micro-organisms including knowledge of insect vectors & their role in transmission of infectious diseases.
v. choose appropriate laboratory investigations required for clinical diagnosis.

(b) Skills

i. plan and interpret laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
ii. identify common infectious agents with the help of laboratory procedure, acquire knowledge of antimicrobial agents, use of antimicrobial sensitivity tests to select suitable antimicrobial agents for treatment.
iii. perform simple laboratory tests, which help to arrive at rapid diagnosis.
iv. be conversant with proper methods of collection, storage & transport of clinical material for microbiological investigations.
v. understand the principles of immunology and its application in the diagnosis and prevention of infectious diseases including immunization schedule, acquire knowledge of the scope of immunotherapy and different vaccines available for the prevention of communicable diseases.
vi. understand methods of disinfection and sterilization and their application to control and prevent hospital and community acquired infections including universal biosafety precautions and waste disposal.
vii. recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.
viii. the student should be well equipped with the knowledge of prevalent communicable diseases of national importance and of the newer emerging pathogens.

(c) Attitude

i. the student will be regular, sincere, punctual and courteous and regular in studies.
ii. the student will follow all the rules laid down by the department and participate in all activities.
iii. the student will understand the importance of, and practice asepsis, waste segregation and appropriate disposal.
iv. the student will understand the importance of, and practice the best methods to prevent the development of infection in self and patient. (E.g. hand washing, using aprons for hospitals in hospitals only, regularly washing the aprons, wearing gloves (as and when required / handling specimens etc.).
v. the student will understand the use of the different antimicrobial agents including antibiotics to use judiciously and prevent misuse, (prescribing attitude).
vi. the student will understand the significance of vaccinations and will receive appropriate vaccines (e.g. TT, Hepatitis B and any other as per needs).
vii. the student will wash his/her hands with soap after each practical class.
viii. the student will leave the area allotted for his practical neat and tidy.
ix. the student will discard the slides in the appropriate container provided for the same.
x. the student will report any injury sustained in class, immediately.
xi. the student will report any breakage occurring during class times immediately.
xii. the student may give suggestions to improve teacher student association.

3. Total duration of para-clinical teaching 3 semesters
Total 360 teaching days

Total number of teaching hours allotted for Microbiology (As per MCI guidelines 1997). **250 hrs**

4. Syllabus

a. Learning methods

Lectures, practicals

Distribution of teaching hours

A) Theory (lectures &	…..	71
(tutorials	…..	26
Total	…..	**97**
B) Practicals and Revision	…..	120
C) Assessments	…..	33
Total	…..	250

b. & c. Sequential organisation of contents and their division

The areas of study in Microbiology will include General Microbiology, Systemic Microbiology including Bacteriology, Immunology, Mycology, Virology, Rickettsia, Chlamydia, Parasitology and Applied microbiology in relation to infections and diseases of various systems of the body.

A) GENERAL MICROBIOLOGY: (n=10)

No	***Topic of lecture***	***Must know (MK)***	**Desirable to know (DK)**	***Hrs***
1.	Introduction and Historical background	Definitions: Medical Microbiology, pathogen, commensal, symbiont etc. To cover Anton van Leewenhoek, Pasteur, Lister, Koch, Flemming etc. In History: Scope to cover the importance of Med. Microbiology on diagnosis and prevention of infectious diseases.	Micro-organisms as models in Molecular Biology and Genetic engineering.	1
2.	Morphology of bacteria and Classification	Bacterial cell and its organelles, morphological classification, methods of studying bacteria, staining methods & their principles Grams & Zeil Nelson staining, their importance in presumptive diagnosis, negative staining, dark ground illumination, phase contrast and fluorescent microscopy, briefly about electron microscopy. Principles and applications of all microscopes.		1
3.	Physiology of bacteria including growth requirements & metabolism	Nutrition, respiration (anaerobic & aerobic) and growth of bacteria, growth curve, physical factors influencing growth. Culture media: Definition, classification and application.	Important constituents of culture media.	1
4.	Sterilization	Definition of sterilization, disinfection, asepsis, antiseptics. Ubiquity of bacteria, modes of killing microbes and preventing them, factors determining selection of the mode, factors adversely affecting sterilization. Enumeration of physical methods of sterilization including principle & their application.	Working and efficacy testing of autoclave, inspissator and hot air oven. Central Sterile Supply Department (CSSD) – concept only.	1
5.	Disinfectants	Asepsis and antisepsis, modes of Action of chemical agents on microbes. Phenols, Halogens, Aldehydes, Acids, Alcohol, heavy metals, oxidizing agents etc. Universal biosafety precautions.	Dyes, soaps and detergents. Concentration and contact time.	1
6.	Waste disposal	Definition of waste, classification, segregation, transport and disposal.		1

7.	Bacterial genetics and drug resistance to antimicrobial agents.	Introduction – codon, lac operon, mutation, transformation, transduction & conjugation, R factor, mode of action of antimicrobials on bacteria, mechanism of drug resistance and antimicrobial susceptibility tests, steps taken to minimize emergence of resistant strains (Antibiotic policy, formulation),		1
8.	Host parasite relationship and bacterial infections	Commensal, pathogenic and opportunistic organisms, their pathogenic factors and modes of transmission. Microbial factors: spores, capsule, toxins, enzymes, intracellular parasitism, antigenic variation & extrinsic factors etc. leading to establishment of infection. Types of infection: primary, secondary, general, local, natural, nosocomial, iatrogenic, zoonotic.		1
9.	Normal flora	Introduction – various sites, types and role		1
10.	Methods of identification of bacteria. Diagnosis of infectious diseases (direct and indirect)	Principles of laboratory diagnosis of infectious diseases. General procedures for collection transport, processing of specimens for microbiological diagnosis.	PCR, RIA, DNA probes.	1

B) IMMUNOLOGY: (n=12)

No.	Topic	Must know	Desirable to know	Hrs
1	Introduction	Definition of immunity, types of immunity, factors responsible, mechanism of innate immunity, active and passive immunity, local immunity.	Herd immunity	1
2	Antigens, HLA	Definition, types, antigen determinants, properties of antigen. MHC- concept, class- I, II & III functions, indication of typing, MHC restriction.	Nature of determinants, e.g. of haptens, e.g. of cross- reactive antigen.	1
3	Antibodies	Definition, nature, structure of immuno-Globulins, papain digestion, understand isotypic, allotypic and idiotypic markers, immunoglobulin classes, physical and biological properties of immunoglobins.,	Pepsin digestion, amino acid sequence, immunoglobin domain, abnormal immunoglobins.	1
4	Serological reactions	Definition, characteristics, titre, sensitivity & specificity, antigen- antibody interaction-primary, secondary & tertiary, prozone phenomenon, principle, types and application of precipitation, agglutination, complement fixation, enzyme immunoassay, radioimmunoassay, immunofluoroscence test, neutralization and opsonisation.	Techniques of precipitation and their uses, blocking antibodies, antiglobulin reactions, co-agglutination, in vitro test, techniques of EIA, IF & electron microscopy.	2

5	Immune response	Types, development, role of --thymus, bone marrow, lymph nodes & spleen, cells of lymphoreticular system, morphology and role of T subsets, NK cells, B cells , plasma cells and macrophages, B & T cell activation, antigen processing and presentation, primary and secondary immune response, principle and uses of monoclonal antibodies, factors affecting antibody production, CMI-definition, types, role of T cell and macrophages, definition of immune tolerance and mechanism of tolerance.	Lymphokines and their role, clonal selection, mechanism of immunoregulation, theories of antibodies formation, techniques of monoclonal antibody formation, detection of CMI, types of immunotolerance.	2
6	Complement	Definition, synthesis, pathways, activation, role & biological functions, components, measurement.	Regulation of complement activation, complement deficiency	1
7	Hypersensitivity	Definition, classification, , difference between immediate and delayed reaction, mechanism of anaphylaxis, manifestations of anaphylaxis, types of anaphylaxis, atopy, e.g. of anaphylactic reaction, tests for anaphylaxis, mechanism and e.g. of type-II & type-III reactions, mechanism & types of delayed hypersensitivity.	Desensitization in anaphylaxis, type V reaction, ADCC, Shwartzman phenomenon.	1
8	Autoimmunity	Definition, mechanism, classification, pathogenesis.		1
9	Transplantation & tumour immunology	Types of transplants, mechanism of transplant rejection, prevention of graft rejection, GVH reaction, IR to tumours, tumour antigens, mechanism of IR to tumours.	Type of tumour antigens, immune surveillance.	1
10.	Immuno-Deficiency	Classification, examples, laboratory tests for detection, manifestations.		1

C) SYSTEMIC BACTERIOLOGY: (n=21)

Pathogenesis includes:

- Infectious agent - MK
- Habitat - MK
- Source / reservoir - MK
- Mode - MK
- Infective dose - MK
- Multiplication, spread - MK
- Clinical features, pathology - MK
- Complications - MK
- Virulence factors - MK
- Immunological response - DK

*MK- *Must know*
*DK- *Desirable to know*

Laboratory diagnosis: -MK___

- Specimen selection -MK
- Collection -MK
- Transport -MK
- Primary smear, hanging drop -MK
- Selection of media -MK
- Pathogenicity testing -MK
- Anti microbial drug susceptibility testing-MK
- Serological interpretation -MK

Key to the abbreviations used in the table below:

✌ **A**- Classification, **B**- Morphology, **C**- Culture and isolation, **D**- Biochemical reactions,

E- Viability, **F** -Virulence, **G**- Diseases, **H**- Antigens, **I**- Pathogenesis, **J**- Laboratory diagnosis, **K**- Prevention and control, **L**- Immune response

No	**Topic/ hours**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
1	Staphylococci (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	MK	MK	MK	-
2	Streptococci Pneumococci (1 hour)	MK	MK	BA-MK, DK	DK	MK	MK	MK	MK	MK	MK	MK	DK
3	Neisseria (1 hour)	DK	MK	DK	DK	MK	MK	MK	DK	MK	MK	MK	-
4	C.diptheriae (1 hour)	DK	MK	DK	-	MK	MK	MK	-	MK	MK	MK	DK
5	M.Tuberculosis (1 hour)	MK	MK	LJ,Growth Time MK	DK	MK	MK	MK	MK	MK	MK	MK	DK
6	Atypical mycobacteria (1hour)	MK	MK	DK	DK	MK	MK	MK	-	MK	MK	MK	-
7	M.leprae (1 hour)	MK	MK	Isolation-MK	-	MK	MK	MK	MK	MK	MK	MK	MK

8	Bacillus Methods of anaerobiosis & classification. Non sporing anaerobes (1 hour)	MK	MK	MK	DK	MK	MK	MK	-	MK	MK	MK	-
9	Clostridium welchii, tetani, botulinum (1 hour)	MK	DK	MK	-	-	-	MK	-	-	MK	-	-
10	Enterobacteriaceae (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	-
11	Salmonella typhi (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	MK
12	Shigella (1 hour)	MK	MK	DK	DK	MK	MK	MK	DK	-	MK	-	-
13	Vibrio & Campylobacter (1 hour)	MK	MK	DK	DK	MK	MK	MK	-	-	MK	-	-
14	Pseudomonas (1 hour)	-	MK	DK	DK	MK	MK	MK	-	-	MK	-	-
15	Other GNB (1 hour)	List only	MK	DK	-	-	MK	-	-	-	MK	-	-
16	Newer bacteria (1 hour)	List only	MK	DK	-	-	-	-	-	-	MK	-	-
17	Spirochete (1 hour)	MK	MK	DK	-	MK	-	MK	-	-	MK	-	DK
18	Actinomycosis & Nocardia (1 hour)	DK	MK	DK	-	-	-	-	-	-	MK	-	-
19	Rickettsia (1 hour)	MK	MK	-	-	-	-	-	-	-	MK	-	-
20	Chlamydia & Mycoplasma (1 hour)	MK	MK	-	-	-	-	-	-	-	MK	-	-
21	Bacteriology of air, water, milk and food (1 hour)	-	-	MK	DK	MK	MK	MK	-	MK	MK	MK	-

D) MYCOLOGY: (n=4)

No	Topic	Must know	Desirable to know	Hrs
1	Introduction to Mycology	Nature of fungus (definition, differences with bacteria), characteristics of fungi, common terminologies, brief account of types of sporulation and morphological classification of fungi. Methods of identification , Infections produced, Lab Diagnosis, processing of skin, hair and nail,	Growth requirements, ecological, medical and industrial importance of fungi (brief account).	1
2	Agents of Superficial mycosis	Enumerate, predisposing factors, morphological features, Lab. Diagnosis	Colony characteristics of dermatophytes	1
3	Subcutaneous mycosis	Enumerate, predisposing factors, Mycetoma, Rhinosporidiosis, Pathogenesis, Lab. Diagnosis	-	1
4	Systemic mycosis Opportunistic fungal infections	Classification, predisposing factors, Candida, Cryptococcus, Histoplasma morphology, pathogenesis, lab. Diagnosis Classification, predisposing factors, Mucor, Aspergillus, Pneumocystis carinii	Cultural characteristics	1

E) VIROLOGY: (n=12)

Morphology, pathogenesis, laboratory diagnosis, prevention and control for all viruses (Must know).

No	Topic of lecture	*Must know*	Desirable to know	Hrs
1	General Virology	Size, shape, symmetry, structure, resistance, multiplication, properties and classification of viruses, pathogenesis, bacteriophages, concept of virons	-	1
2	Laboratory diagnosis of viral infections	Collection of samples, transport, cultivation and methods of diagnosis	-	1
3	Viral immunity	Viral immunity, interferon, viral vaccines	-	1
4	Pox viruses	Small pox and Molluscum	-	1
5	DNA viruses	Papova, Adeno, Herpes viruses (Herpes simplex, Varicella zoster, CMV, EBV)	-	1
6	Respiratory viruses	Orthomyxo and Paramyxoviruses, Ag shift and drift	Rhinoviruses	1
7	Picornaviruses	Polio, Coxsackie, Enteroviruses, Viruses causing diarrhoea – Rota viruses, Immunity (polio)	-	1
8	Hepatitis viruses	Hepatitis viruses , immunity and laboratory diagnosis	-	1
9	Arboviruses	Dengue, KFD, Japanese encephalitis – definition, classification, enumeration in India, Pathogenesis, laboratory diagnosis and control	-	1

10	Rhabdoviruses	Rabies	-	1
11	Slow and Oncogenic viruses	Characteristics of slow virus infections, pathogenesis and laboratory diagnosis and viruses associated with it	-	1
12	Retroviruses	HIV/AIDS, Immunity, USP	-	1

F) PARASITOLOGY: (n=11)

Must know –

- Geographical distribution
- Habitat
- Morphology (different stages) found in human beings
- Life cycle
- Pathogenesis
- Laboratory diagnosis
- Treatment
- Control
- Immunoprophylaxis

No	Topic of lecture	Must know	Desirable to know	Hrs
1	Introduction to medical Parasitology	Parasites: their nature, classification, and explanation of terminologies, epidemiology, emerging parasitic infections, (pathogenicity and laboratory diagnosis)		1
2	E. histolytica	Amoebic infections		1
3	Free living amoebae and flagellates	Free living amoebae, PAME, Giardia & Trichomonas		1
4	Hemoflagellates	L. donovani: life cycle, morphology, pathogenicity, and lab. Diagnosis etc.	Brief account of Trypanosomes	1
5	Malaria	Malarial parasites: life cycle, morphology, pathogenicity, laboratory diagnosis etc.		1
6	Misc. Pathogenic protozoa	Toxoplasma,	Cryptosporidium, Isospora, B.coli	1
7	Cestodes	Taenia saginata & solium, Echinococcus granulosus, life cycle, morphology, pathogenicity and laboratory diagnosis.	Brief mention of other cestodes	1
8	Trematodes	Schistosomiasis: life cycle, morphology, pathogenicity & lab diagnosis.	Brief account of Fasciola hepatica	1
9	Intestinal Nematodes	A.duodenale, A. lumbricoides, E. vermicularis, T. tritura	brief mention of S. stercoralis, life cycle,morphology laboratory diagnosis	2
10	Tissue Nematodes	W. bancrofti, D. medinensis, in brief T. spiralis		1

TUTORIALS (APPLIED MICROBIOLOGY) : (n=26)

Regular tutorials, student seminars & symposia shall be conducted in addition to lectures.

Students must know:

- Micro-organisms causing diseases & pathological lesions
- Methods of collection & transportation of specimens
- Methods of laboratory diagnosis
- Serological response produced by organisms
- Interpretation of laboratory report

No	Topic of Tutorial	Hrs
1	Gastrointestinal infections (diarrhoea and dysentery) and their laboratory diagnosis	2
2	Upper respiratory tract infection (patch and sore throat) and their laboratory diagnosis	2
3	Lower respiratory tract infection (pneumonia, bronchitis, bronchiolitis etc.) and their laboratory diagnosis	2
4	Urinary tract infection and their laboratory diagnosis	2
5	Infections of the central nervous system (meningitis, encephalitis, brain abscess) and their laboratory diagnosis	2
6	Wound infections and pyogenic infections	2
7	Septicemia and laboratory diagnosis and PUO	2
8	Eye infections and their laboratory diagnosis	2
9	Sexually transmitted disease (STD) and their laboratory diagnosis (genital ulcerative disease)	2
10	Role of laboratory in cross infection, Nosocomial infections / outbreak / epidemic	2
11	Vehicles and vectors of communicable disease & zoonosis	2
12	Preventive inoculations, immunomodulation and immunotherapy	2

Suggested topics for integrated teaching:

- ♦ Tuberculosis and Leprosy
- ♦ Pyrexia of Unknown Origin (PUO)
- ♦ Sexually Transmitted Diseases
- ♦ Hepatitis
- ♦ HIV / AIDS
- ♦ Malaria
- ♦ Diarrhoea and Dysentery

Note: Each topic may be allotted 3 hours. These topics may be covered in 2nd and 3rd term of 2nd MBBS.

d. Term-wise distribution

First term (4 months)	Theory- 32 hours	Practical- 32 hours
Second term (5 ½ months)	Theory- 66 hours	Practical- 44 hours
Third term (4 months)	Theory- 48 hours	Practical- 32 hours
Total teaching hours	**254 hours**	

System-wise distribution

TERM	BROAD TOPICS	NO. OF CLASSES		TUTORIALS (2 hours)
		Lectures (1 hour)	Practicals (2 hours)	
First term	General Microbiology	10	28	-
	Systemic Bacteriology	18	24	-
Second term	Systemic bacteriology	3	19	-
	Immunology	12	4	-
	Virology	12	4	-
	Mycology	5	4	-
	Parasitology	11	24	-
Third term	Applied microbiology	-	-	26

e. Practicals : Total hours, number & contents : (n=100)

No	Topic	Hrs
1.	Introduction to Microbiology, Microscopy and Micrometry.	4
2.	Morphology and physiology of bacteria and methods staining.	4
3.	Growth requirements of bacteria (media) and identification of bacteria (biochemical reactions).	4
4.	Scheme for laboratory diagnosis of infectious diseases and collection, storage and transport of microbiological specimens and laboratory animals.	4
5.	Sterilization- the physical agents. Sterilization- the chemical agents and method of waste disposal.	4
6.	Serological tests for diagnosis of microbial infections.	4
7.	Staphylococci and other gram-positive cocci.	4
8.	Streptococci and Pneumococci.	4
9.	Gram negative cocci	4
10.	C. diphtheriae and other gram positive non sporing bacilli	4
11.	Mycobacteria	4
12.	Spore bearing aerobic and anaerobic bacilli.	4
13.	Enteric gram-negative bacilli – lactose fermenters - E.coli etc	4
14.	Non lactose fermenters – Salmonella and Shigella	4
15.	V. cholerae and other Vibrio like organisms	4
16.	Other gram-negative bacilli including Pseudomonas, Proteus and hospital acquired infection.	4
17.	Spirochetes	4
18.	Actinomycetes, Nocardia and Fungi.	4
19.	Rickettsia, Chlamydia, Mycoplasma and Viruses	4
20.	Introduction to Parasitology and Protozoal infections (including Isospora & Cryptosporidium)	4
21.	Haemoflagellates	4
22.	Plasmodia and toxoplasma.	4
23.	Cystodes and trematodes	4
24.	Intestinal nematodes	4
25.	Extra-intestinal nematodes.	4

The number of practicals and lectures can be changed as per the needs.

Introduction Of "Bio-Medical Waste" topic in subject of Microbiology & Preventive & Social Medicine

f. Books recommended:

1. Textbook of Microbiology - *R. Ananthanarayan C. K. Jayaram Panikar*
2. A Textbook of Microbiology - *P. Chakraborty*
3. Textbook of Medical Microbiology - *Rajesh Bhatia & Itchpujani*
4. Textbook of Medical Microbiology - *Arora and Arora*
5. Textbook of Medical Parasitology - *C. K. Jayaram Panikar*
6. Textbook of Medical Parasitology - *Arora and Arora*
7. Textbook of Medical Parasitology - *S.C.Parija*
8. Microbiology in clinical practice - *D. C. Shanson*

A Textbook of Parasitology - *Dr. R.P. Karyakarte and Dr. A.S. Damle*

Reference books:

1. Mackie McCartney practical Medical Microbiology- *Colle JG , Fraser AG*

2. Principles of Bacteriology, Virology & Immunology vol. 1,2,3,4,5- *Topley Wilsons*
3. Medical Mycology (Emmons)- *Kwon – Chung*
4. Review of Medical Microbiology (Lange)- *Jawetz*
5. Immunology- *Weir DM*
6. Medical Microbiology- *David Greenwood, Richard Stack, John Pentherer*

7. Parasitology- *KD Chatterjee*
8. Medical virology- *Timbury MC*
9. Mackie McCartney Medical, Microbiology vol.1- *Duguid JP*
10. Microbial infections- *Marmion BP, Swain RHA*

5. Evaluation

a. Methods

Theory, Practical & Viva

No		Total marks
1	Theory (2 papers – 40 marks each)	80
2	Oral (Viva)	15
3	Practical	25
4	Internal assessment (theory –15, practicals –15)	30
	TOTAL	**150**

Passing : A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in practicals and 50% in internal assessment (combined theory and practical).

b. Pattern of Theory Examination including Distribution of Marks, Questions, Time.

Nature of Question Paper

Faculty with Year : ***SECOND MBBS***

Subject : **MICROBIOLOGY**

Paper : ***I***

Total Marks : ***40*** ***Time*** : ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

Faculty with Year **:** ***SECOND MBBS***

Subject **:** **MICROBIOLOGY**

Paper **:** ***II***

Total Marks **:** ***40*** ***Time*** **:** ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

A) MICROBIOLOGY PAPER I

- General Microbiology
- Systematic bacteriology including Rickettsia, Chlamydia and Mycoplasma
- Related applied microbiology.

B) MICROBIOLOGY PAPER II

- Parasitology
- Mycology
- Virology
- Immunology
- Related applied Microbiology.

d. Marking scheme

Each paper of 40 marks as shown in the above table.

e. Nature of practicals and duration

Practical examination in MICROBIOLOGY will be of 26 marks and oral (viva) of 14 marks of THREE hours duration.

Q.1:	Gram staining	5
Q.2:	Zeil – Nelson's staining	5
Q.3:	Stool examination for Ova/cyst	6
Q.4:	Spot identification (Ten spots)*	10
	Total-	**26**

(*Spots- Microscopic slides, Mounted specimen, Instruments used in laboratory, Serological tests, Inoculated culture medium, Sterile culture medium, Vaccines / serum).

f. Viva (Two tables)

		Marks
A:	General & Systemic Microbiology	7
B:	Mycology, Parasitology, Virology, Immunology	7

g. Plan for internal assessment

Marks for Internal Assessment:

Theory:	15
Practical:	15

From the batches which have joined before June 2001

Theory examination

Internal assessment for theory shall be calculated on the basis of two term ending examinations (I^{st} & II^{nd}), two mid term examinations in I^{st} & II^{nd} term & one preliminary examination at the end of the course (total 5 examinations) till the batch of Nov.2000 admission appears for University examination.

Marks Distribution for theory examination: (Internal assessment)

Examination	MCQ		SAQ		LAQ		Total	Time
	Marks	No.	Marks	No.	Marks	No.		
Ist & IInd midterm	10	20	20	10/12	-	-	30	1 hr
Ist & IInd term	28	56	24	12/14	28	4/5	80	3 hr

MCQ = Multiple choice questions, SAQ = Short answer questions, LAQ = Long answer questions

Preliminary examination (as per the University pattern – 2 papers, 3 h each) 80 marks
Internal assessment marks for theory will be computed to 15 out of total 300 marks.

Practicals (Internal assessment):
Three term ending practicals only.

Marks Distribution of Practicals:

Ist term ending examination	40
IInd term ending examination	40
Preliminary Practical examination	40
	Total- 120

Internal assessment marks for Practicals have to be computed out of 12 marks at the end of the curriculum and add marks for journals out of 3. Thus, total marks for practical assessment will be 15.

From the batches joining in June 2001 and later

Pattern for computation of ' Internal Assessment ' in the subject of Microbiology. (Applicable to the batch joining in June 2001)

THEORY:
Internal assessment shall be computed on the basis of three term ending examinations (two terminals & one preliminary examination before the university examination).

EXAMINATION	No.of Papers	Pattern	Duration of each paper	Total Marks
1ST TERMINAL	One -50 Marks	MCQs- 28(14 Marks) SAQs- 10/12 (20 Marks) LAQs- 2/3 (16 Marks)	2 Hours 30 Minutes	50
2ND TERMINAL	One - 50 marks	MCQs- 28(14 Marks) SAQs- 10/12(20Marks) LAQs- 2/3 (16 Marks)	2 Hours 30 Minutes	50

PRELIMINARY (As per final University pattern)	Two - 40 marks each	Each paper- MCQs- 28(14 Marks) SAQs- 6/7(12Marks) LAQs- 2/3 (14 Marks) (Total- 40 Marks, each paper)	2 Hours each paper	80
			TOTAL	180

Final internal assessment in THEORY shall be computed on the basis of actual marks obtained out of 180, reduced to marks out of 15.

PRACTICAL:

Internal assessment in PRACTICALS shall be computed on the basis of three term ending examinations and the marks allotted to practical record book.

EXAMINATION	PATTERN	MARKS	TOTAL
1ST TERMINAL	Exercise(eg.Gram's Stain)	10	40
	Spotting	10	
	Viva	20	
2ND	Exercise/Exercises(eg .Gram's & Z.N. Stain)	10	40
	Spotting	10	
	Viva	20	
PRILIMINARY EXAM As per University pattern	Gram's Stain	5	40
	Ziehl-Neelson Stain	5	
	Stool Exam.	5	
	Spotting	10	
	Viva	15	
		TOTAL	120

Actual marks obtained out of 120 shall be reduced to out of 12. Add marks obtained out of 3 for Practical Record Book. Total internal assessment marks for Practical shall be out of (12+3) 15.

Total Internal Assessment : Theory --- 15
Practical -- 15

Total: 30

Pharmacology and Pharmacotherapeutics

1. Goal

The broad goal of teaching pharmacology to undergraduate students is to inculcate in them a rational and scientific basis of therapeutics.

2. Educational objectives

(a) Knowledge

At the end of the course, the student shall be able to -

i. describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs
ii. list the indications, contraindications, interactions and adverse reactions of commonly used drugs
iii. indicate the use of appropriate drug in a particular disease with consideration of its cost, efficacy and safety for -
   - individual needs, and
   - mass therapy under national health programmes

iv describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisonings
v Integrate the list the drugs of addiction and recommend the management
vi. Classify environmental and occupational pollutants and state the management issues
vii. Explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy and old age
vii explain the concept of rational drug therapy in clinical pharmacology
viii state the principles underlying the concept of `Essential Drugs'
ix evaluate the ethics and modalities involved in the development and introduction of new drugs

(b) Skills

At the end of the course, the student shall be able to -

i. prescribe drugs for common ailments
ii. identify adverse reactions and interactions of commonly used drugs
iii. interpret the data of experiments designed for the study of effects of drugs and bioassays which are observed during the study
iv. scan information on common pharmaceutical preparations and critically evaluate drug formulations
v. be well-conversant with the principles of pharmacy and dispense the medications giving proper instructions

(c) Integration

Practical knowledge of rational use of drugs in clinical practice will be acquired through integrated teaching vertically with pre-clinical & clinical subjects and horizontally with other para-clinical subjects.

3. Total duration of para-clinical teaching 3 Semesters (III,IV,V)

Total 360 teaching days

Total number of teaching hours allotted to Pharmacology 300 hours

4. Syllabus

a. Learning methods

Lectures, tutorials, Practicals

Distribution of teaching hours

Theory

- ***lectures*** ***……...109 ± 5***
- ***tutorials*** ***…….17 ± 5***

Total 126 ± 10

B) Practicals ……...120 ± 5

C) Revision & Evaluation (Internal Assessment) ……..60

b. & c. Sequential organisation of contents & their division

A) INTRODUCTION: ***Pharmacology - a foundation to clinical practice***
(N=1)
Development of the branch of pharmacology; Scope of the subject; role of drugs as one of the modalities to treat diseases,
definition of drug;
nature and sources of drugs;
subdivisions of pharmacology
rational pharmacotherapy

B) GENERAL PHARMACOLOGY: (N=7 ± 2)

Pharmacokinetics: Absorption, Distribution, Biotransformation, Elimination
(n=3) Pharmacodynamics: Principles of Drug Action, Mechanisms of drug action,

Receptors (Nature, Types, Theories, Principles, Regulation) (n=1)

Application to pharmacotherapeutics: Relevance of Pharmacokinetics and dynamics

in clinical practice, Sequale of repeated administration of drug (n=2)

Adverse Drug Reactions (n=1)

C) AUTONOMIC PHARMACOLOGY: (N= 8 ± 2)

General Considerations (n=1)

Adrenergic agonists (n=1)

Adrenergic antagonists I: □-blockers (n=1)

Adrenergic antagonists II: □-blockers (n=1)

Cholinergic agonists (n=1)

Anticholinesterases (n=1)

Antimuscarinic drugs (n=1)
Skeletal muscle relaxants (n=1)

A) CARDIOVASCULAR SYSEM INCLUDING DRUGS AFFECTING COAGULATION AND THOSE ACTING ON KIDNEYS: (N=14 ± 2)

General Considerations and Overview of antihypertensive therapy;
Diuretics (n=2)
Angiotensin Converting Enzyme (ACE) inhibitors (n=1)
Sympatholytics & vasodilators (n=1)

Management of hypertension

Antianginal: Nitrates & others (n=1)
Calcium channel blockers (n=1)

Pharmacotherapy of chest pain

Anticoagulants & Coagulants
Thrombolytics & Antiplatelet Agents (n=2)

Drugs for CCF: Digitalis glycosides, Others agents (n=2)

Management of CCF

Antiarrhythmic Agents (n=1)

Agents used for the management of shock (n=1)

Hypolipidaemic drugs (n=1)

Role of Nitric oxide and endothelin to be covered in CVS
…….DK

E) HAEMATINICS AND HAEMATOPOIETIC FACTORS: (N=1)

Agents used in therapy of iron deficiency anaemia and megaloblastic anaemia; Erythropoietin,
GM-CSF (n=1)

Management of anaemia

F) NEUROPSYCHIATRIC PHARMACOLOGY INCLUDING INFLAMMATON, PAIN & SUBSTANCE ABUSE (N=15 ± 2)

General Considerations (n=1)
Sedative-Hypnotics (n=2)
Psychopharmacology: Antianxiety; Antipsychotics; Antidepressants (n=3)
Antiepileptics (n=2)

Therapy of neurodegenerative disorders:
Anti-Parkinsonian agents; cerebral vasodilators/nootropics (n=1)
Local anaesthetics (n=1)

Analgesics: Opioids; NSAIDs (n=3)

Pharmacotherapy of pain including migraine
Pharmacotherapy of rheumatoid arthritis and gout

Substance abuse: Management of opioid, alcohol and tobacco addictions (n=1)

G) MISCELLANEOUS TOPICS - I: (N=6 ± 2)

Autocoids *(to be covered before pain lectures)* (n=1)
Antiallergics: Antihistaminics (n=1)

Drugs used for bronchial asthma (n=1)

Pharmacotherapy of cough

Drugs acting on immune system:

Immunostimulants, immunosuppressants; pharmacology of vaccines & sera (n=1)

Drugs acting on the uterus (n=1)

H)CHEMOTHERAPY INCLUDING CANCER CHEMOTHERAPY:(N=22 ± 2)

General considerations (n=1)

Antimicrobial agents: (n=7)

- Sulphonamides & Cotrimoxazole
- Quinoline derivatives
- Penicillins, Cephalosporins & Other Lactams
- Aminoglycosides
- Macrolides
- Tetracyclines & Chloramphenicol

Pharmacotherapy of UTI

General principles of Antimicrobial use (n=1)
Antimycobacterial therapy: Anti-Kochs agents; Anti-leprotic agents (n=3)

Pharmacotherapy of tuberculosis

Antiprotozoal agents:

Antiamoebic, Antimalarials and Anti Kala azar (n=3)

Pharmacotherapy of malaria

Antihelminthics (n=1)

(against intestinal Nematodes and Cestodes; extra intestinal Nematodes and Trematodes)

Antifungal agents (n=1)

Antiviral agents including antiretroviral agents (n=2)

Pharmacotherapy of STDs (n=1)

Principles of cancer chemotherapy and their adverse drug reactions (n=1)
(individual agents and regimes need not be taught)

I) ENDOCRINOLOGY: (N=12 ± 2)

Introduction to endocrinology

(including Hypothalamic and Anterior Pituitary hormones) (n=1)
Steroids (n=2)
Glucocorticoids: Use and Misuse
Oestrogens & antagonists (n=1)
Progestins & antagonists (n=1)
Oral contraceptives & profertility agents (n=1)

Testosterone & anabolic steroids (n=1)
Fertility control
Thyroxine and antithyroid agents (n=2)
Agents affecting calcification (n=1)
Antidiabetic agents: Insulin; Oral antidiabetic drugs (n=2)

Pharmacotherapy of Diabetes Mellitus

J) AGENTS USED IN GASTROINTESTINAL DISORDERS: (N=2)

Pharmacotherapy of nausea & vomiting (n=1)
Pharmacotherapy of peptic ulcer (n=1)

Management of dyspepsia
Management of diarrhoea and constipation

K) PERIOPERATIVE MANAGEMENT: *to be covered as a **case study***
Preanaesthetic medication
Preparation of surgical site: antiseptics etc.
Local Anaesthetics
Skeletal muscle relaxants
Drugs used in post-operative period: analgesics, antiemetics etc.

L) MISCELLANEOUS TOPICS – II (N=5-7)

Drug-Drug Interactions (n=1)
Drug use at extremes of age, in pregnancy & in organ dysfunction (n=2)
Use of chelating agents in heavy metal poisonings; Environmental & occupational toxicants and principles of management (particularly cyanide and CO) (n=1)
Ocular pharmacology (n=1)
Dermatopharmacology (n=1)

General Anaesthetics…DK

Pharmacotherapy of glaucoma and conjunctivitis

M) RATIONAL PHARMACOTHERAPY: (N=4)

Prescription writing and P-drug concept
Rational Drug Use; Essential Drug List (EDL)

Criticism with reference to Fixed Drug Combinations (FDCs)

Use and misuse of commonly used preparations: vitamins, antioxidants, enzymes etc.

d. Term-wise distribution

I term

Introduction
General pharmacology
Autonomic pharmacology
Drugs acting on cardiovascular system including drugs affecting coagulation and those acting on the kidneys

II term

Prescription writing and P-drug concept
Rational use of drugs; Essential drug list
Neuro-psychiatric pharmacology including inflammation, pain and substance abuse
Miscellaneous topics - I
Chemotherapy
Endocrinology

III term

Agents used in gastro-intestinal disorders

Peri operative management

Miscellaneous topics

Criticism with reference to FDCs

Use and misuse of commonly used preparations: vitamins, antioxidants, enzymes etc.

e. Practicals: Total hours, number & contents

Total hours: 120

Number: 18

Contents:

I term practicals **(N=7)**

Introduction to Practical Pharmacology, Prescription Writing, Pharmacokinetics I, Routes of Administration: Oral, Routes of Administration: Topical, Routes of Administration: Parenteral, Pharmacokinetics II: Applied Pharmacokinetics

II term practicals **(N=7)**

Pharmacodynamics I (Isolated Tissue, Cat NM junction), Pharmacodynamics II (Dog: BP and Respiration), Screening Techniques for New Drugs, Adverse Drug Reactions, Rational Pharmacotherapy I, Rational Pharmacotherapy II, Sources of Drug Information including scrutiny of Promotional Literature

III term practicals **(N=4)**

Case Study 1, Case Study 2
Revision Practicals (n=2)

***f. Books recommended* :**

1. Basic & Clinical Pharmacology. Katzung BG (Ed), Publisher: Prentice Hall International Ltd., London.
2. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher: Popular Prakashan, Bombay.
3. Essentials of Medical Pharmacology. Tripathi KD (Ed), Jaypee Brothers, publisher:Medical Publishers (P) Ltd.
4. Clinical Pharmacology. Laurence DR, Bennet PN, Brown MJ (Ed). Publisher: Churchill Livingstone

***Reference books* :**

2. Goodman & Gilman's The Pharmacological Basis of Therapeutics. Hardman JG & Limbird LE (Ed), Publisher: McGraw-Hill, New York.
3. A Textbook of Clinical Pharmacology. Roger HJ, Spector RG, Trounce JR (Ed), Publisher: Hodder and Stoughton Publishers.

5. Evaluation

Methods

Theory, Practical & viva

b. Pattern of Theory Examination including Distribution of Marks, Questions & Time

Nature of Question Paper

Faculty with Year **:** ***SECOND MBBS***

Subject **:** **PHARMACOLOGY & THERAPEUTICS**

Paper **:** ***I***

Total Marks **:** ***40*** ***Time*** **:** ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

Faculty with Year **:** ***SECOND MBBS***

Subject **:** **PHARMACOLOGY & THERAPEUTICS**

Paper **:** ***II***

Total Marks **:** ***40*** ***Time*** **:** ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

c. Topic distribution

A) **PHARMACOLOGY PAPER I** includes General Pharmacology including drug-drug interactions; Autonomic Nervous System, Cardiovascular System including drugs affecting Coagulation and those acting on the Kidneys; Haematinics; Agents used in Gastro-Intestinal Disorders; Ocular pharmacology; Drug use at extremes of age, in pregnancy & in organ dysfunction; Diagnostic & Chelating agents; Environmental & Occupational Pollutants; Vitamins

B) **PHARMACOLOGY PAPER II** includes Neuro-Psychiatric Pharmacology including Antiinflammatory-Analgesics and Addiction & its management; Pharmacology in Surgery (particularly peri-operative management); Chemotherapy including Cancer Chemotherapy; Endocrinology; Dermatology; Miscellaneous Topics I (Lipid-derived autacoids; Nitric Oxide; Allergy - Histaminics & Antihistaminics including anti-vertigo; Anti Asthmatics; Anti-tussive agents; Immunomodulators; Vaccines & sera; Drugs acting on the uterus)

d. Marking scheme

Each paper of 40 marks as shown in the above table.

e. Nature of practicals and duration

Practical Heads	**Marks 26**
Prescription writing	**5**
• Long	(3)
• Short	(2)
Criticism	**8**
• Prescription & rewriting	(4)
• Fixed dose formulation	(4)

Clinical Pharmacy

(dosage forms, routes of administration, label information and instructions)

i. Spots **8**

a Experimental Pharmacology – Graphs, Models for evaluation, Identification of a drug, Interpretation of data (2)

b Human Pharmacodynamics - Drug Identification – urine analysis, eye chart, - Subjective / objective effects of a drug (2)

c Therapeutic problems based on pharmaceutical factors - Outdated tablet, Bioavailability, Dosage form, Ethics and Sources of drug information (2)

d Recognition of ADRs & interaction of commonly used drugs (2)

For each of the 4 groups (a, b, c & d) 2 spot questions each of 1mark to be asked.

Time distribution:
For prescription and criticism the time given will be ½ hour.
For clinical pharmacy practical viva will be taken on pre-formed preparations and/or marketed formulations. The students may be asked to write labels and instructions to be given to the patients or demonstrate how specific dosage forms are administered and state the precautions to be taken/ explained to the patients while using them. The time for this will be 5 min.
For spots 20 min will be given (2 min per spot).
Thus the total time for the practical examination will be 1 hour.

f. Viva: duration and topic distribution

Viva	14 marks
Duration	10 mins
Four examiners	5 mins with each candidate
Two examiners	for topics of paper I - systems to be distributed
Two examiners	for topics of paper II - systems to be distributed

At each table marks will be given out of 7.

g. Plan for internal assessment
The time-table for internal assessment will be as follows:

For the batches which have joined before June 2001

I term
1st midterm: After 60 teaching days (MCQs, and SAQs)
1st term ending: After 120 teaching days (Theory and Pharmacy Practicals)

II term
2nd midterm: After 60 days of 2nd term (MCQs and SAQs)
2nd term ending: At the end of 2nd term (Theory and Practicals: Exptal/Clinical Pharmacy)

IIIrd term
Prelims examination on the basis of University pattern -Theory, Practicals and Viva
(Minimum 4 weeks gap mandatory between Preliminary and University examinations)

For each mid-term examination 40 MCQs (each worth 1/2 mark) will be administered to the students along with 5 SAQs (each of 2 marks with an option of 5 out of 6). The total time will be 1 hour and the total marks will be 30.

The term ending examination will be of 80 marks and the nature of questions will be as per University exam.
This will be followed by practical (total time 1½ hours).
To familiarize the students with the 'viva-vocé', the marks for the practical may be kept at only 20, while 20 marks be reserved for viva on theory topics (total 40 marks).

For the batches joining in June 2001 and later

I term
1st term ending: After 120 teaching days (Theory and Pharmacy Practicals)

II term
2nd term ending: At the end of the 2nd term (Theory and Practicals: Exptal/Clinical Pharmacy)

IIIrd term
Prelims examination on the basis of University pattern -Theory, Practicals and Viva
(Minimum 4 weeks gap mandatory between Preliminary and University examinations)

For the terminal theory examination students will be evaluated by a combination of 28 MCQs (each worth 1/2 mark), 10 SAQs (each of 2 marks with an option of 10 out of 12) and 2 LAQs (option of 2 out of 3 each worth 8 marks). The total time allotted for this 50 marks paper will be 2hours 30minutes.

This will be followed by practicals (total time 1½ hours).
To familiarize the students with the 'viva-vocé', the marks for the practical may be kept at only 20, while 20 marks be reserved for viva on theory topics (total 40 marks).

Prelim pattern will be as per the University exam with 2 papers in theory, each of 2 hours duration.

FORENSIC MEDICINE AND MEDICAL JURISPRUDENCE INCLUDING TOXICOLOGY

1. Goal

The broad goal of teaching undergraduate students Forensic Medicine is to produce a physician who is well informed about Medico-legal responsibility during his/her practice of Medicine. He/She will also be capable of making observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and associated medico-legal problems. He/She acquires knowledge of law in relation to Medical practice, Medical negligence and respect for codes of Medical ethics.

2. Educational objectives

(a) Knowledge

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

i. identify the basic Medico-legal aspects of hospital and general practice
ii. define the Medico-legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre
iii. appreciate the physician's responsibilities in criminal matters and respect for the codes of Medical ethics
iv. diagnose, manage and identify also legal aspect of common acute and chronic poisonings
v. describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings
vi. detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act
vii. describe the general principles of analytical toxicology

(b) Skills

A comprehensive list of skills and attitude recommended by Medical Council of India Regulation, 1997 desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate for Forensic Medicine and

Toxicology

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

i. make observations and logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems

a. to be able to carry on proper Medico-legal examination and documentation/Reporting of Injury and Age

b. to be able to conduct examination for sexual offences and intoxication

c. to be able to preserve relevant ancillary materials for medico - legal examination

d. to be able to identify important post-mortem findings in common unnatural deaths

ii. diagnose and treat common emergencies in poisoning and chronic toxicity
iii. make observations and interpret findings at post-mortem examination
iv. observe the principles of medical ethics in the practice of his profession

(c) Integration

Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding Medico-legal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. Medicine, Pharmacology etc.

3. Total duration of Para-clinical teaching 3 Semesters
Total 360 teaching days

Total number of teaching hours allotted for Forensic Medicine & Toxicology 100 hours

4. Syllabus

a. Learning methods
Lectures, tutorials, practical demonstrations

Distribution of teaching hours

Didactic lectures should not exceed one third of the time schedule, two third schedule should **include Practicals, Demonstrations, Group discussions, Seminars and Tutorials.**

Learning process should include living experiences and other case studies to initiate enquiries in criminal matters and Medico-legal problems.

A) Theory (lectures &		….. 40
Tutorials, seminar & allied)		….. 20
	Total	….. 60

B) Practicals (including demonstrations)		….. 25
		….. 15
	Total	….. 40

This period of training is minimum suggested. Adjustments whenever required, depending on availability of time, be made.

b. & c. Sequential organisation of contents & their division

Topic wise distribution

The course is designed to meet the needs of a General Practitioner and includes the following topics:

1.	Forensic Medicine	40 Hrs
2.	Toxicology	20 Hrs
3.	Medical Jurisprudence	12 Hrs
4.	Legal Procedures in Medico-Legal cases	08 Hrs
5.	Court attendance when medical evidence is being recorded	04 Hrs
6.	Integrated approach towards allied disciplines	06 Hrs
7.	Tutorial and Seminars	10 Hrs

Total: 100 Hrs

<u>Part – 1 Forensic Medicine</u>: (N=40)

Contents & division
Note: Must Know (MK), **Desirable to Know (DK) and `*' is Nice to Know (NK)**

A) DEFINITION, SCOPE RELEVANT TO SUBJECT

1. History of Forensic Medicine
2. **Need, Scope, Importance and probative value of Medical evidence in Crime Investigation**

B) PERSONAL IDENTITY NEED AND ITS IMPORTANCE.

1. **Data useful for Identification of Living and Dead**
2. **Age estimation and its medico-legal Importance**
3. Sex determination and it's medico-legal importance
4. Other methods of establishing identity: Corpus Delicti, **Dactylography, Tattoo marks**, Deformities, Scars and other relevant factors
5. Identification of decomposed, Mutilated bodies and skeletal remains
6. Medico legal aspect of *DNA fingerprinting - a brief introduction
7. **Medico - legal aspect of blood and blood stains**

Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for identification and Medico-legal examination

C) **MECHANICAL INJURIES AND BURNS**

1. **Definition and classification of injuries: Abrasions, Contusions, Lacerations, Incised and Stab injury, Firearm and Explosion injury, Fabricated and Defence injury**
2. **Medico-legal aspect of injury/hurt, simple and grievous hurts, murder, Ante - mortem, Postmortem Wounds, Age of the injury, cause of death and relevant sections of I.P.C., Cr.P.C.**
3. **Causative Weapon and appearance of Suicidal, Accidental and Homicidal injuries**
4. Physical methods of Torture and their identification
5. **Reporting on Medico-legal cases of Hurts**
6. **Regional injuries**: Head injury, cut throat injuries and Road traffic accident injuries
7. **Thermal injuries**: Injuries due to heat and cold, Frostbite, Burns, Scalds and Bride burning
8. Injuries due to Electricity, Lightening

Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for Medico-legal examination

D) MEDICO-LEGAL ASPECTS OF SEX, MARRIAGE AND INFANT DEATH

1. **Sexual Offences and perversions**: Natural (**Rape**, Adultery, and Incest), Unnatural (**Sodomy, Bestiality** and Buccal coitus) Lesbianism, perversions and **relevant sections of I.P.C. and Cr.P.C.**
2. Fertility, **Impotence**, Sterility, **Virginity**, and Nullity of marriage and divorce on Medical ground
3. **Pregnancy, Delivery**, Paternity, Legitimacy, Artificial Insemination, *Fertilisation in Vitro, *Sterilization (Family Planning Measures)
4. **Abortions, Medical Termination of pregnancy, criminal abortions**, Battered Baby Syndrome, Cot deaths and relevant sections of I.P.C. and Cr.P.C., **M.T.P. Act of 1971 and foetal sex determination Act**
5. **Infant death (Infanticide)**
   i. Definition Causes, Manners and Autopsy features
   ii. Determination of age of Foetus and Infant
   iii. Signs of live-born, stillborn and dead born child

Collection, Preservation and Dispatch of Specimen: Hair, seminal fluid/ stains and other ancillary material for medico-legal examination, examination of seminal stains and vaginal swabs

E) MEDICO-LEGAL ASPECTS OF DEATH

1. **Definition and concept of death, stages, modes, Signs of death and its importance**
2. **Changes after death**, Cooling, Hypostasis, Changes in eye, Muscle changes, Putrefaction, Saponification, Mummification, **Estimation of time since death**
3. **Death Certification**, Proximate causes of death, causes of sudden deaths, Natural deaths. Presumption of death and survivorship, disposal and preservation of dead
4. Introduction to *The Anatomy Act, *The Human organ transplantation Act. 1994
5. Medico-legal aspects and findings of post-mortem examination in cases of **death due to common unnatural conditions**
6. **Sudden unexpected death**, deaths from starvation, cold and heat and their medico-legal importance
7. **Medico-legal aspects of death from Asphyxia, Hanging, Strangulation,** Suffocation and **Drowning**

F) MEDICO-LEGAL AUTOPSY

1. **Autopsy: Objectives, Facilities, Rules and Basic techniques, Proforma for reporting medico-legal autopsy**
2. **Exhumation**, examination of mutilated remains, Obscure autopsy and **post-mortem artifacts**

Collection, preservation and despatch of material for various investigations to Forensic Science Laboratory

G) *FORENSIC PSYCHIATRY

1. **Definition, General terminology** and * Basic concept of normality and abnormality of human behaviour, Civil and Criminal responsibility
2. Examination, Certification, restraint and admission to Mental Hospital
3. Mental Health Act – Principles and Objectives

Part – 2 Toxicology: (N=20)

A) POISONS AND THEIR MEDICO-LEGAL ASPECTS

1. **Definition of poison, General consideration and Laws in relation to poisons**\Narcotic drugs and psychotropic substances Act, *Schedules H and L drugs, *Pharmacy Act, **Duties and responsibilities of attending physician**
2. **Common poisons and their classification, Identification of common poisons**, Routes of administration, Actions of poisons and factors modifying them, **Diagnosis of poisoning (Clinical and Confirmatory) , Treatment/ Management of cases of acute and chronic poisonings**
3. Addiction and Habit forming drugs, drug dependence

4. **Occupational and environmental poisoning, prevention and Epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act**
5. **Medico-Legal aspects and findings of postmortem examination in cases of death due to poisonings**

B) POISONS TO BE STUDIED

1. **Corrosive: Euphoric Acid**, Nitric Acid, Hydrochloric Acid, **Carbolic Acid** and Oxalic Acid, **Sodium and Potassium and Ammonium Hydro-Oxide**
2. **Non-metallic, Metallic Poisons and Industrial hazards: Phosphorus** and compounds of Lead, Arsenic, Mercury, **Copper**, and Glass powder
3. **Plant Poisons: Castor, Croton**, Capsicum, Semicarpus Anacardium (Bhilawa), Calatropis Gigantea, **Abrus Precatorius (Ratti), Dhatura, Cannabis Indica, Cocaine, Opium**, Aconite, Yellow Oleander, **Strychnine**
4. **Animal and Bacterial Poisons: Snakes**, Scorpion and Food poisoning
5. **Alcohol (Drunkenness) Ethyl Alcohol, Methyl Alcohol**, Kerosene, Barbiturates
6. **Asphyxiant & Gaseous Poisons: Carbon Monoxide**, War gases, Hydrocyanic acid, and Cyanides
7. **Insecticides, pesticides and Miscellaneous poisons: Organo-Phosphorus Compounds, Organo-Chloro Compounds, Carbamates (Carbaryl) and Rodenticides (Phosphides)**

Collection, Preservation and forwarding of evidence, remains of poison, body discharges and viscera etc. to Forensic Science Laboratory in cases of poisoning

C) FORENSIC SCIENCE LABORATORY: (BRIEF)

1. **Aims, objects, general knowledge about Forensic Science Laboratory**
2. **General principles of analytical toxicology**

<u>Part – 3 Medical Jurisprudence</u>: (N=12)

A) LEGAL AND ETHICAL ASPECTS OF PRACTICE OF MEDICINE

1. The **Indian Medical Council**, the Act, Formation and Functions;
   State Medical Council: Formation, Functions, and Registration
2. **Rights and obligations of Registered Medical Practitioners and patient, Duties of physicians and patients**, Euthanasia
3. **Infamous conduct, Professional secrecy and privileged communications**
4. **Codes of Medical Ethics, medical etiquette, Medical Negligence** and contributory negligence, **Precautionary measures and defences for Medical Practitioners against legal actions, Medical/Doctors indemnity insurance, Consumer Protection Act relevant to medical practice**
5. Medical Ethics and prohibition of Torture & care of Torture Victims

B) DEFINITION OF HEALTH AND ITEMS TO CERTIFY ABOUT HEALTH

1. **Common medico-legal problems in Hospital practice, Consent in Medical Examination and treatment, under treatment/ Sickness and Fitness certificate, maintenance of medical records**
2. Social, Medical, Legal and Ethical problems in relation to AIDS

C) ACTS AND SCHEMES RELATED TO MEDICAL PROFESSION IN BRIEF:

Workmen's compensation Act, * Mental Health Act, **Medical Practitioner Act,** Protection of human rights Act, 1993, * National Human Rights Commission, * Human Organ Transplantation Act and other relevant sections of I.P.C., Cr.P.C. and I.E. Act. Maharashtra civil medical code, Hospital administration manual

Part – 4 Legal procedures in medico-legal cases: (N=8)

A. **Medico-Legal Investigations of death** in suspicious circumstances, different **Inquest**, type of offences
B. **Types of Criminal courts and their powers**, punishments prescribed by law, **kinds of witnesses, Evidence, Documentary Medical evidence**, Dying declaration and Dying deposition
C. The Trial of criminal cases, **Rules and Conventions to be followed by Medical Witness at Medical evidence**, **subpoena, conduct money**
D. Relevant Sections from the Indian Evidence Act, Indian Penal code and Criminal Procedure code

NOTE : Must know, desirable to know and ' * ' is nice to know

d. Term-wise distribution

Terms	Lectures	Non – Lectures	Pracs.	Demos. Tuts/Sem/Allied
I Term	15	08	06	06
II Term	15	10	05	06
III Term	10	07	04	08
Total	40	25	15	20

This period of training is the minimum suggested. Adjustments whenever required, depending on availability of time, be made

e. Practicals (including demonstrations) : Total no.of hours & contents

Practicals will be conducted in the laboratories.
Objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion.
Emphasis should be on candidate's capacity in making observations and logical inferences in order to initiate enquiries in criminal matters and medico-legal problems.

Total Marks: 25 + 15 = 40

Contents:

Part 1 Forensic Medicine

Report on:

1. **Estimation/Certification of Age**
2. **Recording of fingerprints**
3. **Examination/Certification of the Injured [Prescribed Forms]**
4. **Examination of the Causative Agents in cases of Injuries (e.g. Weapons, Instruments)**
   a. Hard and blunt weapons
   b. Sharp cutting, sharp pointed and Sharp Heavy cutting weapons
   c. Firearm weapons
5. **Sexual offences :**
   a. Examination/Certification of Victim
   b. Examination/Certification of Accused
6. **Examination of Foetus to opine about age**
7. **Examination of Bones and teeth for Medico-legal purpose to determine age, sex, stature, cause of death, time since death**
   a. Skull and Mandible
   b. Scapula, Sternum and Upper limb bones
   c. Sacrum and hip bone/ Pelvic bone
   d. Lower limb bones

Study of:

8. **Medical certification of cause of Death as per Birth and Death registration Act [Prescribed Forms]**
9. **Studies of Skiagrams** for estimation of age, bony injury, foreign body, and pregnancy
10. **Photograph of different events of Medico-legal importance** and post-mortem changes
11. **Study of Various museum specimens** of medico-legal significance
12. **Study of Various slides** of medico-legal significance
13. **Demonstration of Instruments:**
    a. Used in treatment of acute poisoning cases
    b. Used for causing abortions
    c. Used for carrying out autopsy

[Standard human autopsy dissection Box/set]

Part 2 Forensic Toxicology

1. **Examination/Certification of Alcoholic [Prescribed Forms 'A' &'B']**
2. **Study of Common poisons:**

[Sulphuric Acid, Nitric Acid, Hydrochloric Acid**, Carbolic Acid and Oxalic Acid,** Sodium and Potassium Hydro-Oxide, **Phosphorous,** Lead, Arsenic, Mercury**, Copper, Glass powder, Castor, Croton,** Capsicum, Semicarpus Anacardium (Bhilawa), Calatropis Gigantea, **Abrus Precatorius (Ratti), Dhatura, Cannabis Indica, Opium,** Aconite, Yellow Oleander, Strychnine, **Snakes, Scorpion, Alcohol, Methyl Alcohol, Kerosene,** Barbiturates**, Organo-phosphorus compounds, Organo Chloro compounds, Carbamates (Carbaryl)] and other commonly used poisons, antidotes and preservatives**

Part 3 Medical Jurisprudence

Study of Medical Certificates [Prescribed Forms]

a. Sickness Certificate
b. Fitness Certificate
c. Certificate of Physical fitness
d. * Medical certificate prescribed under Mental Health Act : 1987
e. * Medical Certificate of Sound/ Unsoundness of mind.

Part – 4 Legal procedures in medico-legal cases

Study of the various prescribed Forms:

Consent to surgery Anaesthesia and other Medical services, Request for sterilization, Consent to access to hospital records, Authorization for Autopsy, **Dead body Challan used for sending a dead body for post-mortem examination,** Request for the second inquest by Magistrate on the dead body**, Provisional post-mortem certificate, Post-mortem form, Pictorial Post-mortem form, Form for the Final cause of death,** Forms for despatch of exhibits other than the viscera to chemical analyser, Forms for despatch of Viscera for Histopathological Examination, **Form for dispatch of viscera to chemical analyser,** Forensic Science Laboratory report form, Summons to witness.

Each student shall attend and record as a clerk

a. As many as possible cases / items of medico-legal importance
b. 10 cases of medico-legal autopsies

Both above 'a' and 'b' should be recorded in the approved Proforma in the single Journal. The Journal should be scrutinised by the teacher concerned and presented for the inspection and evaluation during the university examination.

Each student shall attend the court at least 2 cases when Medical Evidence is being recorded.

f. Books recommended

1. **Modi's Textbook of Medical Jurisprudence and Toxicology Ed. 22, 1999, by B.V. Subramanyam, Butterworth**
2. The Essentials of Forensic Medicine & Toxicology by K.S. Narayan Reddy
3. Parikh's Textbook of Medical Jurisprudence and Toxicology.
4. **Text Book of Forensic Medicine – J.B. Mukherjii VOL 1 & 2**
5. **Principles of Forensic Medicine - A. Nandy**
6. Toxicology at a Glance by Dr S.K. Singhal
7. Bernard Knight et. All: Cox's Medical Jurisprudence & Toxicology

Reference books

1. Russell S. Fisher & Charles S.Petty: Forensic Pathology
2. Keith Simpson: Forensic Medicine
3. Jurgen Ludwig: Current Methods of autopsy practice.
4. Gradwohl – Legal Medicine
5. A Doctors Guide to Court – Simpson
6. Polson C.J. : The essentials of Forensic Medicine
7. Adelson, L.: The Pathology of Homicide.
8. Atlas of Legal Medicine (Tomro Watonbe)
9. Sptiz, W.U. & Fisher, R.S.: Medico-legal Investigation of Death.
10. A Hand Book of Legal Pathology (Director of Publicity)
11. Taylor's Principles & Practice of Medical Jurisprudence. Edited by A.Keith Mant, Churchill Livingstone.
12. Ratanlal & Dhirajlal, The Indian Penal Code; Justice Hidayatullah & V.R. Manohar
13. Ratanlal & Dhirajlal, The Code of Criminal procedure; Justice Hidayatullah & S.P. Sathe
14. Ratanlal & Dhirajlal, The Law of Evidence; Justice Hidayatullah & V.R. Manohar
15. Medical Law & Ethic in India – H.S. Mehta
16. Bernard Knight : Forensic Pathology
17. Code of medical ethics : Medical Council of India, approved by Central Government, U/S 33 (m) of IMC Act, 1956 (Oct 1970)
18. Krogman, W.M.: The human skeleton in legal medicine.
19. FE Camps, JM Cameren, David Lanham : Practical Forensic Medicine
20. V.V. Pillay : Modern Medical Toxicology.

5. Evaluation

a. Methods

Theory, Practical & viva

b. Pattern of Theory Examination including Distribution of Marks, Questions, Time

Nature of Question Paper

Faculty with Year **:** ***SECOND MBBS***

Subject **:** **FORENSIC MEDICINE & TOXICOLOGY**

Paper **:** ***--***

Total Marks **:** ***40*** ***Time*** **:** ***2 Hours***

Section "A" (8 Marks)

Instructions:-

1) Fill (dark) the appropriate empty circle below the question number once only..
2) Use **blue/black** ball point pen only.
3) Each question carries **one / half mark.**
4) **Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "A" : MCQ (8 marks)

Question No.	Question Description	Division of Marks	Total Marks
1.	Total MCQs : 16	16 X ½	08

Section "B" & "C" (32 Marks)

Instructions:-

1) All questions are compulsory.
2) The number to the right indicates full marks.
3) Draw diagrams wherever necessary.
4) **Answer each section in the respective answerbook only. Answers written in the inappropriate sectional answer books will not be assessed in any case.**
5) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

Section "B" : BAQ (20 Marks)

Question No.	Question Description	Division of Marks	Total Marks
2.	**Brief answer questions** **(Attempt any five out of six)** a) b) c) d) e) f)	5 X 4	20

Section "C" : LAQ (12 Marks)

Question No.	Question Description	Division of Marks	Total Marks
3.	**Attempt any two out of three:** ***Long answer question only*** a) b) c)	2 X 6	12

c. Topic distribution in the theory paper

Section A & C: Forensic Medicine, Toxicology, Medical Jurisprudence, Legal Procedure
Section B: Forensic Medicine, Toxicology and/or Medical Jurisprudence

d. Marking scheme

As shown above

e. Nature of practicals and duration

Practicals ***Marks 30***
Report on: Six Exercises [With available resources] Time: About 2 hrs.

1. An Injured **OR** Age of the child
   OR An Alcoholic **OR** Sexual offence 07 Marks
2. Bone **OR** Determination of age of Foetus 05 Marks
3. Weapon 05 Marks
4. Certificate of Sickness, fitness **OR** Death. 05 Marks
5. Report on TWO Poison 04 Marks
6. Report on any TWO articles: [Skiagram **OR** Photographs **OR** Slides **OR** Museum Specimens **OR** Instruments] 04 Marks

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TOTAL **30 Marks**

In respect of items 1 to 6, students will be expected to prepare their Reports as if they would be required to submit it to the investigating authority concerned within the time allotted, and the examiners will be assessing proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Emphasis should be on candidate's capacity in making observations and logical inferences in order to initiate enquiries in criminal matters and medico-legal problems.

f. Viva : duration and topic distribution

Viva-vocé: Time: About 20 Min

There will be TWO tables examining each student separately on the topics 'a' and 'b'.

Viva	10 marks
Duration	20 mins
Four examiners	10 mins with each candidate
Two examiners	for topics a. Toxicology and Medical Jurisprudence
Two examiners	for topics b. Forensic Medicine and Legal Procedures

At each table marks given will be out of 5 and then added together (total out of 10)

g. Plan for internal assessment

The time-table for internal assessment will be as follows:

SCHEME OF INTERNAL ASSESSMENT WITH FREQUENCY OF EXAMINATIONS FOR THE BATCHES WHICH HAVE JOINED BEFORE JUNE 2001

Marks for internal assessment 'A' shall be calculated on the basis of two mid terminals & three terminal college examinations conducted. During mid terminal (periodical examination) assessment should be done by MCQs of Single Best Response type.

Marks for internal assessment 'B' shall be calculated on the basis of three terminal college examinations (7 marks) & day-to-day class practical work and Record (3 marks).

Department will maintain a register for periodic evaluation of their students. The internal assessment will be done separately for theory and practical examinations.

A total of 5 (five) examinations will be conducted as under:

FREQUENCY AND MARKING OF EXAMINATION FOR INTERNAL ASSESSMENT

Termwise distribution	**Theory/Practical (Total Marks)**
I Term	
One Midterm	15 / no practicals
1st Terminal	40 / 25
II Term	
One Midterm	15 / no practicals
2nd Terminal	40 / 40
III Term	
One term ending Preliminary	40 / 40

SCHEME OF INTERNAL ASSESSMENT WITH FREQUENCY OF EXAMINATION FOR THE BATCHES JOINING IN JUNE 2001 AND LATER

I term

1st term ending: After 120 teaching days (Theory and Practicals)

II term

2nd term ending: At the end of the 2nd term (Theory and Practicals)

III term

Prelims examination on the basis of University pattern -Theory, Practicals and Viva
(Minimum 4 weeks gap mandatory between Preliminary and University examinations)

For the terminal theory examination students will be evaluated by a combination of 28 MCQs (each worth 1/2 mark), 6 SAQs (each of 2 marks with an option of 6 out of 7) and 2 LAQs (option of 2 out of 3 each worth 7 marks). The total time allotted for this 40 marks paper will be 2 hours.

This will be followed by practicals (total time 1½ hours). The marks for the I term practicals will be 25 and for the II term will be 40.

To familiarize the students with the 'viva-vocé', for the I term the marks for the practicals may be kept as 15, while 10 marks be reserved for viva on theory topics (total 25 marks); for the II term the marks for the practicals may be kept as 30, while 10 marks be reserved for viva on theory topics (total 40 marks).

Prelim pattern will be as per the University exam.

REVISED INTERNAL ASSESSMENT EXAMINATION SCHEME w.e.f. JUNE 2007 EXAMINATION

YEAR :- Second MBBS

SN	Subject	1st Term End			2nd Term End			Preliminary Examination		
		Semester	Theory	Practical	Semester	Theory	Practical	Semester	Theory	Practical
			(A)	(B)		(C)	(D)		(E)	(F)
1.	Pharmacology	III	50	40	IV	50	40	V	80	40
2.	Pathology	III	50	40	IV	50	40	V	80	40
3.	Microbiology	III	50	40	IV	50	40	V	80	40
4.	FMT	III	20	20	IV	20	20	V	40	40

(B) Calculation Method:-

I) Theory Marks to be send to the University out of 15 Except FMT $= \frac{(A)+(C)+(E)}{12} = \frac{50+50+80}{12} = \frac{180}{12} = 15$

II) Practical Marks to be send to the University out of 15 Except FMT $= \frac{(B)+(D)+(F)}{8} = \frac{40+40+40}{8} = \frac{120}{8} = 15$

III) For FMT Theory Marks to be send to the University out of 10 $= \frac{(A)+(C)+(E)}{8} = \frac{20+20+40}{8} = \frac{80}{8} = 10$

IV) For FMT Practical Marks to be send to the University out of 10 $= \frac{(B)+(D)+(F)}{8} = \frac{20+20+40}{8} = \frac{80}{8} = 10$

Introduction of "Communication Skills, Professionalism & Ethics in Medical Education Modules" TOPIC in 2nd &3rd MBBS Syllabus

MAHARASTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

III M.B.B.S.

MEDICINE

(i) **GOAL** :

The broad goal of the teaching of undergraduate students in Medicine is to have the knowledge, skills and behavioral attributes to function effectively as the first contact physician.

(ii) **OBJECTIVES** :

(a) KNOWLEDGE :

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

(1) Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases;
(2) Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indications and contra-indications;
(3) Propose diagnostic and investigative procedures and ability to interpret them;
(4) Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required;
(5) Recognize geriatric disorders and their management.

(iii) **SKILLS** :

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

(1) develop clinical skills (history taking, clinical examination and other instruments of examination to diagnose various common medical disorders and emergencies;
(2) refer a patient to secondary and/or tertiary level of health care after having instituted primary care;
(3) perform simple routine investigations like hemogram, stool, urine, sputum and biological fluid examinations;
(4) assist the common bedside investigative procedures like pleural tap, lumber puncture, bone marrow aspiration/ biopsy and liver biopsy.

A course of systematic instruction in the principles and practice of medicine, including medical disease of infancy;

a. Lecture - demonstrations, seminars and conferences in clinical medicine during the 3 years shall run concurrently with other clinical subjects.;
b. Instructions in comprehensive medical care;
c. Instructions in applied anatomy and physiology and pathology throughout the period of clinical studies;
d. Instructions in dietetics, nutrition and principles of nursing Medical and in simple ward procedure e.g. should be imparted during clinical concurrently.

iv) **Attitude :**

a. The teaching and training in clinical medicine must aim at developing the attitude in students to apply the knowledge & skills he/she acquires for benefit and welfare of the patients.

b. It is necessary to develop in students a sense of responsibility towards holistic patient care & prognostic outcomes.

c. Students should develop behavioural skills and humanitarian approach while communicating with patients, as individuals, relatives, society at large & the co- professionals.

Curriculum for Theory Lecture series & Tutorials and LCD for General Medicine including Psychiatry, Tb. & Dermatology

TERM	DAY	TIME	LECTURES	TOPIC
4th	MON	8-9	20	Introduction to Medicine
5th	MON	8-9	15	Infectious Diseases/Tropical diseases
	FRI	8-9	15	Cardiovascular System
6th	TUE	12-1	20	GIT, Liver, Pan.
	THU	8-9	20	Chest + Miscellaneous
	MON	8-9	20	TB
	TUE	8-9	20	Psychiatry
	SAT	8-9	15	Skin
7th	FRI	8-9	15	Neurology
	THU	12-1	15	Haematology/Haemato-oncology
	FRI	2-4	30	Tutorials
	MON	2-3	20	Skin / STD
8th	TUE	8-9	20	Endo + Misc + Genetics (3 Lectures.)
	THU	8-9	20	Nephro. +Clinical Nutrition
	TUE	2-4	40	Tutorial Medicine, Skin, Tb, Psychiatry,
	WED	2-4	40	Tutorial
9th	TUE	12-1	15	LCD Medicine (10) Skin 1 Psychiatry (1) Tb(1)
	MON	2-4	30	LCD Medicine (7)

The above timetable is general outline to guide the planning of curriculum at college level. However, flexibility may be exercised to the extend that there may be

minor re-scheduling of course contents day-wise or term-wise. It must be ascertained that the course contents are covered fully and total hours allotted for the subjects are effectively implemented.

Note :- These are suggested time tables. Adjustments where required, depending upon the availability of time and facility, be made.

SYLLABUS

(General Instruction: 1) **The Lectures** Stated below shall cover knowledge about applied aspects of basic & allied sciences, practical approaches in the management of patients in the outdoor & indoor settings as well as their management in the community. Special emphasis shall be placed on preventive aspects, National Health Programs & dietetics & nutrition.)

2) **During practical teaching & training in wards**, OPD & field works proper emphasis should be given to common health problems in addition to other diseases. Emphasis should be given to learning of tacit knowledge & skills in diagnosis & interpretation of finding & Lab. data.

INTRODUCTION TO MEDICINE : 4 TH SEMESER

Lect.01. : History of Medicine.

Lect.2/3. : Concept & objectives of history taking. Diagnosis, Provisional Diagnosis, Differential diagnosis.

Lect.04. : Symptomatology of Cardiovascular Diseases.

Lect.05. : Symptomatology of Respiratory diseases.

Lect.06. : Symptomatology in Nervous system.

Lect.07. : Symptomatology in Gastrointestinal and Hepatobiliary diseases.

Lect.08. : Approach towards a patient with Fever / Oedema.

Lect.09. : Approach towards a patient with anaemia / jaundice.

Lect.10. : Approach towards a patient with Lymphadenopathy.

Lect.11. : Investigations (Non- Invasive)
X-rays, USG
C.T. ./ M.R.I. Scan
Secretions examinations
Peripheral smear

Lect.12.: Investigations (Invasive)
Bone marrow
F.N.A.C.
Liver biopsy
Lymph node biopsy
Endoscopies
Lumber puncture.

Lect.13/14.: Review of common diseases in India.

Lect.15/16,: Revision.

Lect.17.: Examination.

Lect.18/20: Buffer.

INFECTIOUS DISEASES : 5 TH SEMESTER

Lect.01:Introduction.
Infections – types, Modes of Infection transmission, Incubation period
Host defenses, Immunity & Immunization & Management including Prevention

Lect.02 : Viral hepatitis.

Lect.3/4/5: Tetanus/ Diphtheria

Lect.6/7: Malaria

Lect.08: Rabies

Lect.09: Typhoid fever

Lect.10/11: Gastroenteritis

Lect.12: Plague / Dengue

Lect.13/14: (HIV) Infection & AIDs.

Lect.15.: Examination.

Note :- The course contents in above topics should also cover applied aspects in basic sciences like Anatomy, Physiology, Bio-Chemistry, Micro- Biology, Pharmacology, Pathology, FMT while giving training on Clinical features, investigations, Diagnosis, D/D treatment & prevention.

CARDIOVASCULAR SYSTEM : 5 TH SEMESTER

Lect.01 : Introduction
Functions / anatomy / physiology and its applications
Various terminologies used

Lect.2/3: Methods of evaluation
Non - invasive
Invasive

Lect.04 : Arrhythmias
Concept & Classification
Presentation
Diagnosis
Pharmacotherapy in short

Lect.05: Cardiac arrest.

Lect.06: C.C.F.
Types
Presentations
Pathophysiology
Management

Lect.07: C.H.D.
Aetiology and classification
CHD in adults & its importance

Lect.08: Rheumatic fever

Lect.09: Presentation and haemodynamics of various Valvular lesions including investigations, Diagnosis, D/D treatment & Prevention.

Lect.10: Infective endocarditis

Lect.11/12: C.A.D, (Coronary artery disease)

Lect.13: Pericardial diseases and cardiomyopathy

Lect.14: Hypertension

Lect.15: Examination.

GASTROENTEROLOGY, HEPATOBILIARY SYSTEM & PANCREAS :
6 TH SEMESTER

Lect.01: Introduction to GIT
- Oral Cavity
- Ulcers
- Bleeding
- Pigmentation
- Oral manifestation of systemic diseases

Lect.2/3: Oesophagus
- Inflammation, Dysphagia

Lect.4/5: Stomach
- Peptic ulcers
- Aetiopathogenesis
- Clinical features
- Investigations
- D/D and management
- Acute and Chronic gastritis

Lect.6/7. Small and large intestine diseases
- Secretions & functions
- MAS Mal –absorption-syndrome
- Tuberculosis of Abdomen

Lect.08: Ulcerative colitis & Crohn‟s disease

Lect.09: Liver.
- Introduction
- LFT & their interpretation

Lect.10/11: Hepatitis - Acute & Chronic

Lect.12/13: Cirrhosis of liver

Lect.14: Gall bladder diseases

Lect. 15/16: Pancreas
- Functions
- Investigations
- Acute and Chronic pancreatitis
- Manifestation and D/D & treatment.

Lect.17/18: Misc. & Revision.

Lect.19: Examination.

RESPIRATORY SYSTEM : 6 TH SEMESTER

Lect.01: Applied Anatomy and physiology of R.S.

Lect.02: P.F.T. (Pulmonary Function Testing)

Lect.03: Resp. Infection- Pneumonias.

Lect.04: Chronic bronchitis and emphysema

Lect.5/6: Bronchiectasis and lung abscess.

Lect.07: Bronchial asthma

Lect.08: Malignancies

Lect.09: Mediastinum and its disorders.

Lect.10: Pleural disease - Emphasis on pneumothorax

Lect.11: Pleural effusion.

Lect.12: Occupational lung disease. Its concept and short review

Lect.13: Revision - Fungal & Parasitic diseases

Lect. 14:Respiratory emergencies & Introduction to mechanical ventilators

Collagen Vascular Disorders

Lect.1: Allergy - Concept & hypersensitity, Autoimmunity

Lect.2: Collagen disease.

Lect.3: Rheumatoid arthritis

Lect.4: Sero negative arthritis

Lect.5: Revision HIV , Alcohol related disease

Lect.6: Examination

TUBERCULOSIS : 6 TH SEMESTER

Lect.01: History and introduction

Lect.2/3: Pathogenesis and pathology

Lect.04: Role of host related factors

Lect.05: Microbiology of AFB

Lect.06: Clinical features of pulmonary tuberculosis and its investigations

Lect.07: Anti – Tubercular drugs
Pharmacology & Schedules of treatment.

Lect.8/9: Resistant tuberculosis
DOTS
Prophylaxis - Drugs /BCG/ Tuberculin test.
HIV & TB.

Lect.10: Extra - pulmonary tuberculosis
Plural effusion
Empyema
Others

Lect.11/12: Revision

Lect.13: Examination

NEUROLOGY: 7 TH SEMESTERS

Lect.01: Introduction
Applied anatomy & physiology
History taking in neurology

Lect.02: Investigations

Lect.3/4: CVD (Cerebro Vasular Disease)
Types & its differential diagnosis
Predisposing factors
Diagnosis and management

Lect.05: S.O.L. (Space Occupying Lesions)

Lect.06: Encephalitis and meningitis

Lect.07: Epilepsy

Lect.08: Cerebellar syndrome

Lect.09: Parkinsonism

Lect.10: Paripheral neuropathy

Lect.11: Muscle disorders in brief

Lect.12/13: Spinal cord disorders

Lect.14: CSF
Formation and absorption
Status in various disorders

Lect.15: Examination.

HEMATOLOGY: 7 TH SEMESTER

Lect.01: Introduction
Cell line of hemopoisis
Stimulating factors
Physiology and Anatomy of RBCs.

Lect.02: Anemias
Introduction
Classification
Symptoms & signs in general
Basic investigations & its interpretation

Lect.03: Microcytic hypochromic anaemias
Fe Kinetics
C/F, investigations of Fe deficiency.
Treatment of Fe deficiency.
D/D - Sideroblastic / thallasemic.

Lect. 04: Macrocytic anaemias
Kinetics of B-12 and Folic acid
C/F, investigations and management of B-12 / FA deficiency.

Lect.05: Anaemias (continued)
Brief of Chronic infections and inflammation
Hemolytic anaemias

Lect.06: Hemoglobinopathies

Lect.07: Hypoplastic / Aplastic anemia
Definition
Classification
Diagnosis and management

Lect.08: Introduction to WBCs.
Agranulocytosis - Aetiology & its significance
Leukemias (AML, ALL, CML, CLL)

Lect.09: Management of leukemia

Lect.10: Lymphomas
Hodgkin‟s disease / NHL (Non-Hodgkin‟s lymphoma)

Lect.11: Approach to a patient with bleeding disorders
Recognition
Investigations
Physiology ofPlatelets
Therapy

Lect.12: Blood groups & Blood Transfusion & Component Therapy

Lect.13-14: Revision

Lect. 15: Examination.

ENDOCRINOLOGY : 8 TH SEMESTER

Lect. 01: Introduction - Hormones
Concept
Types
Action
Endocrine system
General
Control

Lect.2/3: Pituitary
Anatomy
Regulation
Disorders of Ant. Pituitary
Acromegaly
A.G. Syndrome
Disorders of Post. Pituitary
Hypopituitarism

Lect.4/5: Thyroid
Anatomy

Regulation
Goiter
Hypothyroid state & hyperthyroid state
Classifications
Management

Lect.6/7: Adrenal gland
Anatomy
Regulation
Addison‟s & Cushing syndrome
Recognition
Investigations
Management
Pheocromocytoma

Lect.08: Vit. D. Metabolism.
Ca. Metabolism and its relations to parathyroid
Diagnosis & management of related disorders.

Lect.9/10: Diabetes Mellitus

Lect.11: FSH < H. Oestrogens Progesterone‟s
Significance
Disorders
Its recognition and diagnosis
Management

Lect.12: Multiple endocrine-syndrome and paraneoplastic syndrome Overview.
Diabetes incipidus.

Miscellaneous

Lect.13/14 : Poisoning
Suicidal / Homicidal / Accidental
Chemical / Biological / Corrosives / Drugs
Concepts of management
Optimum Barbiturate
DDT
Organophosphorus

Lect.15: Hyperpyrexia and Heat exhaustion
Aetiology
Pathophysiology
C / F. Types
Management
Preventive measures

Lect.16 : Electrical injury
Types
Manifestations
Management
Lightening

Lect.17: Shock
Types
Pathophysiology / Complications
Management

Lect.18/19: Revision

Lect.20: Examination

NEPHROLOGY, NUITRITION : 8 TH SEMESTER

NEPHROLOGY :

Lect.01: Anatomy & Physiology of Urinary system

Lect.02: R.F.T. (Renal Function Tests)

Lect.03: Acute Glomerulonephropathy

Lect.04: Chronic Glomerulonephropathy

Lect.05: Infections of urinary system.

Lect.06: Nephrotic syndrome

Lect.07: Approach towards common problem

i. Proteinuria
ii. Hematuria
iii. Renal colics

Lect.08: Acute & Chronic renal failure

Lect.09: Dialysis - Diet - Drugs. In renal failure

Lect.10:Revision

Lect.11: Examination

Genetics (3 lectures)

Lect.1 : Introduction

Lect.2 : Common genetic disorders

Lect.3 : Application of Genetic Engineering in Medicine

NUTRITION :

Lect.11: Concepts of carbohydrate, proteins, fats, vitamins and minerals. Balanced diet.

Lect.12: Protein energy malnutrition.

Lect.13/14: Vitamin deficiency state
Scurvy / Beribery / Pellegra / Vit.A

Lect.15: Obesity / Asthenia
Diagnosis
"Complications and management

Lect.16: Revision

Lect.17: Examination.

Introduction of " Brain Death and Organ Donation" topic in subjects of Physiology , Preventive & Social Medicine, Psychiatry, Medicine & Surgery

Recommended Books:

1. Hutchinson"s Clinical Methods by Hunter and Bomford,
2. The Principles and practise of Medicine - Sir Stanley Davidson
3. Text book of Medical Treatment - Dunlop and Alstead.
4. Savill"s system of Clinical Medicine - E. C. Warner.
5. Principles of internal Medicine - Harrison.
6. API Text Book of Medicine.
7. **Reference Book (Clinical Medicine) : "Clinical Examination in Medicine": Author: Dr. A. P. Jain**
8. **"Manual of Clinical Practical Medicine" : 1) Dr. G.S.Sainani**
   2) Dr. V.R. Joshi
   3) Dr. Rajesh G. Sainani

SKIN

DERMATOLOGY / STD/ LEPROSY

Goals :

The aim of teaching the Under graduate students in Dermatology, S.T.D. and Leprosy is to impart such knowledge and skills that may enable him to diagnose and treat common ailments and to refer rare diseases or complications and unusual manifestations of common diseases to the specialist.

OBJECTIVES :

Knowledge :

At the end of the course of Dermatology, Sexually Transmitted Diseases & Leprosy the student shall be able to :

1. Demonstrate sound knowledge of common diseases, their clinical manifestations including emergent situations and of investigative procedures to confirm their diagnosis.
2. Demonstrate comparative knowledge of various modes of topical therapy.
3. Demonstrate the mode of action of commonly used drugs, their doses, side effects / toxicity, indications and contraindication & interactions.
4. Describe commonly used modes of management including the medical & Surgical procedures available for the treatment of various diseases and to offer a comparative plan of management for a given disorder.

Skills :

The student shall be able to

1. Interview the patient, elicit relevant and correct information and describe the history in a chronological order :
2. conduct clinical examination, elicit and interpret physical findings and diagnose common disorders and emergencies :
3. perform simple, routine investigative and laboratory procedures required for making the bed-side diagnosis, especially the examination of scrapings for fungus, preparation of slit smears and staining for AFB for leprosy patients and for STD cases :
4. take a skin biopsy for diagnostic purposes ;
5. Manage common diseases recognizing the need for referral for specialized care, in case of inappropriateness of therapeutic response.

Structures and functions of Skin and its appendages

Pruritus

Infections (Bacterial , Chlamidia, Mycoplasma, Fungal & Viral)

Infestations (Ecto and Endoparasites)

Nutritional disorders

Allergic Disorders

Leprosy

STD

HIV & Skin

Papulesquamous disorders

Collagen Vascular Disorders

Pigmentory disorder

Drug reactions.

Chest

TUBERCULOSIS AND RESPIRATORY DISEASES:

(i) GOAL :

The aim of teaching the undergraduate student in Tuberculosis and Chest Diseases is to impart such knowledge and skills that may enable him/her to diagnose and manage common ailments affecting the chest with the special emphasis on management and prevention of Tuberculosis and especially National Tuberculosis control programme.

(ii) **OBJECTIVES :**

(a) **KNOWLEDGE :**

At the end of the course of Tuberculosis and Chest diseases, the student shall be able to:

1) demonstrate sound knowledge of common chest diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis‟
2) demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;

3) describe the mode of action of commonly used drugs, their doses, side-effects/toxicity, indications and contra-indications and interactions.;
4) describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Control Programme.

(b) **SKILLS** :

The student shall be able to :

1) interview the patient, elicit relevant and correct information and describe the history in chronological order;
2) conduct clinical exami9nation, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;
3) perform simple, routine investigative and office procedures required for making the bed side diagnosis, especially sputum collection and examination for etiologic organisms especially Acid Fast Bacilli (AFB), interpretation of the chest x-rays and respiratory function tests;
4) interpret and manage various blood gase4s and PH abnormalities in various respiratory diseases.
5) Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response;
6) Assist in the performance of common procedures, like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage/aspiration

(c) **INTEGRATION:**

The broad goal of effective teaching can be obtained through integration with departments of Medicine, Surgery, Microbiology, Pathology, Pharmacology and Preventive and Social Medicine

Lect. 01 : History and introduction.

Lect. 2/3: Pathogenesis and pathology

Lect. 04: Role of host related factors.

Lect. 05: Microbiology of AFB

Lect. 06: Clinical features of pulmonary tuberculosis

Lect. 07: Anti-tuberculous drugs
-Pharmacology & schedules of drug therapy

Lect. 8/9: Resistant tuberculosis
DOTS
Prophylaxis - Drugs / BCG / Tuberculin test.
HIV & TB

Lect 10 Extra - Pulmonary tuberculosis
Pleural Effusion
Others.

Lect 11/ 12: Revision

Lect. 13: Examination.

Respiratory System :

1. Applied anatomy & Physiology of R.S.
2. Lung function tests
3. Respiratory infections, pneumonias, fungus,
4. Bronchiectasis & lung Abscess.
5. Bronchial Asthma.
6. Lung & Pleural Malignancies.
7. Mediastinum & its disorders.
8. Pleural Diseases
9. Occupational Lung Disease
10. Respiratory emergencies.

Lecture cum Demos (Resp system)

1. Lung function test and blood gas Analysis and Resp. alkalosis & Acidosis.
2. Chest bronchios emphysema
3. Suppurative lung diseases
4. Bronchogenic carcinoma & other malignancies with Mediastinal obstruction
5. Pleural disease - pneumothorax, pyopneumothorax, Pleural

L.C.D. In T.B.

1. Haemoptysis
2. Drug resistance
3. TB & HIV

Psychiatry

(i) **GOAL** :

The aim of teaching of the undergraduate student in Psychiatry is to impart such knowledge and skills that may enable him to diagnose and treat common Psychiatric disorders, handle Psychiatric emergencies and to refer complications/unusual manifestation of common disorders and rare Psychiatric disorders to the specialist.

(ii) **OBJECTIVES** :

(a) **KNOWLEDGE** :

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

1. comprehensive nature and development of different aspects of normal human behaviour like learning, memory, motivation, personality and intelligence;
2. recognize differences between normal and abnormal behaviour;
3. classify psychiatric disorders;
4. recognize clinical manifestations of the following common syndromes and plan their appropriate management of organic psychosis, functional psychosis, schizophrenia, affective disorders, neurotic disorders, personality disorders, psychophysiological disorders, drug and alcohol dependence, psychiatric disorders of childhood and adolescence;
5. describe rational use of different modes of therapy in psychiatric disorders.

(b) **SKILLS :**

The Student shall be able to :

1) interview the patient and understand different methods of communications in patient-doctor relationship;
2) Elicit detailed psychiatric case history and conduct clinical examination for assessment of mental status;
3) Define, elicit and interpret psycho-pathological symptoms and signs;
4) Diagnose and manage common psychiatric disorders;
5) Identify and manage psychological reactions and psychiatric disorders in medical and surgical patients in clinical practice and in community setting.

(c) **INTEGRATION :**

Training in Psychiatry shall prepare the students to deliver preventive, promotive, curative and re-habilitative services for the care of patients both in the family and community and to refer advanced cases for a specialized Psychiatry / Mental Hospital. Training should be integrated with the departments of Medicine, Neuro-Anatomy, Behavioral and Forensic Medicine.

4th or 5th semester 5 lectures

2. Motivation (including) frustration, conflicts etc.) Emotion (including mind-body relationship)

3. Learning (different types) memory (Types of memory, cause of forgetting etc.)
4. Intelligence, emotional Quotient including M.R. and sifted child.
5. Personality-Different types with mental mechanisms
6. Difference between normal and abnormal behaviour. Doctor-Patient relationship and communication skills

In 8th & 9th Semester remaining 15 lectures.

1. Psychiatric classification. Difference between functional and organic psychosis. Difference between psychosis and neurosis.
2. Schizophrenia including drugs and rehabilitation.
3. Affective disorders including pharmacotherapy
4. Affective disorders including non-pharmocotherapy treatment.
5. Anxiety disorders-Generalised anxiety, disorders, panic disorders.
6. O.K.D. and Phobias.
7. Somatoform disorders.
8. Alcohol dependence
9. Psycho-Physiological disorders.
10. Scholastic problems.
11. Behavioural disorders.
12. Sexual disorders.
13. Psychiatric emergencies including suicide and organic brain disorders.
14. Psychotherapies including behaviour therapy.

Introduction of " Brain Death and Organ Donation" topic in subjects of Physiology , Preventive & Social Medicine, Psychiatry, Medicine & Surgery

Academic Notification No. 08/2013
Introduction of "WHO New Growth Charts/SAM/IYCF" Topic In MBBS Syllabus

Paediatrics

Paediatric including Neonatology

The course includes systematic instructions in growth and development, nutritional needs of a child, immunization schedules and management of common diseases of infancy and childhood including scope for Social Paediatrics and counseling.

(i) **GOAL** :

The broad goal of the teaching of undergraduate students in Paediatrics is to acquire adequate knowledge and appropriate skills for optimally dealing with major health problems of children to ensure their optimal growth and development.

(ii) **OBJECTIVES** :

(a) **KNOWLEDGE** :

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

(1) Describe the normal growth and development during foetal life, neonatal period, childhood and adolescence and outline deviations thereof;

(2) Describe the common paediatric disorders and emergencies in terms of Epidemiology, aetiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation;

(3) Age related requirements of calories, nutrients, fluids, drugs etc, in health and disease;

(4) Describe preventive strategies for common infectious disorders, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse;

(5) Outline national Programmes relating to child health including immunization Programmes.

(b) **SKILLS** :

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

(2) take a detailed paediatric history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigation results and plan and institute therapy.

(3) Take anthropometric measurements, resuscitate newborn infants at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programmes, perform venesection, start an intravenous saline and provide nasogastric feeding :

(4) Conduct diagnostic procedures such as a lumbar puncture, liver and kidney biopsy, bone marrow aspiration, pleural tap and ascitic tap;

(5) Distinguish between normal newborn babies and those requiring special care and institute early care o all new born babies including care of preterm and low birth weight babies, provide correct guidance and counseling in breast feeding ;

(6) Provide ambulatory care to all sick children, identify indications for specialized / inpatient care and ensure timely referral of those who require hospitalization :

(C) **INTEGRATION** :

The training in paediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and at hospital as part of team in an integrated form with other disciplines, e.g. Anatomy, Physiology, Forensic Medici9ne, Community Medicine and Physical Medicine and Rehabilitation.

LIST OF LECTURE/ SEMINARS

Lectures : 3rd / 4th Semester :

1. Introduction of Paediatrics.
2. History taking in children.
3. Examination of Children.
4. Normal Growth
5. Normal Development.
6. Introduction to newborn and normal newborn baby.
7. Temperature regulation in newborn.
8. Breast feeding and lactation management.
9. Infant and child feeding (include complimentary feeding)
10. Normal fluid and electrolyte balance in children.
11. Immunization.

Lecturers : 7th / 8th / 9th Semester :

1. Birth Asphyxia
2. Low Birth Weight Babies.
3. Neonatal Respiratory Distress.
4. Jaundice in newborn.
5. Neonatal Infections.
6. Neonatal convulsions.
7. PEM and its management.
8. Vitamin and micronutrient deficiencies.
9. Nutritional anaemia in infancy and childhood.
10. Acute diarrhoea.
11. Hypothyroidism in children.
12. Congestive heart failure - diagnosis and management.
13. Congenital heart disease.
14. Rheumatic heart disease.
15. Hypertension in children.
16. Acute respiratory infections.
17. Bronchial asthma.
18. Nephrotic syndrome
19. Acute glomerulonephritis and hematuria
20. Abdominal pain in children.
21. Chronic liver disease including ICC.
22. Haemolytic anaemia including thalassemia.
23. Leukaemias.
24. Bleeding and coagulation disorders.
25. Seizure disorders.
26. Cerebral Palsy.
27. Common exanthematous illness.
28. Childhood tuberculosis

Other Lectures to be covered :

1. Fluid and electrolyte balance -pathophysiology and principles of Management.
2. Acid-base disturbances - pathophysiology and principles of management.
3. Adolescent growth and disorders of puberty.
4. Congenital heart disease.
5. Acute respiratory infections, Measles, Mumps, Chicken pox
6. Other childhood malignancies.
7. Coagulation disorders - Haemophilia
8. Mental retardation.
9. Approach to a handicapped child.
10. Acute flaccid paralysis.
11. Behaviour disorders.
12. Meningitis.
13. Diphtheria, Pertussis and Tetanus.
14. Childhood tuberculosis.
15. HIV infection.
16. Malaria.
17. Neurocysticercosis.
18. Enteric fever.

19. Immunization.
20. Paediatric prescribing.
21. Common childhood poisonings.

Integrated Seminar Topics :

Convulsions

Coma

PUO

Jaundice

Portal hypertension

Respiratory failure

Shock

Rheumatic Heart Disease

Hypertension

Diabetes mellitus

Hypothyroidism

Anemia

Bleeding

Renal failure

Tuberculosis

Malaria

HIV infection

Neurocysticercosis

Perinatal asphyxia (with obstetrics)

Intrauterine growth retardation (with obstetrics)

Introduction of " Intigrated Management of Neonatal And Childhood Illness" Topic in MBBS Syllabus

Academic Notification No. 08/2013
Introduction of "WHO New Growth Charts/SAM/IYCF" Topic In MBBS Syllabus

Preventive and Social Medicine / Community Medicine (PSM)

A. The teaching of Social & Preventive Medicine shall place throughout the teaching period.

B. Field experience in rural health is included in pre-clinical as well as during clinical period

C. During the students attendance at various departments which is now required under medicine and surgery, such as infectious diseases. T.B. Leprosy, V.D. etc. emphasis shall be laid as much on the preventive as on the clinical and Therapeutic aspects of these diseases.

D. In addition to the teaching undertaken by the department of Social & Preventive Medicine, a joint programme with other departments is essential in order to give the students a comprehensive picture of man, his health and illness.

E. Stress shall be laid on national programmes, including those of control of communicable diseases and family planning and health education.

F. An epidemiological units as an integrate part of every hospital in order to achieve a comprehensive study disease by the students should be established.

G. The objective of the internship shall be clearly defined and that a proper training programme is oriented for this period. Objectives, and the methods by which the internship could be made into a satisfying and fruitful experience. Sharpening and for planning in this phase of education shall be done.

H. As regards the qualifications of the teachers it is highly important that All teachers in Social and A preventive Medicine should have as far as possible had adequate administrative experience in addition to the teaching experience. They should also be encouraged to acquire skills in clinical subject specially related to community medicine.

I. Practical Skills : Due stress shall be laid on the students acquiring practical skill in the following procedures.

Community Medicine including Humanities
(Preventive and Social Medicine)

(Phase I,II and Part 1st of Phase III M.B.B.S.)

GOALS :

The broad goal of the teaching of undergraduate students in community medicine is to prepare them to function as community and first level physicians in accordance with the institutional goals.

OBJECTIVES :

Knowledge :

At the end of the course the student shall be able

- Explain the principles of sociology including demographic population dynamics.
- Identify social factors related to health, disease and disability in the context of urban and rural societies.
- Appreciate the impact of urbanization on health and disease.
- Observe and interpret the dynamic of community behaviours.
- Describe the elements of normal psychology and social psychology.
- Observe the principles of practice of medicine in hospital and community settings.
- Describe the health care delivery systems including rehabilitation of the disabled in the country.
- Describe the National Health Programmes with particular emphasis on maternal and child health programmes, family welfare planning and population control.
- List the epidemiological methods and techniques.
- Outline the demographic pattern of the country and appreciate the roles of the individuals, family, community and socio-cultural milieu in health and disease.
- Describe the health information systems.
- Enunciate the principles and components of primary health care and the national health policies to achieve the goal of "Health for all".
- Identify the environmental and occupational hazards and their control.
- Describe the importance of water and sanitation in human health.
- To understand the principles of health economies, health administration, health education in relation to community.

Skills :-

At the end of the course, the student shall be able to make use of

- The principles and practice of medicine in hospital and community settings and familiarization with elementary practices.
- Use the Art of communication with patients including history taking and medico social work.
- Use epidemiology as a scientific tool to make rational decisions relevant to community and individual patient intervention.
- Collect, analyse, interpret and present simple community and hospital base data.
- Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-culture beliefs.
- Diagnose and manage common nutritional problems at the individual and community level.
- Plan, implement and evaluate a health education programme with skill to use simple audio-visual aids.
- Interact with other members of the health care team and participate in the organization of health care services and implementation of national health programmes.

Integration:

Develop capabilities of synthesis between cause of illness in the environment or community and individual health and respond with leadership qualities to institute remedial measures for this.

Course Content :

Total hours of teaching in community medicine and Humanities are 376. The distribution of them shall be as follows.

Phase	Semester	Theory	Practical Hours
I	I & II	30	30
II	III & IV	68	132
III Part1st	VI & VII	50	66

Community Medicine (P.S.M.)

List of theory lectures

Phase I (1st and 2nd semester) 30 Hours

1. Introduction – Evolution of Community Medicine.
2. Health – Definition, spectrum of health and factors affecting – indicators of health.
3. Health Problem of World – Urban and Rural – Indian Health.
4. Health Care Delivery system in India – Urban and Rural.
5. Demography, Demographic cycle, Population trends – World and India.
6. Fertility and factors affecting it.
7. Family welfare and Population control.
8. Medical ethics and Doctor – patient relationship – Consumer Protection Act.
9. Sociology and Social factors effecting health.
10. Social Psychology – introduction, Group Behaviour, Motivation Personality.
11. Economics and health.
12. Health Education and Communication.
13. Hospital Management.
14. Nutrition and Health.
    - Constituents of food.
    - Food and food groups.
    - Diet planning and recommended dietary allowances.
    - Nutritional diseases.
    - Iodine deficiency disorders.
    - Diseases due to vitamin and mineral imbalance
    - Toxins in the food.
    - Assessment of Nutritional status.
    - Examination

Phase II – (3rd and 4th Semester) 68 Hours

General Epidemiology

- The concepts of disease.
- Natural history of disease.
- Epidemiological triad.
- Dynamics of diseases transmission.

- Concept of disease control.

Epidemiology

- **Definition, types, measurements in epidemiology, epidemiological studies, and clinical trial, investigation of an epidemic.**
- **Uses of epidemiology.**
- **Screening for disease.**
- **Disinfection, sterilization and control of Hospital acquired infections.**
- **Immunity.**

Environmental health

- **Introduction to environment health.**
- Water in relation to health and disease.
- Air pollution and ecological balance.
- Housing and health.
- Effects of radiation on human health (Ionizing, Non-ionizing & Nuclear warfare)
- Effects of Noise on human health.
- Meteorological environment.
- Solid waste disposal.
- Disposal of hospital waste.
- Liquid waste disposal

Medical entomology

Arthropods of medical importance and their control.

Biostatistics (Theory and Practical)

Introduction and uses.
Data- Types, Collection and Presentation.
Centering constants.
Measures of Variation.
Normal distribution.
Sampling methods and Sampling variability.

Tests of significance.

- SE of difference between two means.
- SE of difference between two proportions
- X^2 test. (Chi-square)
- Students „t" test
  - Paired .
  - Unpaired.
- Statistical fallacies.

Computers in Medicine

There use at all the stages to be demonstrated. The students should use computers in analysis and presentation of data

Epidemiology of communicable diseases.

- Air borne infections.
- Exanthematous fevers.
- Chicken pox, Rubella, and Measles
- Factors responsible to eradicate small pox.
- **Influenza and ARI.**
- Diphtheria and Pertussis

- Tuberculosis.
- Faeco-oral infections.
  - Poliomyelitis.
  - Hepatitis.
  - Enteric Fever and Cholera
  - Bacillary and Amoebic dysentery.
- Soil transmitted Helminths.
- Tetanus
- Rabies and other Viral Zoonotic disease.
- Leprosy.
- Leprosy.
- Malaria
- Filariasis.
- Arthropod borne viral diseases.
- Sexually transmitted diseases and their control.
- A.I.D.S.

Examinations at the end of 3rd and 4th semester.

(Phase III (6th and 7th Semester) 50 hrs.

(Teaching in 7th semester includes tutorials also.)

- Community development programmes and multisectoral development.
- Comprehensive medical care and Primary health care.
- National Health Policy.
- Maternal and Child Health care.
- Epidemiology of Non-communicable diseases.
- Occupational health.
- Problems of adolescence including Drug dependence.
- Geriatrics
- Vital statistics – sources and uses, Census, Fertility statistics.
- Management information system.
- Mental health.
- Genetics in public health.
- Health planning and management.
- National Health Programmes.
- International health and Voluntary Health Agencies.Tutorials.

Examination at the end of 6th and 7th semester.

Practicals

Phase I (Ist And 2nd semester) - 30 hours.

Field visit-

Every Medical College should have adequate transport facilities to take medical undergraduate for field visits. In the phase I total 15 visits, each of 2 hours duration or total 10 visits – each of 3 hours duration (depending on distances) are to be planned by the departments of community medicine. The broad outline of place for educational field visits is given below.

- Hospital visits (O.P.D., Casualty, Immunization clinic, different wards, Kitchen, FW Centre, PPP, Blood Bank, Sterilization section, Infectious disease ward, Minor operation theatre, etc.)
- Rural Health Training Centre.
- Primary Health Centre.
- Urban Health Centre.
- District Health Office (DHO).
- District Training Team (DTT)/IEC Bureau.
- District Tuberculosis Centre.
- Public Health Laboratory.
- District Malaria Office.
- Remand Home.
- Rehabilitation Centre.

III rd Semester, I st Clinical Posting - 66 hours.

Lecture – Cum – Demonstration, at appropriate places

SN	Topic	Demonstration
1	Visit to Urban / Rural health Training Centre.	Functions of UHC/ RHTC Manpower & Duty arrangements
2	Immunization Programme	I (demonstration)
3	Immunization Programme	II (Cold Chain)
4	Care of ANC mother	Demonstration of Antenatal case
5	Care of Infant	Demonstration of case
6	Post-natal case of mother/child.	Demonstration of case
7	Contraceptive devices	Situation to be given and sex education.
8	Exclusive breast feeding	Visit to Baby Friendly Hospital
9	Weaning foods	Demonstration
10	Nutritional demonstration	Explain nutritive values of Indian foodstuff
11	Nutritional assessment	Demonstration
12	Anthropometric measurements	Demonstration
13	Nutritional deficiency disorders	With A/V aids or case, Road to Health Chart
14	Protein Energy Malnutrition	With A/V aids or case, ORS preparation
15	Diarrhoea as a community health problem	With A/V aids or case
16	ARI as a community health problem	With A/V aids or case
17	Elementary essential drugs	Visit to drug store, Inventory control
18	Examination	

4th Semester 2nd Clinical Posting - 66 hours.

The board guidelines for planning programmes are as follows.

1) Posting for family care study - 6 days
   - Principle of clinical epidemiology
   - Morbidity Survey.
   - Data analysis and presentation.
2) Posting for School Health - 6 days
   - Health check-up of school children.
   - Data analysis and presentation.
   - Health education activities in the school by the students.
3) Visit to anganwadi and ICDS scheme block - 2 days
4) Visit to Home for aged and discussion - 2 days

on geriatric health problems

5) Students" seminars on topics like - 5 days
   - Disaster management
   - Road traffic accidents
   - Population explosion etc.
6) Examinations - 3 days.

Phase III (6th and 7th Semester)

3rd Clinical Posting - 66 hours.

Posting : Clinical case presentation by students

1. Introduction to infectious diseases – history taking
2. Exanthematous fever.
3. Diarrhoea / Cholera / Dysentery.
4. Tuberculosis
5. Leprosy.
6. Dog – bite case.
7. Tetanus.
8. PUO / Enteric fever / Malaria.
9. S.T.D. / AIDS.
10. Hepatitis
11. Introduction to non- communicable diseases.
    - Rheumatic heart disease.
    - Cancer.
    - Obesity / diabetes.

Examinations.

MARKS OF INTERNAL ASSESSMENT :-

Theory –20 marks and practical 20 marks. The students must secure at least 50% , marks of the total marks fixed for internal assessment in the subject in order to clear the subject.

I) Theory

1) 3rd Semester 50 Marks
2) 4th Semester 50 Marks
3) 6th Semester 50 Marks

Total 150 Marks — Converted it to out of 10 marks

4) Prelim exam. Theory Paper I - 60 Marks
Paper II - 60 Marks
Total 120 Marks,
Convert it to out of 10 marks

Total Theory Internal Assessment marks will be 20.

II) Practicals -

1) 1st Clinical rotation exam. - 3rd Semester - 50 Marks
2) 2nd Clinical rotation exam. - 4th Semester - 50 Marks
3) 3rd Clinical rotation exam. - 6th Semester - 50 Marks
Total 150 Marks
Convert it to out of 10 marks

4) Prelim exam. - 40 Marks
10 Marks for Journals
Total 50 Marks
Convert it to out of 10 marks

Total Practical Internal Assessment marks will be 20.

Introduction of " Brain Death and Organ Donation" topic in subjects of Physiology , Preventive & Social Medicine, Psychiatry, Medicine & Surgery

Introduction Of "Bio-Medical Waste" topic in subject of Microbiology & Preventive & Social Medicine

Introduction of " Intigrated Management of Neonatal And Childhood Illness" Topic in MBBS Syllabus

BOOKS RECMMENDED.

1. Text book of Community Medicine, Kulkarni A.P. and Baride J.P.
2. Park"s Textbook of Preventive and Social Medicine, Park
3. Principles of Preventive and Social Medicine, K. Mahajan
4. Textbook of Community Medicine, B. Shridhar Rao.
5. Essentials of Community Medicine, Suresh Chandra.
6. Textbook of Biostatistics, B. K. Mahajan
7. Review in Community Medicine, V.R. Sheshu Babu.
8. **Reference Book for Community Medicine: "Principles and practice of Biostatistics", Author: Dr. J.V. Dixit**

FURTHER READINGS.

Epidemiology and Management for health care for all P.V. Sathe and A.P. Sathe.

Essentials of Preventive Medicine O.P. Ghai and Piyush Gupta.

Record Book:

1) The case records will have to be entered in a record book separately for General Medicine , for Paediatrics and for PSM.
2) In the record book of General Medicine, number of case records for Medicine shall be 12, for Skin & V.D. & Leprosy shall be 3, for Psychiatry shall be 2 and for Chest & TB shall be 3 cases.
3) The certificate of satisfactory completion of all Clinical postings will be entered based on similar certificates from all postings in all the above subjects.
4) In addition, details of the marks secured in the posting ending examination shall be entered on the second page on which the calculations of the internal assessments shall also be stated. Record book will not carry any marks but its satisfactory completion will be a prerequisite for appearing in examination.

University Examinations in Medicine and Allied Subjects at a Glance

MEDICINE :-

Theory 2 papers of 60 marks each = 120 marks
Paper I - General Medicine
Paper II - General Medicine(Including Psychiatry, Dermatology, STD shall contain one question on basic sciences and allied subject.)
Oral (viva) interpretation of X-Ray, ECG etc. = 20 marks
Clinical (Bedside) = 100 marks
Internal Assessment = 60 marks
(Theory 30 Marks, Practical 30 Marks)
Grand Total = 300 marks

PAEDIATRICS :- (Including Neonatology)

Theory – One paper	= 40 marks
(Shall include one question on basic sciences & allied subjects)	
Oral (Viva)	= 10 marks
Clinical	= 30 marks
Internal Assessment	= 20 marks
(Theory 10 Marks, Practical 10 Marks)	
Grand Total	= 100 marks

COMMUNITY MEDICINE :-

Theory 2 papers of 60 marks each = 120 marks

Includes problems showing applied aspects of management at primary level including essential drugs, occupational (agro based) diseases rehabilitation and social aspects of community.

Oral (Viva) = 10 marks

Practical /Project evaluation = 30 marks

Internal Assessment = 40 marks

(Theory 20 Marks, Practical 20 Marks)

Grand Total = 200 marks

Criteria of passing in various subjects at III MBBS Examination

SN	Subject	Theory Paper ./ Oral/ Practical / Internal Assessment		Maximum Marks in each of the subject	Minimum marks required to pass in each part of any subject		Minimum marks required to pass in each subject out of
01)	Community Medicine	a) Theory	Paper - I	60	60	65	100 / 200
			Paper - II	60			
		b) Oral		10			
		c) Practical		30		15	
		d) Internal Assessment	Theory	20		20	
			Practical	20			
02)	General Medicine	a) Theory	Paper I	60	60	70	150 / 300
			Paper II	60			
		b) Oral		20			
		c) Practical		100		50	
		d) Internal Assessment	Theory	30	30		
			Practical	30			
03)	Paediatrics	a) Theory	Paper	40	20	25	50 / 100
		b) Oral		10			
		c) Practical		30	15		
		d) Internal Assessment	Theory	10	10		
			Practical	10			

It is compulsory to obtain 50% marks in theory.

It is mandatory to obtain 50% marks in theory+viva/oral.

(The Frequency & other details of Internal Assessment Examinations shall be as stated in circular dated 15/02/01 table no III & IV. of General

Guidelines for U.G. teaching & training & Internal Assessment. Passing in Internal Assessment is prerequisite for eligibility to clear the subject. For passing in Internal Assessment student should secure minimum 30 out of 60 marks (theory & practical combined)

The Internal Assessment Examination shall consist of one clinical case paired with viva-voce for the periodical tests. However, the preliminary examination shall be carried out in a pattern similar to final University examination.

University (Final) Exam : General Medicine

Paper I (60 Marks) Time 3 hours.	Paper II (60 Marks) Time 3 hours.
Section A – Marks 15 MCQs – 30 Items each of ½ mark Time 30 minutes (Shall cover whole course syllabus stated in Section B and C of Paper I below	**Section A – Marks 15** MCQs 30 Items each of ½ mark Maximum time 30 minutes (Shall cover whole course syllabus stated in Section B and C of Paper I below
Section B – (Total Marks 25) Two long questions Each of 8 marks & 3 Short Answer Questions of 3 marks each. (3 out of 5 SAQs by choice. On course contents of - Cardiovascular System, Gastrointestinal System, Hepatobiliary System & Pancreas, Haematology,Haemato-oncology& Genetics	**Section B – (Total Marks 25)** ***Two long Questions each of 8 marks and*** 3 short answer questions (out of 5 SAQs) on course contents of Neurology, Psychiatry, Dermatology, Veneroleprology` & Collagen Disorders
Section C – (Total Marks 20) One long Question of 8 marks and 4 (out of six) SAQs of 3 marks each on course contents of Endocrinology, infectious diseases/Tropical Disease, Miscellaneous	**Section C – (Total Marks 20)** One long question of 8 marks and 4 (out of six) SAQs of 3 marks each on course contents on Respiratory Diseases, Tuberculosis & Clinical Nutrition and Nephrology
The Max Time for Section B & C shall be of 2 hrs. + 30 minutes	The Max time for section B and C shall be of 2 hrs. and 30 minutes

MCQ Section A shall be given to the candidates in the beginning of examination. After 30 min. section A will be collected following which B & C shall be given. The time given Section B & C together is two and half hours. This applies to paper I & II.

(one of the short answer questions shall be on basic & allied sciences.)

Final University Exam : Practical Exam :

Shall comprise of total 120 marks . with divisions as below :-

(A) Clinical Bed side :

One Long case - 50 Marks	Long Case / The time for case taking
Two short case - 25 Marks each	for student is 45 min. & for examination
Total - 100 Marks	is 10 min.
	Short Case / The same for each short case is 10 min. & 5 min. respectively

(B) Oral Viva Voce and interpretation of investigation materials (like X-Rays, ECGs, etc. – 20 marks

Viva at Two Tables Each for 10 mars There should be even & balanced distribution of the course contents on these tables, between Internal & External examiners. This should include, specimens, instruments, microscopy & drugs on table no 1 & emergencies, radio-diagnostics, electrodiagnostic & Biochemical Lab. investigations on table no 2 as applicable to the course contents of final M.B.B.S. Exam.

(C) The marks of Internal Assessment shall be sent to the University before the commencement of the Theory Examination.

Note – In the event when I.A. could not be held on the specified time due to technical reasons or otherwise, then it should be held during the vacation.

IIIrd MBBS EXAM. PATTERN

FINAL MBBS EXAMINATION IN Paediatrics

Evaluation

Internal assessment: 20 (Theory 10 +Practical 10)

Plan of Internal assessment in Paediatrics (as per university circular on 9th February 2001) Marks of Internal Assessment should be sent to University confidentially before the commencement of Theory examination.

- Passing in internal assessment will be pre-requisite for clearing the subject.

Combined theory and practical of internal assessment will be considered for passing in internal assessment.

Internal assessment in Theory -

1 . Examinations during semesters : This will be carried out by conducting two theory examinations at the end of 6th and 8th semesters (50 marks each). Total of 100 marks to be converted into 5 marks.(A/5)

2 . Prelim examination : This shall be carried out during 9th semester. One theory papers of 40 marks as per university examination. Total of 40 marks to be converted into 5 marks. (B/5)

Total marks of Internal assessment of Theory will be addition of A and B.

Internal assessment in Practical

Examinations at end of Clinical postings:

1 There will be practical examination at the end of each clinical posting of Paediatrics.: 6th and 8th semester. Each examination will be of 50 marks.

Total of 2 examinations – 100 marks , will be converted to 5 marks.(C/5)

2. Prelim examination:

This will be conducted for 40 marks as per university examination pattern and marks will be converted to 5 (D/5).

Total marks of Internal assessment of Practical will be addition of C and D.

Evaluation **Methods - Theory, Practical and Viva**

Pattern of theory examination including distribution of marks, questions and time

Pattern of theory examination including distribution of marks

1. There shall be one theory paper , carrying 40 marks
2. The paper will have two sections, A and B
3. The paper will be of 2.5 hours duration.
4. Section A will be MCQ in each paper. Section B will have to be written in separate answer sheets.

THEORY : 40 marks Duration Two and half hours (2.5) hours

MCQ section A will be given to candidates at the beginning of the examination. After 30 minutes Section A will be collected. Section B of paper will then be handed over to candidates.

Section A :30 min. duration

28 MCQs - 1/2 mark each 14 marks

- Separate paper
- Single based response
- MCQ will cover whole syllabus

Section B : 2 hours duration

2 LAQ of 7 marks each 14 marks

3 /5 SAQ of 4 marks each 12 marks

PRACTICAL (FINAL EXAMINATION): 40 Marks

One Long Case 20 Marks

Case Taking Time 45 Minutes

Examination Time 10 Minutes

One Short Case 10 Marks

Case Taking Time 10 Minutes

Examination Time 05 Minutes

ORAL (VIVA VOCE) **10 Marks**

Duration 10 Minutes

(Instruments, X-ray, Drugs, Emergency in Paediatrics.)

It is directed to interpretation of investigations

Clinical :One long case :30 marks :30 min. for taking case and 10 minutes for assessment

Oral (viva voce) :10 marks:10 min. duration

1.Dark Room	5 marks
2.Instruments	5 marks

FINAL EXAMINATION :- IN PSM

The distribution of marks at final examination

Theory : two papers of 60 marks each	120 Marks
Oral (Viva)	10 Marks
Practicals	30 Marks
Internal assessment	40 Marks
(Theory 20 Marks)	
(Practical 20 Marks)	
Total	**200 Marks**

PATTERN :
THEORY : TWO PAPERS OF 60 MARKS EACH 120 MARKS :-

- Paper I include Concepts in Health & Disease, Sociology / Humanities, Epidemiology, Biostatistics, Communicable and non- communicable diseases, Genetics and Environmental Health.
- Paper II includes Demography & Family Planning, Maternal and child health Nutrition, Occupational Health, Mental Health, Health Education, Health Planning & Management, Health Care Delivery System , National Health Programmes, International Health,
- These are broad divisions. There are some chances of overlapping.

NATURE OF THEROY QUESTION PAPERS :

Final MBBS Examination of subject-PSM

Theory

Paper –I

Section A : 30 MCQs

½ Mark each

Should cover whole course content Of the Paper I stated in Section B & C below (Max time = 30 min)

Section B: Total Marks =25

2. LAQs, each of 8 Marks
3. (out of 5) SAQs. each of 3 marks on

Epidemiology, Bio-statistics & communicable & non communicable diseases

Section C: Total Marks =20

One LAQ of 8 marks & 4 (out of 6) SAQs each of 3 marks

On

Concepts in Health & Disease, Sociology / Humanities Genetics & environmental Health

Paper -II

Section A : 30 MCQs

½ Mark each

Should cover whole course content Of the Paper II stated in Section B & C below (Max time = 30 min)

Section B: Total Marks =25

2. LAQs, each of 8 Marks
3. (out of 5) SAQs. each of 3 marks on

Demography & Family Planning Maternal and child health, Nutrition, Occupational health;

Section C: Total Marks =20

One LAQ of 8 marks & 4 (out of 6) SAQs each of 3 marks

On

Mental Health, Health Education, Health Planning & Management Health care delivery system. National Health Programmes International Health

The full time for section B plus section C shall be of 2½ hrs. of Paper I and 2½ hrs for Paper II.

MCQ Section will be given to candidates first. After 30 minutes the Section B & C will be given to the candidates.

PATTERN AT PRACTICAL EXAMINATION

	Marks
Orals (Viva)	10
Practical	30

The distribution of 30 marks of practical shall be -

1)	Spots	-	10 Marks	(5 spots of 2 marks each) Time 10 min.
2)	Exercises	-	10 Marks	(5 marks for Bio-Stat. & 5 marks for Epidemiological exercises) Time 10 min.
3)	Clinical case Presentation	-	10 Marks	Time 45 min.
			Total 30 Marks	

It is compulsory to obtain 50% marks in theory.
It is mandatory to obtain 50% marks in theory+viva/oral.

COURSE OF SURGERY AND ITS ALLIED SPECIALITIES FOR THIRD M.B.B.S.

These guidelines are based on MCI recommendations.
Teaching has to be done keeping in mind the goals and objectives to be achieved by medical student

SURGERY and allied specialties-

(i)GOAL:

The broad goal of the teaching of undergraduate students in Surgery is to produce graduates capable of delivering efficient first contact surgical care.

(ii) OBJECTIVES:

The departmental objectives, syllabus and skills to be developed in the department of surgery during undergraduate medical education are presented herewith. These are prepared taking into consideration of various aspects and institutional goals given below:

1. A medical student after graduation may have different avenues of his/her professional career and may work either as a first contact physician in a private, semi-private or public sector or may take up further specialization in surgery or other specialties.
2. He may have to work in different settings such as rural, semi-urban or urban which may have deficient or compromised facilities.
3. These are based on the various health services research data in our community.
4. These are also based on following institutional goals in general;

   At the end of the teaching/ training the undergraduate will be able to:

   - Diagnose and manage common health problems of the individual and the community appropriate to his/her position as a member of the health team at primary, secondary and tertiary levels.
   - Be competent to practice curative, preventive, promotive and rehabilitative medicine and understand the concepts of primary health care.
   - Understand the importance and implementation of the National Health Programmes in the context of national priorities.
   - Understand the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude required for professional responsibilities.
   - Develop the ability for continued self-learning with a scientific attitude of mind and acquire further expertise in any chosen area of medicine.

A. KNOWLEDGE

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

1. Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children;

2. Define indications and methods for fluid and electrolyte replacement therapy including blood transfusion.

3. Define asepsis, disinfection and sterilization and recommend judicious use of antibiotics.

4. Describe common malignancies in the country and their management including prevention.

5. Enumerate different types of anaesthetic agents, their indications, mode of administration, contraindications and side effects

B. <u>SKILLS</u>

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

1. Diagnose common surgical conditions both acute and chronic, in adult and children.
2. Plan various laboratory tests for surgical conditions and interpret the results;
3. Identify and manage patients of haemorrhagic; septicaemic and other types of shock.
4. Be able to maintain patent air-way and resuscitate:
   - A A critically injured patient.
   - B Patient with cardio-respiratory failure;
   - C A drowning case.
5. Monitor patients of head, chest, spinal and abdominal injuries, both in adults and children
6. Provide primary care for a patient of burns;
7. Acquire principles of operative surgery, including pre-operative, operative and post operative care and monitoring;
8. Treat open wounds including preventive measures against tetanus and gas gangrene.
9. Diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring the patient to secondary/territory centers;
10. Identify congenital anomalies and refer them for appropriate management.

In addition to the skills referred above in items (1) to (10), he shall have observed/assisted/performed the following:

i. Incision and drainage of abscess;
ii. Debridement and suturing open wound;
iii. Venesection;
iv. Excision of simple cyst and tumours.
v. Biopsy and surface malignancy
vi. Catheterisation and nasogastric intubation;
vii. Circumcision
viii. Meatotomy;
ix. Vasectomy;
x. Peritoneal and pleural aspirations;
xi. Diagnostic proctoscopy;
xii. Hydrocoele operation;
xiii. Endotracheal intubation
xiv. Tracheostomy and cricothyroidetomy;
xv. Chest tube insertion.

Human values,and Ethical practice

- .Adopt ethical principles in all aspects of his clinical practice. Professional honesty and integrity are to be fostered. Surgical care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- .Develop communication skills, in particular the skill to explain various options available in management
- .Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues and specialist in the field when needed.
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion

© **INTEGRATION**

The undergraduate teaching in surgery shall be integrated at various stages with different pre and para and other clinical departments.

LEARNING METHODS

Lectures, Tutorials bedside clinics and lecture cum demonstrations
Distribution of Teaching hours -

- **Lectures - 160 hours**
- **Tutorials and revision - 140 hours**
- **Bedside clinics - 468 hours five clinical postings totalling 26 weeks including Anaesthesiology**
- **Clinical postings in General Surgery -**
  - 3rd Semester - 6 weeks
  - 5th Semester - 4 weeks
  - 7th Semester - 4 weeks
  - 8th Semester - 6 weeks
  - 9th Semester - 6 weeks

Sequential organisation of contents and their division -

GENERAL SURGERY LECTURES

4TH Term

General Surgery : Part I 16 Lectures

6th Term 3 modules

- Module 1
  Vascular Surgery : 8 Lectures
  Tropical Surgery : 4 Lectures
  Gen. Surgery Remaining 16 Lectures
- Module 2
  Head and Neck surgery
  Endocrine surgery 16 Lectures
- Module (3)

  Breast surgery 4
  Plastic & Reconstructive Surgery 6
  Neurosurgery 6 16 Lectures

7th Term: 3 modules

- Module (1)

  Cardio Thoracic surgery 8
  Paediatric surgery 8 16 Lectures

- Module (3)

  Liver)
  Spleen) 16 Lectures
  Pancreas)
  Biliary Tract)
  Portal Hypertension.).

- Module (3)
  Upper Gastro intestinal Tract + Peritoneum 16 Lectures

8th Term **4 modules**

- Module (1)
  Lower G.I. tract — 16 Lectures
  Abdominal wall,
  Incisional Hernia

- Module (2)
  Upper GUT — 16 Lectures
  Organ transplantation

- Module (3)
  Lower GUT — 16 Lectures
  Hernia, Hydrocoele

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160 Hours

9th Term

Revision Lectures/ tutorials/ lecture cum demonstrations 48

208

TUTORIALS

6TH Term	Surgical pathology	32
8th Term	Operative Surgery + Instruments	32
9th Term	Imaging sciences- Interpretation of Investigations	28

300

Course contents- General Surgery - including paediatric surgery

COURSE CONTENTS

I. A. GENERAL PRINCIPLES

1. Wound healing and management, scars: Hypertrophic scar and keloid; First aid management of severely injured.
2. Asepsis, antisepsis, sterilisation.
3. Surgical sutures, knots, drains, bandages and splints.
4. Surgical infections and rational use of antibiotics: Causes of infection, prevention of infection, common organisms causing infection.
5. Boils, cellulitis, abscess, necrotising fascitis.
6. Tetanus and Gas gangrene: Prevention of Tetanus and Gas Gangrene.
7. Chronic specific infections: Tuberculosis, Filariasis, and Leprosy.
8. Antibiotic therapy.
9. Hospital infection.
10. AIDS and Hepatitis B; Occupational hazards and prevention.

I . B . 1. Mechanism and management of missile, blast and gunshot injuries.

2. Surgical aspects of diabetes mellitus.
3. Bites and stings.
4. Organ transplantation - Basic principles.
5. Nutritional support to surgical patients.

II. RESUSCITATION.

1. Fluid electrolyte balance.
2. Shock: Aetiology, pathophysiology and management.
3. Blood transfusion : Indication and hazards.
4. Common postoperative complications.

III. COMMON SKIN AND SUBCUTANEOUS CONDITIONS.

1. Sebaceous cyst, dermoid cyst, lipoma, haemangioma, neurofibroma, premalignant conditions of the skin, basal cell carcinoma, naevi and malignant melanoma.
2. Sinus and fistulae. Pressure sores; prevention and management.

IV. ARTERIAL DISORDERS.

1. Acute arterial obstruction : diagnosis and initial management; types of gangrene ; diagnosis of chronic arterial insufficiency with emphasis on Burger‟s disease, athreosclerosis and crush injuries.
2. Investigations in cases of arterial obstruction. Amputations;
3. Vascular injuries : basic principles of management.

V. VENOUS DISORDERS.

1. Varicose veins: diagnosis and management; deep venous thrombosis: diagnosis, prevention, principles of therapy; thrombophlebitis.

LYMPHATICS AND LYMPH NODES.

1. Diagnosis and principles of management of lymphangitis, lymphedema, acute and chronic lymphadenitis; cold abscess, lymphomas, surgical manifestations of filariasis.

VII. BURNS.

1. Causes, prevention and first aid management; pathophysiology; assessment of depth and surface area, fluid resuscitation; skin cover; prevention of contractures.

VIII. SCALP, SKULL AND BRAIN.

1. Wounds of scalp and its management: recognition, diagnosis and monitoring of patients with head injury including unconsciousness; Glasgow coma scale recognition of acute / chronic cerebral compression.

IX. ORAL CAVITY, JAWS, SALIVARY GLANDS.

1. Oral cavity: I) Cleft lip and palate; Leukoplakia; retention cyst; ulcers of the tongue.
   II) Features, diagnosis and basic principles of management of carcinoma lip, buccal mucosa and tongue, prevention and staging of oral carcinomas.
2. Salivary glands: I) Acute sialoadenitis, neoplasm: diagnosis and principles of treatment.

IX. B. Epulis, cysts and tumours of jaw: Maxillofacial injuries; salivary fistulae

X. NECK.

1. Branchial cyst; cystic hygroma.
2. Cervical lymphadenitis: Non-specific and specific, tuberculosis of lymphnodes, secondaries of neck.

X. B. Thoracic outlet syndrome: diagnosis.

XI. THYROID GLAND

1. Thyroid: Surgical anatomy, physiology, investigations of thyroid disorders; types, clinical features, diagnosis and principles of management of goitre, thyrotoxicosis and malignancy, thyroglossal cyst and fistula.

XI. B. Thyroiditis, Hypothyroidism.

XII. PARATHYROID AND ADRENAL GLANDS.

1. Clinical features and diagnosis of hyperparathyroidism, adrenal hyperfunction/ hypofunction.

XIII. BREAST.

1. Surgical anatomy; nipple discharge; acute mastitis, breast abscess; mammary dysplasia; gynaecomastia; fibroadenomas.
2. Assessment and investigations of a breast lump.
3. Cancer breast : diagnosis, staging, principles of management.

XIV. THORAX.

1. Recognition and treatment of pneumothorax, haemothorax, pulmonary embolism: Prevention/ recognition and treatment, flail chest; Stove in chest ; Postoperative pulmonary complications.

XIV. B. Principles of management of pyothorax; cancer lung.

XV. HEART AND PERICARDIUM.

1. Cardiac tamponade
2. Scope of cardiac surgery.

XVI. OESOPHAGUS.

1. Dysphagia: Causes, investigations and principles of management.
2. Cancer oesophagus : Principles of management.

XVII. STOMACH AND DUODENUM.

1. Anatomy; Physiology, Congenital hypertrophic pyloric stenosis; aetiopathogenesis, diagnosis and management of peptic ulcer, cancer stomach; upper gastrointestinal haemorrhage with special reference to bleeding varices and duodenal ulcer.

XVIII. LIVER

1. Clinical features , diagnosis and principles of management of : Amoebic liver abscess, hydatid cyst and portal hypertension. Liver trauma.

XVIII. B. Surgical anatomy; primary and secondary neoplasms of liver.

XIX. SPLEEN

- Splenomegaly: causes, investigations and indications for splenectomy: splenic injury.

XX. GALL BLADDER AND BILE DUCTS

1. Anatomy, physiology and investigations of biliary tree; clinical features, diagnosis, complications and principles of management of cholelithiasis and cholecystitis; obstructive jaundice.

XX. B. Carcinoma of gall bladder, choledochal cyst.

XXI. PANCREAS.

1. Acute pancreatitis : Clinical features, diagnosis, complications and management.
2. Chronic pancreatitis, pancreatic tumours.

XXII. PERITONEUM, OMENTUM, MESENTERY AND RETROPERITONEAL SPACE.

1. Peritonitis : Causes, recognition and principles of management; intraperitoneal abscess.

XXII B. Laparoscopy and laparoscopic surgery.

XXIII. SMALL AND LARGE INTESTINES

1. Diagnosis and principles of treatment of : Intestinal amoebiasis, tuberculosis of intestine, carcinoma colon; lower gastrointestinal haemorrhage; Enteric fever, parasitic infestations.

XXIII. B. Ulcerative colitis, premalignant conditions of large bowel.

XXIV. INTESTINAL OBSTRUCTION.

1. Types, aetiology, diagnosis and principles of management; paralytic ileus.

XXV. ACUTE ABDOMEN.

1. Causes, approach, diagnosis and principles of management.

XXVI. APPENDIX

1. Diagnosis and management of acute appendicitis, appendicular lump and abscess.

XXVII. RECTUM.

1. Carcinoma rectum: diagnosis, clinical features and principles of management; indications and management of colostomy.

XXVII. B. Management of carcinoma rectum; prolapse of rectum.

XXVIII. ANAL CANAL .

1. Surgical anatomy. Clinical features and management of: fissure, fistula in ano, perianal and ischiorectal abscess and haemorrhoids; Diagnosis and referral of anorectal anomalies.

XXVIII. B. Anal carcinoma.

XXIX. HERNIAS.

1. Clinical features, diagnosis, complications and principles of management of : Umbilical, Inguinal, epigastric and femoral hernia.
2. Omphalitis.

XXIX . B. Umbilical fistulae, Burst abdomen, ventral hernia.

XXX. GENITO- URINARY SYSTEM.

1. Symptoms and investigations of the urinary tract.

XXXI. KIDNEY AND URETER

1. Investigations of renal mass; diagnosis and principles of management of urolithiasis, hydronephrosis, pyonephrosis, and perinephric abscess, congenital anomalies of kidney & Ureter and renal tumours.
2. Renal tuberculosis.

XXXII. URINARY BLADDER.

1. Causes, diagnosis and principles of management of haematuria, anuria and acute retention of urine.

XXXIII. PROSTATE AND SEMINAL VESICLES.

1. Benign prostatic hyperplasia: diagnosis and management.

XXXIII. B. Carcinoma prostate.

XXXIII. URETHRA AND PENIS

1. Diagnosis and principles of management of Phimosis, paraphimosis and carcinoma penis.
2. Principles of management of urethral injuries.
3. Urethral strictures.

XXXV. TESTES AND SCROTUM

1. Diagnosis and principles of treatment of undescended testis; torsion testis; Hydrocoele, hematocoele, pyocoele, varicocele, epididymo-orchitis and testicular tumours.

XXXVI PAEDIATRIC SURGERY

1. Oesophageal atresia and Intestinal atresia
2. Anorectal malformations
3. Constipation in children: Hirschsprung's disease, Acquired megacolon,
4. Congenital diaphragmatic hernia
5. Extrophy, Epispadias complex and hypospadias
6. Spinal diastrophism and Hydrocephalus
7. Urinary tract infections in children- Vesicoureteral reflux, posterior urethral Valves, Vesico Ureteral Junction obstruction/Duplex ureter, Obstructive uropathy in Children : Hydronephrosis, Hydroureteronephrosis
8. Testicular Maldescent
9. Umbilical Hernia, Exompholos: Major/minor
10. Wilm‟s Tumours:Neuroblastoma, Ganglionioneuloblestoma, Ganglioneuroma, Endo-dermal Sinus Tumours.
11. Hamartomas in Children: Lymphangioma and Cystic hygroma, Haemangioma.

    Biliary Atresia and Surgical jaundice

Suggested lecture program

Distribution of syllabus in respective semesters

This is suggested programme and can vary at institute
Total 300 hours of teaching has to be done in General Surgery including Tutorials
Details of syllabus is given separately below after distribution as per semester

4 th Semester : 16 Lectures

1) Introduction to Surgery
2) Body response to injury
3) Wound and wound healing
4) Acute infection, Boils, Carbuncle etc
5) Chronic infections
6) Tetanus and Gas gangrene
7) Neoplasm General Consideration
8) Surgical Nutrition
9) Pre operative and Post operative Care
10) Sepsis and Anti Spesis
11) Burns
12) Shock
13) Fluid and Electrolyte Balance
14) Monitoring of surgical Patients
15) Hemostasis and Blood transfusion.

6th Term 3 modules

Module l

General surgery

a. Polytrauma
b. Missiles and their effects & blast injuries
c. Management of war wounds
d. Surgical diseases skin conditions
e. Minimally invasive surgery
f. Principal of Radiotherapy
g. OT Techniques
h. AIDS in surgery
i. Foot including Diabetic Foot
j. Hand and hand infection

Vascular Surgery

* ARTERIAL DISORDERS.

1. Acute arterial obstruction: diagnosis and initial management; types of gangrene ; diagnosis of chronic arterial insufficiency with emphasis on Burger"s disease, athreosclerosis and crush injuries.
2. Investigations in cases of arterial obstruction. Amputations;
3. Vascular injuries : basic principles of management.
4. Surgically correctable Hypertension

* VENOUS DISORDERS.

1.Varicose veins: diagnosis and management; deep venous thrombosis : diagnosis, prevention, principles of therapy; thrombophlebitis.

LYMPHATICS AND LYMPH NODES.

Diagnosis and principles of management of lymphangitis, lymphedema, acute and chronic lymphadenitis; cold abscess, lymphomas, surgical manifestations of filariasis.

❑ *Module 2*

HEAD, FACE, NECK ***8 lectures***

1.ORAL CAVITY , JAWS, SALIVARY GLANDS.

1. Oral cavity :
   I) Cleft lip and palate; Leukoplakia ; retention cyst; ulcers of the tongue.
   II) Features, diagnosis and basic principles of management of carcinoma lip, buccal mucosa and tongue, prevention and staging of oral carcinomas.
2. Salivary glands :
   I) Acute sialoadenitis, neoplasm : diagnosis and principles of treatment
   II) Salivary fistulae

2. Epulis, cysts and tumours of jaw: maxilofacial injuries

3 NECK

1. Branchial cyst; cystic hygroma.
2. Cervical lymphadenitis : Non specific and specific,
3. Tuberculosis of lymphnodes, secondaries of neck.

4. Thoracic outlet syndrome : diagnosis.

2. ENDOCRINE SURGERY *8 lectures*

A.THYROID GLAND

I) Thyroid : Surgical anatomy, physiology, investigations of thyroid disorders; types, clinical features, diagnosis and principles of management of goitre, thyrotoxicosis and malignancy, thyroglossal cyst and fistula.

ii) Thyroiditis, Hypothyroidism.

B.PARATHYROID AND ADRENAL GLANDS.

Clinical features and diagnosis of hyperparathyroidism,

Tumours of the adrenal gland

Adrenal hyperfunction/ hypofunction

C.Diseases of thymus

- **Module 3**

1.NEURO-SURGERY *6 lectures*

1. Head injury
2. Intracranial tumours & other ICSOL
3. Congenital anomalies of brain & spinal cord
4. Surgery of peripheral nerves & diseases

2. Surgery of Breast *5 lectures*

1. Surgical anatomy; nipple discharge; acute mastitis, breast abscess; mammary dysplasia; gynaecomastia; fibroadenomas.
2. Assessment and investigations of a breast lump.
3. Cancer breast : diagnosis, staging, principles of management

3. PLASTIC & RECONSTRUCTIVE SURGERY *6 lectures*

1.Management of burns

2.Skin grafting including flaps

3.Injuries of the hand

4.Infections of the hand

7 th Semester

Module (1)

Cardio Thoracic surgery	8	
Paediatric surgery	8	*16 lectures*

- ***CARDIO-THORACIC SURGERY***

1. Injuries of the chest
2. Tumours of the lung & bronchial tree
3. congenital heart disease
4. Acquired heart disease
5. Surgery of ischaemic heart disease
6. Diseases of pericardium
7. Cardiac arrest

Paediatric Surgery

1. Oesophageal atresia and Intestinal atresia
2. Anorectal malformations
3. Constipation in children: Hirschsprung's disease, Acquired megacolon,
4. Congenital diaphragmatic hernia
5. Extrophy, Epispadias complex and hypospadias
6. Spinal diastrophism and Hydrocephalus
7. Urinary tract infections in children- Vesicoureteral reflux, posterior urethral Valves, Vesico Ureteral Junction obstruction/Duplex ureter, Obstructive uropathy in Children : Hydronephrosis, Hydroureteronephrosis
8. Testicular Maldescent
9. Umbilical Hernia, Exompholos : Major/minor
10. Wilm"s Tumours: Neuroblastoma, Ganglionioneuloblestoma, Ganglioneuroma, Endo-dermal Sinus Tumours.
11. Hamartomas in Children : Lymphangioma and Cystic hygroma, Haemangioma.
12. Biliary Atresia and Surgical jaundice

Module 2

- ***TROPICAL SURGERY***

1. Surgical consideration in Amoebiasis & Enteric fever
2. Filariasis, Dracontiasis & Ascariasis
3. Hydatid disease
4. Leprosy, Madura foot, Tropical ulcer Actionomycosis

- ***HEPATOBILIARY PANCREATIC SURGERY +SPLEEN***

A.LIVER

- Clinical features, diagnosis and principles of management of: Amoebic liver abscess, Liver trauma
- Surgical anatomy; primary and secondary neoplasms of liver.

SPLEEN

- Splenomegaly: causes, investigations and indications for splenectomy: splenic injury.

GALL BLADDER AND BILE DUCTS

- Anatomy, physiology and investigations of biliary tree; clinical features, diagnosis, complications and principles of management of cholelithiasis and cholecystitis; obstructive jaundice.
- Carcinoma of gall bladder, choledochal cyst.

PANCREAS.

- Acute pancreatitis: Clinical features, diagnosis, complications and management.
- Chronic pancreatitis, pancreatic tumours.

PORTAL HYPERTENSION

- Clinical presentation, Investigation and management

Module 3

Upper gastrointestinal Tract and Peritoneum

- PERITONEUM, OMENTUM, MESENTERY AND RETROPERITONEAL SPACE.
  1. Peritonitis: Causes, recognition and principles of management;
  2. Intraperitoneal abscess
- OESOPHAGUS.
  1. Dysphagia: Causes, investigations and principles of management.
  2. Cancer oesophagus: Principles of management.

- STOMACH AND DUODENUM.
  1. Anatomy; Physiology, Congenital hypertrophic pyloric stenosis; aetiopathogenesis, diagnosis and management of peptic ulcer, cancer stomach; upper gastrointestinal haemorrhage with special reference to bleeding varices and duodenal ulcer.
- SMALL INTESTINES
  1. Diagnosis and principles of treatment of, tuberculosis of intestine.

8th Semester

Module 1

Lower gastrointestinal Tract and abdominal wall

- Acute Abdomen
- INTESTINAL OBSTRUCTION.
  Types, aetiology, diagnosis and principles of management; paralytic ileus
  Aetiology, Clinical Features. Invesigations and management
- Abdominal Wall
  1.Features, diagnosis, complications and principles of management of :
  Umbilical, epigastric hernia., incisional; hernia ventral hernia
- LARGE INTESTINES
  Ulcerative colitis, premalignant conditions of large bowel carcinoma colon; lower gastrointestinal haemorrhage;, parasitic infestations.

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- APPENDIX
  Diagnosis and management of acute appendicitis,
  Appendicular lump and abscess.
- RECTUM.
  Carcinoma rectum: diagnosis, clinical features and principles of management; indications and
  Management of colostomy.
  Management of carcinoma rectum;
  Prolapse of rectum.
- ANAL CANAL
  . Surgical anatomy. Clinical features and management of: fissure, Fistula in ano, perianal and ischiorectal abscess and haemorrhoids; Diagnosis and referral of anorectal anomalies.
  Anal carcinoma.
- Umbilicus and Abdominal wall
  Umbilical fistulae, Burst abdomen, ventral hernia.

Module 2

Upper genito-urinary Tract and Organ Transplantation

- GENITO- URINARY SYSTEM.
- Symptoms and investigations of the urinary tract.
- KIDNEY AND URETER
  Anatomy and Embryology of Kidney and ureter
  Congenital anomalies of kidney & Ureter
  Investigations of renal mass;
  Diagnosis and principles of management of urolithiasis,
  Hydronephrosis, pyonephrosis, perinephric abscess,
  Renal tumours.
  Renal tuberculosis.

Module 3

Upper genito-urinary Tract and Hernia

- URINARY BLADDER.
  Causes, diagnosis and principles of management of haematuria,
  Anuria and Acute retention of urine.
- PROSTATE AND SEMINAL VESICLES.
  Benign prostatic hyperplasia: diagnosis and management.
  Carcinoma prostate.
- URETHRA AND PENIS
  Diagnosis and principles of management of Phimosis , paraphimosis and.
  Principles of management of urethral injuries.
  Urethral strictures.
  Carcinoma penis
- TESTES AND SCROTUM.
  Diagnosis and principles of treatment of undescended testis; torsion testis;
  Hydrocoele, hematocoele, pyocoele,
  Varicocele, epididymo-orchitis and
  Testicular tumours
- HERNIAS.
- Clinical features, diagnosis, complications and principles of management of:
  Umbilical, Inguinal, epigastric and femoral hernia.

Introduction of " Brain Death and Organ Donation" topic in subjects of Physiology , Preventive & Social Medicine, Psychiatry, Medicine & Surgery

RECOMMENDED BOOKS FOR GENERAL SURGERY

TEXT BOOKS:

1 . Charles V. Mann, R.C.G. Russel, Norman S., Williams,
Bailey and Love"s Short Practice of Surgery, 23rd Edition, 2000 Chapman and Hall.

2. K.Das: Clinical Methods in Surgery, 8th Edition, 1968, Suhas Kumar Dhar, Calcutta.
3. JSP Lumley : Hamilton Bailey"s Physical Signs 18th Edn Butterworth/Heinemann.

1997,

4. Somen Das ; A Practical Guide to Operative Surgery, 4th Edition, 1999, s. Das, Calcutta

REFERENCE TEXT BOOKS

1. .James Kyle : Pye‟s Surgical handicraft, Indian edition, k.m. Varghese Company David C.
2. Sabiston ; Text Book of surgery : The Biological basis of Modern Surgical Practice, 15th Edition, 1971, W.B. Saunders.
3. Seymour I. Schwartz, G. Tom Shines, Frank C. Spencer, Wendy Cowles Husser: Principles of Surgery, Vol. 1 & 2, 7th Edition, 1999, Mc Graw Hill
4. R.F. Rintoul : Farqharson‟s Text Book of Operative Surgery, 8th Edition, 1995, Churchill Livingstone.
5. Sir Charles Illingworth, Bruce m. Dick: A Text Book of Surgical Pathology,12th Edition, 2979, Churchill Livingstone.
6. R.W.H. McMinn : Last‟s Anatomy: Regional and Applied; 10th Edition, 1999, Churchill Livingstone

Goals and objectives of Allied Subjects

(B) ORTHOPAEDICS

(A) KNOWLEDGE

The student shall be able to:

1. Explain the principles of recognition of bone injuries and dislocation.
2. Apply suitable methods to detect and manage common infections of bones and joints.
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
4. Recognize metabolic bone diseases as seen in this country:
5. Explain etiogenesis, manifestations, and diagnosis of neoplasm affecting bones.

(B) SKILLS:

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

1. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colles‟s forearm, phalanges etc.
2. Use techniques of splinting, plaster, immobilization etc.
3. Manage common bone infections, learn indications for sequestration, amputations and corrective measures for bone deformities;
4. Advise aspects of rehabilitation for Polio, Cerebral Palsy and Amputation.

(C) APPLICATION

Be able to perform certain orthopaedic skills, provide sound advice of skeletal and related conditions at primary or secondary health care level.

(D) INTEGRATION

LEARNING METHODS

Lectures, Tutorials bedside clinics and lecture cum demonstrations
Distribution of Teaching hours -

- Lectures - 50 hours
- Tutorials and revision - 50
- **Clinical postings in Orthopaedics**
  Total clinical Posting of 10 weeks of 180 hours
  5th Semester - 4 weeks
  6th Semester - 4 weeks
  9th Semester - 2 weeks

Course contents and suggested lecture program of Orthopaedics (Total 100 hours)

This is suggested programme and can vary at institute
Total 100 hours of teaching has to be done in Orthopaedics including Tutorials
Details of syllabus is given separately below after distribution as per semester

- ***6th Semester*** ***Lectures*** ***1 to 16***
- 8 th Semester Lectures 1 17 to 32
- 8th Semester Lectures 2 33 to 48

Topic : General Orthopaedics
Lectures

1. Introduction and scope of Orthopaedics Traumatology and Orthopaedic Diseases. Idea about Scheme of Examination.
2. Definition and Classification of Fracture and Dislocation Signs, symptoms and diagnosis of sprain, contusion fracture and dislocation.
3. First aid measures in Poly-trauma patient, spinal cord Injury patients and knowledge about various splints.
4. & 5 Principles of Management of sprain, Fracture and Dislocation with emphasis on various aspects of closed reduction, immobilization including internal fixation and rehabilitation.

6,7,8 Complications of fracture and its management with specific reference to malunion Delayed union, Non union, Myositis Ossificans, Sudeck‟s dystrophy, Volkman‟s ischaemia, Avascular Necrosis, Fat embolism, secondary Osteoarthrosis and injury to Muscles, Tendon, nerve and Blood vessels.

1. Plaster technique, plaster complications and plaster disease.
2. Fracture Healing in cortical and cancellous bones and factors affecting fracture healing.

Topic : Orthopaedic Traumatology

3. Fracture clavicle, scapula, neck humerus and shaft humours.
4. Supracondylar fracture humerus with complications.
5. Fracture Forearm bones, Monteggia and Galeassi fracture dislocations, fracture olecranon head and neck radius.
6. Fracture scaphoid, Metacarpals and phalanges.
7. Colles fracture and Complications.
8. Dislocation (Acute and Recurrent) of shoulder and elbow.
9. Fracture of Vertebrae with complications.
10. Fracture of Pelvis with complications.
11. Fracture Neck femur and trochanteric fracture.
12. Fracture shaft femur and fractures around knee.
13. Meniscus and ligaments injury at knee.
14. Fracture Tibia-fibula, fracture in tarsals, Metatarsals and phalanges.
15. Fracture dislocation around ankle,
16. Dislocation of Hip, knee, ankle, tarsals and small bones in foot.

Topic : <u>Orthopaedic Diseases</u>

25,26 Congenital skeletal anomalies with emphasis on congenital Talipes Equino varus (CTEV). :-

27. Congenital dislocation of hip (CDH), Osteogenesis Imperfecta, spina
28. Bifida and Torticollis.
29. Ostecochondritis – various types.
30. Post Polio Residual Palsy with stress on preventive and rehabilitation aspect.

30. Acute Osteomyelitis.

31. Chromic Osteomyelitis.

32. Pyogenic arthritis of Hip, knee.

33,& 34. Osteo-articular Tuberculosis with special reference to Tuberculous of Hip, knee and elbow.:-

35. Tuberculosis spine and paraplegia.

36. Fungal Infections and leprosy in Orthopaedics.

37. Cerebral palsy, Diagnosis and rehabilitation.

38. Rheumatoid arthritis.

39. Degenerative arthritis.

40. Nerve injuries and principles of management.

41. Amputation and Disarticulation – Indications methods and complications.

42. Metabolic bone disease : Rickets, Osteomalacia and Osteoporosis.

43,& 44 Tumours of bones and its classification. Benign :- Osteochondroma, Giant cell tumour Unicameral Bone cyst, Aneurysmal cyst.

45,46 Malignant- Osteogenic sarcoma, Ewing"s tumour, Fibrosarcoma, Chondrosarcoma, Multiple Myeloma, Secondaries from Primary Carcinoma (Metastatic tumours)

47. Back ache,

48. Frozen shoulder, Tennis Elbow, Dequervain"s disease, Dupuytren"s Contracture Osgood – Schlatter;s disease, planter fascitis.

Practical and Lecture cum Demonstration Classes, in MBBS in Orthopaedics

Once a week class for two hours in $8^{th}/9^{th}$ semester.

Topics of Demonstrations :-

1. Plaster technique and splint applications.
2. Traction application, Orthopaedic appliances demonstration, Demonstration of Physiotherapy equipments.
3. Specimens of sequestrum and Tumours, Madura foot etc.
4. Common instruments and Implants.

5 to 7. Common X-rays of traumatology, bony infection, joint infection and tuberculosis, Malunited Colle"s fracture, forearm or Supracondylar Humerus fracture.

8 to 10. Chronic osteomyelitis case, knee effusion case, Non union case, Bony tumour case.

Seminar Topics :-

1. Osteomyelitis.
2. Tuberculosis.
3. Bone tumours
4. First aid and Acute trauma Life saving (ATLS) measures.

Tutorial Topics :-

15. Supracondylar fracture Humerus.
16. Colle"s fracture.
17. Fracture neck femur.
18. Spine examination, Pott"s spine and paraplegia
19. CTEV.
20. Shoulder, Elbow and wrist examination.
21. Hip examination.
22. Knee, ankle foot examination.
23. Nerve examination and nerve injuries.

Internal assessment:

- Two Term ending examination at the end of Posting of 50 markseach
  Total 100 out of 450 marks under general surgery.

C) ANAESTHESIOLOGY

DEPARTMENTAL OBJECTIVES:

At the end of the training, the students should be able to:

1. Perform cardio-pulmonary resuscitation with the available resources and transfer the patients to a bigger hospital for advanced life support.
2. Set up intravenous infusion.
3. Clear and maintain airway in an unconscious patient.
4. Administer oxygen correctly.
5. Perform simple nerve block.
6. Exhibit awareness of the principles of administration of general and local anaesthesia.

SKILLS:

1. Start I V line and infusion in adults, children and neonates.
2. Do venous cutdown.
3. Insert, manage a CVP line.
4. Conduct CPR (Cardiopulmonary resuscitation) and first aid in newborns, children and adults including endotracheal intubation.
5. Perform nerve blocks like infiltration, digital and field blocks.
6. Do lumbar puncture.
7. Administer O_2 by mask, catheter, and O2 tent and be able to handle O_2 cylinder.

LEARNING METHODS

Lectures, Tutorials bedside clinics and lecture cum demonstrations
Distribution of Teaching hours -

- **Lectures - 20 hours**
- **Tutorials and revision -**
- **Bedside clinics - 36 hours, one clinical postings 2 weeks in Anaesthesiology**

COURSE CONTENTS:

1. Cardiopulmonary resuscitation (CPR) - basic and advanced, including use of simple ventilators.
2. Anatomy of upper airway, sites of respiratory obstruction and management of airway in an unconscious patient.
3. Various methods of oxygen therapy and its indications.
4. The pharmacology of local anaesthetics, their use and how to perform simple nerve blocks like - Infiltration anaesthesia, digital block, ankle block, pudendal and paracervical blocks.
5. Management of complications of regional anaesthesia. The principles of administration of general anaesthesia.

D) Radiology :Diagnosis & Imaging

Goals :

- Realisation of the basic need of various radio-diagnostic tools.
- Radio-diagnostic Techniques to be adopted indifferent clinical situations in diagnosis of ailments.

Objectives :

- **Knowledge: -**

The student shall be able to

1. Understand basics of X-ray / USG production, its utility and hazards
2. Appreciate and diagnose radiological changes in diseases of Chest, Abdomen, Skeletal system, Gastro-intestinal system, Genito-urinary System & CNS
3. Learn about various Imaging techniques like nuclear medicine, computerised tomography (CT), Ultrasound, magnetic resonance imaging (MRI), conventional & Digital subtraction Angiography (DSA).

Skills: -

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

1. Interpret various radiological findings and their consequences
2. Use basic protective techniques during various Imaging procedures
3. Advice appropriate Diagnostic procedures to arrive at an appropriate diagnosis.

LEARNING METHODS

Lectures, Tutorials bedside clinics and lecture cum demonstrations
Distribution of Teaching hours -

- Lectures - 20 hours
- Tutorials and revision -
- Bedside clinics - 36 hours, one clinical postings 2 weeks in Radiology

I : BONES & JOINTS :

Congenital dislocation of hip, congenital syphilis, Achonodroplasis, Osteogenesis Imperfecta.

Infection : Osteomyelitis, Tuberculosis of Bone & Spine.

Lesions of Joints : Septic / Tuberculous Arthritis, Rheumatoid, Arthritis, Ankylosing Spondylitis, Osteo-Arthritis, Gout.

Bone Tumours: Ewing"s, Osteogenic Sarcoma, Giant Cell Tumour Neurofibroma.

Lymphoreticular system & Haemopoietic Disorders : Thalassaemia, Sickle Cell disease, Lymphomas, Multiple myeloma, plasmacytoma, Haemophilia.

Metabolic & Endocrine Disorders of Bone: Rickets & Osteomalacia, Scurvy, Osteoporosis, Acromegaly, and Hyperparathyroidism.

Skeletal trauma: General Principles.

II: Chest:

Methods of examination, Normal X-ray Chest, Bronchopulmonary Segments.

Interpretation of Abnormal Chest X-ray : Silhouette sign, Air Bronchogram,

Interstitial Shadows, Alveolar Shadows, Honeycomb Lung, Cavitations, Calcification, Hilar Shadow, Mediastinum, Pleura.

Bronchography.

Bronchogenic Carcinoma.

Miliary Shadows, Pulmonary Tuberculosis, Solitary Pulmonary Nodule, Bronchiectasis, Primary complex.

III : CARDIO-VASCULAR SYSTEM

Normal Heart : Methods of examination.

Cardiomegaly, Pericardial Effusion.

Acquired Heart Diseases: Valvular Heart Disease, Ischaemic Heart Disease.

Congenital Heart Disease.

Aortic Aneurysms, Co-arctation of Aorta.

IV : GASTRO-INTESTINAL TRACT & ABDOMEN :

Barium Examination of GI Tract.

Acute Abdomen.

Oesophagus: Carcinoma, Strictures, Varices, Achalasia, and Hiatus Hernia.

Stomach & Duodenum : Ulcer disease, Malignancy.

Intestine: Intestinal Obstruction, Volvulus, Ulcerative Colitis,

Intussusceptions, Malignancy, Hirschsprung‟s Disease, Koch‟s Abdomen Diverticular Disease, Polyp‟s.

V : HEPATO-BILARY SYSTEM, PANCREAS :

Liver : Abscess, Hepatoma, Cirrhosis, Portal Hypertension, and Spenoportography.

Gall-Bladder : Calculus Disease, Malignancy, PTC, ERCP.

Pancreas : Pancreatitis, Malignancy.

VI : URORADIOLOGY:

Method of Examination : Intravenous Urography (IVP)

Calculus Disease, PUJ Obstruction, PU Valves, Renal Artery Stenosis,

Wilm‟s Tumour, Renal Cell Carcinoma, GU Koch‟s.

VII : OBSTETRICS & GYNAECOLOGY :

Hysterosalpingography (HSG), Intra-Uterine Foetal Death, Fibroid, Ovarian Tumours, Ultrasongraphy & Transvaginal US.

VII: CENTRAL NERVOUS SYSTEM :

Raised Intracranial Tension, Intracranial Calcification, Head Injury, Cerebrovascular Accident, Rind Enhancing Lesions in Brain, Spinal Neoplasms, Myelograpy.

IX: MISCELLANEOUS:

Radiation Hazards, Radiation Protection.

Imaging Modalities :

USG, CT, MRI : Principles, Applications, Advantages, Limitations, Developments.

Angiography : Seldinger Technique, Conventional Angiogram, DSA, Carotid, Coronary, Renal Angiograms, Aortogram.

Contrast Media : Barium Sulphate, Water Soluble & Oily Contrast.

Interventional Radiology : Developments, Angioplasty, Embolisation.

Mammography: Principles & Applications.

Internal assessment:

- Term ending examination at the end of Posting of 50 marks out of Total 450 marks under general surgery.

Dentistry for MBBS students under Surgery

GOALS

- Comprehensive understanding of Dentistry, Orofacial structures, the Dentition, Maxillary and Mandibular jaws and the Diagnosis, Treatment, Prevention, Restoration and Rehabilitation of the common dental problems

OBJECTIVES

A. KNOWLEDGE

- Various Diseases, Syndromes, Lesions, Disorders manifesting and affecting the Oral cavity, the Jaws and the TM joint.
- Effects of Dental Caries, Gingival and Periodontal diseases and Malocclusion.

B. SKILLS

- Examination of the Oral cavity and the TM Joint
- Local Anaesthesia Administration. Dental block
- Exodontia.
- Emergency management of Maxillofacial Trauma.
- Plaque control and Oral health care regimen.

Learning methods

- **Total teaching hours: 10**
- **Theory lectures: 10** in 7th Semester

- Clinical Postings; **2weeks** each in 7th semester

Internal assessment:

- Term ending examination at the end of Posting of 50 marks out of Total 450 marks under general surgery.

COURSE

III MBBS, 7Th SEMESTER LECTURES: 10 Hours.

1. Scope of Dentistry
   Introduction of various branches of Dentistry.
   Basic Understanding of Dental Epidemiology
   Effects of deleterious Habits on Dentition and Orofacial structures.

2. Development and Growth of Jaws & Orofacial structures.
   Development & Eruption of teeth, Deciduous & Permanent.
   Occlusion.
   Preventive Care in Paediatric patients.

3. Dental Caries
   Gingival & Periodontal Diseases.
   Developmental Anomalies.
   Cysts & Tumours of Oral cavity.
   Neoplasms of Oral cavity.
   Oral Microbiology.

4. Orofacial Pain & its Management

5. Maxillofacial Trauma and Management of patient.

6. Oral Medicine
   Systemic diseases, the relevance of medications prescribed & their Oral Manifestations.
   Infections of Orofacial structures esp. periodontal diseases & their Manifestations in Systemic conditions.
   Relationship between Oral and systemic health.
   Women‟s Oral health care in Reproductive phase.

7. Interdisciplinary team approach in the management of a patient in Dentistry involving Paediatrics, Plastic surgery, ENT Surgery, Neurosurgery, Opthalmic surgery, Gen. Surgery, Medicine, Orthopaedics, Dermatology, Endocrinology and OB-GYN.

8. Rehabilitation of lost Oral structures.
   Implantology.
9. Dentofacial Deformities and Surgical corrections.
10. Biomaterials used in Dentistry.
    Emerging technologies in Contemporary Dentistry.
    Molecular Dentistry.
    Integration with anatomy, surgery,
    pathology radiology and Forensic Medicine be done.

CLINICAL POSTING in DENTISTRY - 2 WEEKS

1. L.A. Administration, Techniques for different Blocks.
2. Exodontia
3. Preliminary Management of Maxillofacial Trauma
4. Pathological conditions of Oral cavity.
5. Oral and Maxillofacial Radiography & Imaging
6. Maxillo Facial Prosthodontics

Criteria of passing in various surgical subjects at III MBBS Examination

SN	Subject	Theory Paper / Oral/ Practical / Internal Assessment		Maximum Marks in each of the subject	Minimum marks required to pass in each part of any subject		Minimum marks required to pass in each subject out of
01)	Otorhinolaryngology	a) Theory	Paper - I	40	20	25	50
							100
		b) Oral		10			
		c) Practical		30		15	
		d) Internal Assessment	Theory	10			
			Practical	10		10	
02)	General Surgery	a) Theory	Paper I	60	60	70	150
			Paper II	60			300
		b) Oral		20			
		c) Practical		100		50	
		d) Internal Assessment	Theory	30	30		
			Practical	30			
03)	Obstetrics and Gynaecology	a) Theory	Paper1	40		50	100
		b) Oral		20			
		c) Practical		60	30		200
		d) Internal Assessment	Theory	20	40		
			Practical	20			

04)	Ophthalmology	a) Theory	Paper - I	40	20	25	50 100
		b) Oral		10			
		c) Practical		30		15	
		d) Internal Assessment	Theory	10		10	
			Practical	10			

It is compulsory to obtain 50% marks in theory.
It is mandatory to obtain 50% marks in theory+ viva/oral.

FINAL MBBS EXAMINATION IN SURGERY

Evaluation : Methods – Internal assessment, Theory, Practical and Viva

Internal Assessment (Formative Assessment)

Theory – 30 Practical - 30 Total 60

- Marks of Internal Assessment should be sent to University before the commencement of Theory examination.
- Passing in internal assessment is essential for passing ,as Internal assessment is separate head of passing. in examination.
- It will also be considered for grace marks as per existing rules
- Combined theory and practical of internal assessment will be considered for passing in internal assessment.
- Student will be allowed to appear for both theory and practical exam independent of marks obtained in internal assessment but he if fails in that head even after including the grace marks he will be declared **"Fail** in that Subject"

Internal assessment in Theory -

Examinations during semesters:
This will be carried out by conducting two theory examinations during 6th and 8rth semesters (100 marks each).
Total of 200 marks to be converted into 15 marks.(A/15)

Prelim examination :
This shall be carried out during 9th semester. Two theory papers of 60 marks each as per university examination Pattern
Total of 120 marks to be converted into 15 marks. (B/15)

Total marks of Internal assessmentfor Theory will be addition of A and B.

Internal assessment in Practical

Examinations at end of Clinical postings:

There will be practical examination at the end of each clinical posting of General Surgery. (3rd, 5th, 7th and 8th semester) Each examination will be of 50 marks.
Total of 4 examinations - 200 marks.
These marks and marks from Orthopaedics 100, Radiology 50, Dentistry 50 and Casualty 50 will be added. - Total 450 marks will be converted to 15 marks.(C/15)

Prelim examination:

This will be conducted for 120 marks as per university pattern and marks will be converted to 15 (D/15).

Total marks of Internal assessment for Practical will be addition of C and D.

Record BOOK

Case record will have to be entered in a record book.
A combined record book of General surgery, Orthopaedics, Causality, Anaesthesiology, Dentistry and radiology will have to be maintained
Minimum of five histories have to be recorded in each posting
The certificate of satisfactory completion of all clinical posting will be required from Head Of the department of Surgery. This will be base on multiple similar certificates from all postings in all subjects
In addition it will have details of all marks in posting ending exam on second page and calculation of internal assessment
Record book will not carry any marks but it will be prerequisite for Appearing for examination.

Pattern of theory examination including distribution of marks, Questions and Time

Theory

1. There shall be two theory papers - Paper I and II, carrying 60 marks each.
2. Each paper will have three sections, A, B and C. Each paper will be of 3 hours duration.
3. Section A will be MCQ in each paper. Section B and C will have to be written in separate answer sheets. Both will have Long Answer Question (LAQ) and Short Answer Questions (SAQ)
4. The topic covered in each section shall be as follows : -

A. Paper I

- Section A – MCQ : will cover whole syllabus of Paper I
- Section B- General principles of Surgery, Oncology, head, face, neck, Breast, Endocrine Surgery and Trauma
- Section C - Orthopaedic surgery.

B.Paper II

- Section A – MCQ : will cover whole syllabus of Paper II
- Section B- Gastrointestinal Tract including colon rectum and anal canal
  - Liver, pancreas and biliary tract, Spleen. Paediatric Surgery
- Section C - Urology, Cardio thoracic surgery and Plastic surgery Dental surgery, Radiology and Radiotherapy, Anaesthesiology.

Paper I - 3 hrs - 60 marks

Section . A - MCQ - 30 x ½ marks each – 15 marks

- 30 minutes
- Separate paper
- Single based response
- MCQ will cover whole syllabus of Paper I

Section . B - General Surgery 25 Marks

- 2 LAQS – 8 marks x 2 = 16 marks
- 3/5 SAQS – 3 marks = 9 marks

Topics - General principles of Surgery, Oncology, head, face, neck, Breast, Endocrine Surgery and Trauma..

NB : Shall contain one question on basic Sciences and allied subjects

Sec. C –Orthopaedics Surgery : 20 marks

- Topic; All topics in Orthopaedics
- Orthopaedics examiner will set this part of paper and to be evaluated by Orthopaedics examiner.

- 1 LAQS (Long answer questions) – 8 marks
- 4/6 SAQS(Short answer questions) x 3 marks each = 12 marks

Time Sec. B & C – Two and half hours.

Section B and C to be written in separate answer sheets.

MCQ section A will be given to candidates at the beginning of the examination. After 30 minutes Section A will be collected. Section B and C paper will then be handed over to candidates.

PAPER II - Time 3 hrs - 60 marks

Section . A - MCQ - 30 x ½ marks – 15 marks

- 30 minutes
- Separate paper
- Single based response
- MCQ will cover whole syllabus of Paper II

Section . B – Marks: 25 marks

Topics :Gastrointestinal Tract including colon rectum and anal canal
Liver, pancreas and Biliary tract, Spleen, Paediatric surgery.

- 2 LAQS – 8 marks x 2 = 16 marks
- One question clinical Problem solving.
- 3/5 SAQS – 3 marks = 9 marks

NB : Shall contain one question on basic Sciences and allied subjects

Section . C – Marks: 20 marks

Topics: Urology, Cardio thoracic surgery and plastic surgery
Dental surgery, Radiology and Radiotherapy, Anaesthesiology.

- 1 LAQS – 8 marks
- 4/6 SAQS x 3 marks each = 12 marks

Time Sec. B & C – Two and half hours.

Section B and C to be written in separate answer sheets.

MCQ section A will be given to candidates at the beginning of the examination. After 30 minutes Section A will be collected. Section B and C paper will then be handed over to candidates.

PRACTICAL EXAMINATION - 120 marks

Clinical examination

- Clinical cases
  - Long case I – Gen, Surgery. – 50 marks
  - Short case I - Orthopaedics – 25 marks
  - Short case II – Gen. Surgery -- 25 marks

Time for Long cases- 30 minutes for taking history and clinical examination.
10 minutes for viva
Time for 2 short cases - 20 minutes for taking history and clinical examination.
10 minutes for viva.

Viva examination - Duration and topic distribution (Total 20 marks)

- Tables – Viva will be directed towards **interpretation of investigation**

At two tables, each for ten marks. Time- 10 minutes at each table

- Instruments + Operations, – 10 marks
- Surgical Pathology, Imaging sciences and Orthopaedics – 10 marks

Marks of VIVA will be added to Theory marks
It is compulsory to obtain 50% marks in theory.
It is mandatory to obtain 50% marks in theory+viva/oral.

OPHTHALMOLOGY

These guidelines are based on MCI recommendations.
Teaching has to be done keeping in mind the goals and objectives to be achieved by medical student

(i) GOAL

The broad goal of the teaching of students in ophthalmology is to provide such knowledge and skills to the student that shall enable him/her to practice as a clinical and as a primary eye care physician and also to function effectively as a community health leader to assist in the implementation of National Programme for the prevention of blindness and rehabilitation of the visually impaired.

(II) OBJECTIVES

(a) KNOWLEDGE

At the end of the course, student shall have the knowledge of

1.Common problems affecting the eye,

2. Principles of management of major ophthalmic emergencies,

3.main systemic diseases affecting the eye;

4. Effects of local and systemic diseases on patient‟s vision and the necessary action required to minimize the sequelae of such diseases;

5. Adverse drug reactions with special reference to ophthalmic manifestations;

6, Magnitude of blindness in India and its main causes;

7. National programme for control of blindness and its implementation at various levels.

8. Eye care education for prevention of eye problems

9. Role of primary health center in organization of eye camps;

10.organization of primary health care and the functioning of the ophthalmic assistant;

11. Integration of the national programme for control of blindness with the other national health Programmes.

12. Eye bank organization

SKILLS

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

1. Elicit a history pertinent to general health and ocular status;
2. Assist in diagnostic procedures such as visual acuity testing, examination of eye, Schiotz tonometry, Staining of Corneal pathology, confrontation perimetry, Subjective refraction including correction of presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and Cover test;
3. Diagnose and treat common problems affecting the eye;
4. Interpret ophthalmic signs in relation to common systemic disorders,
5. Assist/observe therapeutic procedures such as subconjunctival injection, corneal conjunctival foreign body removal, carbolic cautery for corneal ulcers, Nasolacrimal duct syringing and tarsorraphy;
6. Provide first aid in major ophthalmic emergencies;
7. Assist to organize community surveys for visual check up;
8. Assist to organize primary eye care service through primary health centers.
9. Use effective means of communication with the public and individual to motivate for surgery in cataract and for eye donation.
10. Establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.

(C) INTEGRATION

The undergraduate training in Ophthalmology will provide an integrated approach towards other disciplines especially Neuro-sciences, ENT, General Surgery and Medicine.

LEARNING METHODS

- Total teaching hours: 100
- Theory lectures: 70(4th,6th,7th term.)
- Tutorials :30(7th term)
- Clinical Postings Two clinical postings of 4weeks

First in 4th semester and second in 6th semester and 3rd posting of 2 weeks in 7th term Bedside clinics 10 weeks of three hours per day 180 hours

SYLLABUS OF III MBBS IN OPHTHALMOLOGY

INTRODUCTION ANATOMY & PHYSIOLOGY OF THE EYE

COMMON DISEASE OF EYE.

A) Conjunctiva.

Symptomatic conditions: - Hyperemia, Sub conjunctival Haemorrhage.

Diseases: - Classification of Conjunctivitis

:- Mucopurulant Conjunctivitis
:- Membranous Conjunctivitis Spring Catarrh.
:- Degenerations :- Pinguecula and Pterigium

B) Cornea: - Corneal Ulcers: Bacterial, Fungal, Viral, Hypopyon.
:- Interstitial Keratitis.
:- Keratoconus.
:- Pannus
:- Corneal Opacities.
:- Keratoplasty.

C) Sclera : :- Episcleritis.
:- Scleritis.
:- Staphyloma.

D) Uvea :- Classification of Uveitis
:- Gen. Etiology, Investigation and Principles Management of Uveitis.
:- Acute & Chronic Iridocyclitis.
:- Panophthalmitis.
:- End Ophthalmitis.
:- Choriditis.

E) Lens :

I) Cataract – Classification & surgical management of cataract.
:- Including Preoperative Investigation.
:- Anaesthesia.
:- Aphakia.
:- IOL Implant

F) Glaucoma :
:- Aqueous Humor Dynamics.
:- Tonometry.
:- Factors controlling Normal I.O.P.
:- Provocative Tests.
:- Classifications of Glaucoma.
:- Congenital Glaucoma.
:- Angle closure Glaucoma.
:- Open Angle Glaucoma.
:- Secondary Glaucoma

G) Vitreous :
:- Vitreous. Opacities.
:- Vitreous. Haemorrhage.

H) Intraocular Tumours :
:- Retinoblastoma.
:- Malignant Melanoma

I) Retina :
:- Retinopathies : Diabetic, Hypertensive Toxaemia of Pregnancy.
:- Retinal Detachment.
:- Retinitis Pigmentosa, Retinoblastoma

J) Optic nerve :
:- Optic Neuritis.
:- Papilloedema.
:- Optic Atrophy.

K) Optics :

:- Principles : V.A. testing Retinoscopy, Ophthalmoscopy.
:- Ref. Errors.
:- Refractive Keratoplasty.
:- Contact lens, Spectacles

L) Orbit :

:- Proptosis – Aetiology, Clinical Evaluation, Investigations & Principles of Management
:- Endocrinal Exophthalmos.
:- Orbital Haemorrhage.

M) Lids :

:- Inflammations of Glands.
:- Blepharitis.
:- Trichiasis, Entropion.
:- Ectropion.
:- Symblepharon.
:- Ptosis.

N) Lacrimal System :

:- Wet Eye.
:- Dry Eye
:- Naso Lacrimal Duct Obstruction
:- Dacryocystitis

O) Ocular Mobility :

:- Extrinsic Muscles.
:- Movements of Eye Ball.
:- Squint : Gen. Aetiology, Diagnosis and principles of Management.
:- Paralytic and Non Paralytic Squint.
:- Heterophoria.
:- Diplopia.

P) Miscellaneous :

:- Colour Blindness.
:- Lasers in Ophthalmology – Principles.

Q) Ocular Trauma : - Blunt Trauma.

:- Perforating Trauma
:- Chemical Burns
:- Sympathetic Ophthalmitis

2) Principles of Management of Major Opthalmic Emergencies :
   :- Acute Congestive Glaucoma.
   :- C. Ulcer.
   :- Intraocular Trauma.
   :- Chemical Burns.
   :- Sudden Loss of vision
   :- Acute Iridocyclitis.
   :- Secondary Glaucomas
3) Main Systemic Diseases Affecting the Eye :
   :- Tuberculosis.
   :- Syphilis.
   :- Leprosy.
   :- Aids.
   :- Diabetes.
   :- Hypertension
4) Drugs :
   :- Antibiotics
   :- Steroids.
   :- Glaucoma Drugs.
   :- Mydriatics.
   :- Visco elastics.
   :- Fluoresceue.
5) Community Ophthalmology :
   :- Blindness : Definition Causes & Magnitude
   N.P.C.B. – Integration of N.P.C.B. with other health
   :- Preventable Blindness.
   :- Eye care.
   :- Role of PHC"s in Eye Camps.
   :- Eye Banking.
6) Nutritional :- Vit. A. Deficiency.

Clinical Ophthalmology cases To Be Covered

MBBS

History taking & Eye examination

Assessment of visual function.

Conjunctiva
   :- Pterigium.
   :- Pinguecula
   :- Conjunctivitis.
   :- Sub Conj. Haemorrhage.

Cornea
   :- Corneal Opacity .
   :- Corneal Ulcer.
   :- Corneal Abscess.
   :- Corneal Transplant

Sclera :- Scleritis, Epi Scleritis.
:- Staphyloma.

Uvea :- Iridocyclitis.

Lens :- Cataract.
:- Aphakia
:- IOLs
:- Complications

Glaucoma – Types, Signs, Symptoms & Management

Squint

Lids :- Entropion
:- Ectropion
:- Ptosis.

OPHTHALMOLOGY - MBBS

TUTORIALS TOPICS (Total 30 Hours)

SURGICAL TECHNIQUES

Cataract :- ECCE
:- ICCE
:- IOL Implantation
:- Phaco-emulsification.

- Pterigium
- Chalazion
- Glaucoma
- Foreign Body Removal
- Enucletion
- Keratoplasty
- Basic of squint, L 10

Instruments

- OPD
- Operative
- Basic Examination and Diagnostic instruments
  Tonometer, Sac Syringing, Slip Lamp.

Optics - **Lenses – Spheres, Cylinders, Prisms,**
Pinhole, Slit, Maddox Rod & Maddox wing,
Red & Green Glasses.
- IOLs
- Ophthalmoscopy
- Retinoscopy
- Contact Lenses
- Colour Vision

Drugs

Miotics	Antibiotics	Antiglaucoma
Mydriatics	Steroids	Anti virals
	NSAIDS	Anti Fungal
	Viscoflastics	Pre-Op. & Post – Op.

Lecture held each term for VII and VIII term : Topics	Under graduate Theory Lectures: (No.of)
1. Anatomy & Physiology	4
2. Optics	6
3. Conjunctiva	4
4. Cornea	6
5. Sclera	1
6. Uvea	4
7. Cataract	6
8. Glaucoma	6
9. Optic Nerve	4
10. Retina	1
11. Vitreous	4
12. Squint	4
13. Community Ophthalmology	2
14. Lids	4
15. Orbit	2
16. Lacrimal Appartus and Dry Eye	4
17. Miscellaneous & Others	2
Total Lectures	**70**
Tutorials	30
	100

FINAL MBBS EXAMINATION IN OPHTHALMOLOGY

Evaluation

Internal assessment: 20 (Theory 10 +Practical 10)

Plan of Internal assessment in Ophthalmology

- Marks of Internal Assessment should be sent to University before the commencement of Theory examination.
- Passing in internal assessment is essential for passing, as Internal assessment is separate head of passing. in examination.
- It will also be considered for grace marks as per existing rules
- Combined theory and practical of internal assessment will be considered for passing in internal assessment.
- Student will be allowed to appear for both theory and practical exam independent of marks obtained in internal assessment but he if fails in that head even after including the grace marks he will be declared **"Fail** in that Subject"

Internal assessment in Theory -

1. Examinations during semesters : This will be carried out by conducting two theory examinations during 4th and 6th semesters (50 marks each).

Total of 100 marks to be converted into 5 marks.(A/5)

2. Prelim examination : This shall be carried out during 9th semester.
One theory papers of 40 marks as per university examination.
Total of 40 marks to be converted into 5 marks. (B/5)

Total marks of Internal assessment- Theory will be addition of A and B.

Internal assessment in Practical

Examinations at end of Clinical postings:

1. There will be practical examination at the end of each clinical posting of Opthalamology.,4th and 6th semester. Each examination will be of 50 marks. Total of 2 examinations – 100 marks , will be converted to 5 marks.(C/5)

2. Prelim examination:
This will be conducted for 40 marks as per university pattern and marks will be converted to 5 (D/5).
Total marks of Internal of-of Practical will be addition of C and D.

Evaluation **Methods - Theory, Practical and Viva**

Pattern of theory examination including distribution of marks, questions and time

Pattern of theory examination including distribution of marks

1. There shall be one theory papers , carrying 40 marks
2. The paper will have two sections, A and B
3. The paper will be of 2.5 hours duration.
4. Section A will be MCQ in each paper. Section B will have to be written in separate answer sheets.

THEORY : 40 marks Duration Two and half hours (2.5) hours

MCQ section A will be given to candidates at the beginning of the examination.
After 30 minutes Section A will be collected. Section B of paper will then be handed over to candidates.

Section A :30 min. duration
Twenty eight single MCQs- 1/2 mark each : 14 marks

- Separate paper
- Single based response
- MCQ will cover whole syllabus

Section B : 2 hours duration

- Two long questions (LAQ) of 7 marks each : 14 marks
  (will contain some preclinical/paraclinical aspects)
- Three /five (SAQ)short notes -4 marks each : 12 marks

PRACTICAL : 40 marks

Clinical : One long case :30 marks :30 min. for taking case and 10 minutes for assessment

- Oral (viva voce) :10 marks:10 min. duration
  1.Dark Room 5 marks
  2.Instruments 5 marks

Marks of VIVA will be added to Theory marks
It is compulsory to obtain 50% marks in theory.
It is mandatory to obtain 50% marks in theory+viva/oral.

Course of OTORHINOLARYNGOLOGY

These guidelines are based on MCI recommendations.

Teaching has to be done keeping in mind the goals and objectives to be achieved by medical student

1. GOAL

The basic idea of undergraduate students teaching and training in otolaryngology
is that he /she should have acquired adequate knowledge and skills for optimally
Dealing with common disorders, emergencies in E.N.T .and basic principles of
impaired hearing rehabilitation.

2. OBJECTIVES

(a) KNOWLEDGE

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

(1) Describe the basic pathophysiology and common Ear, Nose, Throat diseases and emergencies.

(2) Adopt the rationale use of commonly used drugs,keeping in mind their side effects

(3) Suggest common investigative methods and their interpretation.

(b)SKILLS

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

1. Examine and diagnose common ear ,nose ,throat problems including premalignant and malignant diseases of head and neck.
2. Manage ear ,nose ,throat (E.N.T)problems at the first level of care and be able to refer whenever and wherever necessary.
3. Assist/do independently basic E.N.T. procedures like ear syringing, Ear dressings, nasal packing removal of foreign bodies from nose, ear, throat.
4. Assist in certain procedures like tracheostomy, endoscopies.
5. Conduct CPR (cardiopulmonary resuscitation).
6. Be able to use auroscope, nasal speculum, tongue depressor, tunning fork and head mirror.

INTEGRATION

The undergraduate training in E.N.T. will provide an integrated approach towards other disciplines especially neurosciences, ophthalmology and general surgery.

LEARNING METHODS

1. Total teaching hours : 70
2. Theory lectures : 48(4th,6th,7th term.)
3. Tutorials : 22(7th term)
4. Clinical Postings Two clinical postings of 4weeks
   First in 4th semester and second in 6th semester
   Bedside clinics – 8 weeks of three hours per day 144 hours

Course distribution and Teaching Programme

This is suggested programme and can vary at institute
Total 70 hours of teaching has to be done in ENT including Tutorials
Details of syllabus is given separately below after distribution as per semester

Theory lectures will be taken once a week and their distribution will be as below:

1. 4th term :16(nose and Paranasal sinuses/throat)
   a. NOSE AND P.N.S. : 10
   b. THROAT AND NECK: 6
2. 6th term :16 (Remaining topics of throat, head and neck and / ear)
   a. THROAT AND NECK: 8
   b. EAR : 8
3. 7 th term : 16 lectures
   a. RECENT ADVANCES AND OTHERS : 4
   b. EAR 12
   Total Theory lectures 48

Tutorials 7th Term 22 hours teaching

THEORY LECTURES: 4th, 6th, 7th term (one hour per week)

Topics	No.of lectures
Throat	
• Anatomy/physiology	1
• Diseases of buccal cavity	1
• Diseases of pharynx	2
• Tonsils and adenoids	2
• Pharyngeal tumours and related Topics (trismus, Plummer.Vinson Syndrome etc.)	1
• Anatomy /physiology/examination Methods/symptomatology of larynx	2
• Stridor /tracheostomy	2
• Laryngitis /laryngeal trauma/ Laryngeal paralysis/ foreign body larynx/ Bronchus, etc.	2
• Laryngeal tumours	1
Nose and paranasal sinuses	
• Anatomy /physiology/ exam.	
• Methods /symptomatology	2
• Diseases of ext. nose/cong. Conditions	1
• Trauma to nose/p.n.s/Foreign Body. / Rhinolith	1
• Epistaxis	1
• Diseases of nasal septum	1
• Rhinitis	1
• Nasal polyps/nasal allergy	1
• Sinusitis and its complications	1
• Tumours of nose and Para nasal sinuses	1

EAR

• Anatomy /physiology		2
• Methods/methods of examination	1	
• Cong.diseases/ ext.ear /middle ear		1
• Acute/chronic supp. otitis media Aetiology, clinical features and its Management/complications	6	
• Serous/adhesive otitis media	1	
• Mastoid/middle ear surgery		1
• Otosclerosis/tumours of ear	2	
• Facial paralysis/Meniere"s disease		2
• Tinnitus /ototoxicity	2	
• Deafness/hearing aids/rehabilitation Audiometry	2	

FINAL MBBS EXAMINATION IN OTORHINOLARYNGOLOGY

Evaluation

Internal assessment: 20 (Theory 10 +Practical 10)

- Marks of Internal Assessment should be sent to University before the commencement of Theory examination.
- Passing in internal assessment is essential for passing, as Internal assessment is separate head of passing. in examination.
- It will also be considered for grace marks as per existing rules
- Combined theory and practical of internal assessment will be considered for passing in internal assessment.
- Student will be allowed to appear for both theory and practical exam independent of marks obtained in internal assessment but he if fails in that head even after including the grace marks he will be declared **"Fail** in that Subject

Internal assessment in Theory -

1 **Examinations during semesters**: This will be carried out by conducting two theory examinations during 4th and 6th semesters (50 marks each). Total of 100 marks to be converted into 5 marks.(A/5)

2 Prelim examination : This shall be carried out during 7th semester.
One theory papers of 40 marks as per university examination.
Total of 40 marks to be converted into 5 marks. (B/5)

3 **Total marks of Internal assessment**- Theory will be addition of A and B.

Internal assessment in Practical

Examinations at end of Clinical postings:

There will be practical examination at the end of each clinical posting of ENT, 4th and 6th semester) Each examination will be of 50 marks.
Total of 2 examinations – 100 marks , will be converted to 5 marks.(C/5)

Prelim examination:

This will be conducted for 4 0 marks as per university pattern and marks will be converted to 5 (D/5).

Total marks of Internal assessment-of Practical will be addition of C and D.

Methods - Theory, Practical and Viva

Pattern of theory examination including distribution of marks, questions and time

1. There shall be one theory paper , carrying 40 marks
2. The paper will have two sections, A and B
3. The paper will be of 2.5 hours duration.
4. Section A will be MCQ in each paper. Section B will have to be written in separate answer sheets.
5. MCQ section A will be given to candidates at the beginning of the examination. After 30 minutes Section A will be collected. Section B of paper will then be handed over to candidates.

THEORY: 40 marks Duration: Two and half hours (2.5) hours

Section A :30 min. duration

1. Twenty eight MCQs- 1/2 mark each: 14 marks
2. Separate paper Single based response
3. MCQ will cover whole syllabus

Section B : 2 hours duration

1. Two long questions (LAQ) of 7 marks each : 14 marks
   (will contain some preclinical / paraclinical aspects)
2. Three /five (SAQ)short notes - 4 marks each : 12 marks

PRACTICAL : 40 marks

Clinical

1.One long case :20 marks :30 min. For examination and 10minutes for assessment
2.One short case :10 marks :15 min.for examination and 5 minutes for assessment

Oral (viva voce): 10 marks: 10 min. duration
(Instruments, x-rays, specimens, audiograms)

- **Marks of VIVA will be added to Theory marks**
- **It is compulsory to obtain 50% marks in theory.**
- **It is mandatory to obtain 50% marks in theory+viva/oral.**

OBSTETRICS & GYNAECOLOGY

These guidelines are based on MCI recommendations Teaching has to be done keeping in mind the goals and
objectives to be achieved by medical student

(i) GOAL

The broad goal of the teaching of undergraduate students in Obstetrics and Gynaecology is that he/she shall acquire understanding of anatomy, physiology and pathophysiology of the reproductive system & gain the ability to optimally manage common conditions affecting it.

(II) OBJECTIVES;

(A) KNOWLEDGE:

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

- Outline the anatomy, physiology and pathophysiology of the reproductive system and the common conditions affecting it.
- Detect normal pregnancy, labour puerperium and manage the problems he/she is likely to encounter therein,
- List the leading causes of maternal perinatal morbidity and mortality.
- Understand the principles of contraception and various techniques employed, methods of medical termination of pregnancy, sterilization and their complications.
- Identify the use, abuse and side effects of drugs in pregnancy, pre-menopausal and post-menopausal periods;
- Describe the national programme of maternal and child health and family welfare and their implementation at various levels.
- Identify common gynaecological diseases and describe principles of their management.
- State the indications, techniques and complications of surgeries like Caesarian Section, laparotomy, abdominal and vaginal hysterectomy, Fathergill‟s

operation and vacuum aspiration for Medical Termination of Pregnancy (MTP)

(B) SKILLS

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

1.Examine a pregnant woman; recognize high-risk pregnancies AND make appropriate referrals

2.conduct a normal delivery, recognize complications and provide postnatal care;

3. Resuscitate the newborn and recognize the congenital anomalies

4.advise a couple on the use of various available contraceptive devices and assist in insertion and removal of intra-uterine contraceptive devices.

5. Perform pelvic examination, diagnose and manage common gynaecological problems including early detection of genital malignancies;

6. Make a vaginal cytological smear, perform a post coital test and wet vaginal smear examination for Trichomonas vaginalis, Moniliasis and gram stain for gonorrhoea;

7.interpretation of data of investigations like biochemical, histopathological, radiological ultrasound etc.

(C) INTEGRATION

The student shall be able to integrate clinical skills with other disciplines and bring about coordination of family welfare programme for the national goal of population control.

(D) GENERAL GUIDELINES FOR TRAINING:

1. attendance of a maternity hospital or the maternity wards of a general hospital including

(i) antenatal care

the management of the puerperium and

a minimum period of 5 months in-patient and out-patient training including family welfare planning

2. of this period of clinical instruction, not less than one month shall be spent as a resident pupil in a maternity ward of a general hospital.
3. during this period, the student shall conduct at least 10 cases of labour under adequate supervision and assist 10 other cases.
4. a certificate showing the number of cases of labour attended by the student in the maternity hospital and/or patient homes respectively, shall be signed by a responsible medical officer on the staff of the hospital and shall state:
    (a) that the student has been present during the course of labour and personally conducted each case, making the necessary abdominal and other examinations under the supervision of the certifying officer who shall describe his official position.
    (b) That satisfactory written histories of the cases conducted including wherever possible antenatal and postnatal observations, were presented by the student and initialed by the supervising officer

LEARNING METHODS

Lectures, Tutorials bedside clinics and lecture cum demonstrations

Distribution of Teaching hours -

- Lectures - 130 hours
- Tutorials and revision - 170 hours
- Bedside clinics - 468 hours

DIDACTIC LECTURES

SEMESTER	HOURS/WEEK	TOTAL
4	1 / WEEK	17
6	3 / WEEK	48
7	3 / WEEK	48
8	1 / WEEK	17
TOTAL		130

B) CLINICAL DEMONSTRATIONS, PRACTICAL DEMONSTRATIONS, SEMINARS ETC.

SEMESTER	HOURS/WEEK	TOTAL
8	4 / WEEK	68
9	6 / WEEK	102
TOTAL		170

TOTAL TEACHING HOURS 300

Suggested lecture program

Distribution of syllabus in respective semesters

This is suggested programme and can vary at institute

Total 300 hours of teaching has to be done in OB GY including Tutorials

Details of syllabus is given separately below after distribution as per semester

*

4th Semester :OBSTETRICS :

1. Applied anatomy of female genital tract.
2. Development of genital tract
3. Physiology of menstruation
4. Puberty and menopause
5. Physiology of ovulation / conception / implantation.
6. Early development of human embryo.
7. Structure, function and anomalies of placenta.
8. Physiological changes during pregnancy / diagnosis of pregnancy.
9. Antenatal care, nutrition in pregnancy, detection of high-risk pregnancy.
10. Normal labour - Physiology, mechanism, clinical course and management, pain relief in labour.
11. Normal puerperium and breast-feeding.
12. Examination and care of newborn.
13. Contraception - Introduction and basic principles
14. Maternal mortality and morbidity, perinatal mortality and morbidity. National health Programme - safe-motherhood, reproductive and child health, social obstetrics.

6TH Semester: GYNAECOLOGY & FAMILY PLANNING

GYNAECOLOGY

1. Development of genital tract, congenital anomalies and clinical significance, Chromosomal abnormalities and intersex.
2. Physiology of Menstruation, Menstrual abnormalities - Amenorrhoea,Dysmenorrhea, Abnormal Uterine Bleeding, DUB.
3. Puberty and its disorders, Adolescent Gynaecological problems.
4. Menopause & H R T.
5. Infections of genital tract, Leucorrhoea, Pruritus vulvae, Vaginitis, Cervicitis, PID, Genital TB, Sexually transmitted infections including HIV infection.
6. Benign & Malignant tumours of the genital tract. Leiomyoma, carcinoma cervix, carcinoma endometrium,chorio carcinoma, ovarian tumors.Benign & Malignant Lesions of Vulva
7. Radiotherapy & Chemotherapy in Gynaecology.
8. Other gynaecological disorders - Adenomyosis, Endometriosis
9. Genital Prolapse, Genital Tract displacement,
10. Urinary disorders in Gynaecology, Perineal tears, Genital Fistulae, RVF & VVF.

FAMILY PLANNING :

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1. Demography and population Dynamics.

2. Contraception - Temporary methods.
   Permanent methods.

1. MTP Act and procedures of MTP in first & second trimester.

2. Emergency contraception. :

7TH Semester : OBSTETRICS & NEWBORN

1. Complications in early pregnancy.

Hyperemesis gravidarum / abortion / ectopic pregnancy / gestational trophoblastic disease.

2. Obstetrical complications during pregnancy.
   APH - Accidental hemorrhage. Placenta praevia.
3. Poly hydramnios / oligohydramnios, multifetal pregnancy.
4. Medical disorders in pregnancy.
   Anemia, Heart disease. Hypertensive disorder, PIH and Eclampsia, Diabetes, jaundice, pulmonary disease in pregnancy.
5. Infections in pregnancy
   Urinary tract diseases, sexually transmitted infections including HIV, malaria, TORCH etc.
6. Gynaecological and surgical conditions in pregnancy.
   Fibroid with pregnancy, ovarian tumours, acute abdomen, genital prolapse.
7. High risk pregnancy, pre-term labour, post term pregnancy, IUGR, IUFD, pregnancy wastages, Rh incompatibility, post caesarean pregnancy.
8. Induction of labour.
9. Abnormal position & presentation : Occipito posterior, Breech, Transverse, Face & Brow, Compound, Cord Presentation and prolapse.
10. Abnormal labour - abnormal uterine action, CPD.
    Obstructed labour, uterine rupture.
11. Third stage complications - Retained placenta, PPH, Shock, Uterine inversion, Fluid Embolism.
12. Puerperial Sepsis and Other Complications in puerperium.
13. Evaluation of Foetal Health during pregnancy and labour.
14. Drugs used in obstetric practice.
15. Operative procedures in Obstetrics : Caesarean Section, Instrumental Vaginal Delivery. Forceps, Vacuum,
16. Maternal Mortality and morbidity, Perinatal mortality and morbidity. National program - safe motherhood, reproductive and child health , Social Obstetrics.

NEW BORN :
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1. Examination and care of new born & low birth weight babies.

2. Asphyxia and neonatal resuscitation.

3. Diagnosis of early neonatal problems.

4. Birth injuries, jaundice, infection.

5. Anencephaly & Hydrocephalus and other Congenital Anomalies of fetus.

8TH Semester : PREVENTIVE ONCOLOGY

1. Preventive Oncology

2. Principles of gynaecological surgical procedures
3. Pre and post operative care in Gynaecology
4. Ultrasongraphy and Radiology, in Gynaecology
5. Endoscopy in in Gynaecology
6. Drugs and hormones in Gynaecology
7. Surgical procedures in obstetrics
8. Maternal mortality
9. Perinatal mortality
10. Recurrent pregnancy wastages
11. High risk pregnancy
12. Rural obstetrics
13. Drugs in Pregnancy
14. Drugs in obstetric practice

In addition, integrated teaching with other departments like anatomy, physiology, biochemistry, pathology, microbiology, Forensic Medicine and Preventive and Social medicine to be organized for selected topics.

LIST OF TOPICS INTEGRATED TEACHING: 8TH TERM

1. Development of genital tract - any malformations
   of genital tract and their clinical significance - Anatomy
2. Fetal physiology - fetal circulation Physiology
3. fetal malformations - genesis- Embryology
4. CIN Pathology
5. ARF Physiology Medicine
6. Coagulation failure Pathology Medicine
7. Diabetes, heart disease Medicine
8. USG Radiology
9. Infections in pregnancy Microbiology
10. Medico-legal aspects Forensic Medicine
11. Nutrition in pregnancy and lactation PSM
12. Evidence based obstetrics PSM
13. Drugs in pregnancy Pharmacology

SCHEME FOR EXAMINTION FOR FINAL MBBS

EXAMINATION IN OBSTETRICS AND GYNAECOLOGY

Methods – Internal assessment, Theory, Practical and Viva

- **Internal assessment: 40 (Theory 20 +Practical 20)**

  - Marks of Internal Assessment should be sent to University before the commencement of Theory examination.
  - Passing in internal assessment is essential for passing ,as Internal assessment is separate head of passing. in examination.
  - It will also be considered for grace marks as per existing rules
  - Combined theory and practical of internal assessment will be considered for passing in internal assessment.
  - Student will be allowed to appear for both theory and practical exam independent of marks obtained in internal assessment but he if fails in that head even after including the grace marks he will be declared **"Fail** in that Subject"

Internal assessment in Theory -

Examinations during semesters : This will be carried out by conducting two theory examinations during

6th and 8rth semesters (100 marks each). Total of 200 marks to be converted into 10 marks.(A/10)

Prelim examination : This shall be carried out during 9th semester. Two theory papers of 40 marks

each as per university examination. Total of 80 marks to be converted into 10 marks. (B/10)

Total marks of Internal assessment- Theory will be addition of A and B.

Internal assessment in Practical

Examinations at end of Clinical postings:

There will be practical examination at the end of each clinical posting of OBGY. Each examination will be of 50 marks. Total of all exams marks will be converted to 10 marks.(C/10)

Prelim examination:

This will be conducted for 60 marks as per university pattern and marks will be converted to 10 (D/10). Total marks of Internal assessment- Practical will be addition of C and D.

Evaluation **Methods - Theory, Practical and Viva**

Pattern of theory examination including distribution of marks, questions and time

Pattern of theory examination including distribution of marks

1. There shall be two theory papers - Paper I and II, carrying 40 marks each.
2. Each paper will have three sections, A , B and C. Each paper will be of 2.5 hours duration.
3. Section A will be MCQ in each paper. Section B will have SAQ and Section C LAQ answer sheet.
4. MCQ section A will be given to candidates at the beginning of the examination.
5. After 30 minutes Section A will be collected. Section B & C of paper will then be handed over to candidates

PAPER I

Topics - Obstetrics including social obstetrics and newborn care

.**Section A :30 min. duration**

- Twenty eight MCQs- /2 mark each : 14 marks
  - Single based response
- MCQ will cover whole syllabus of Paper I

Section B & C : 2 hours duration

Section B - Three /five (SAQ)short notes -4 marks each 12 marks

- **Section C** - Two long questions (LAQ) of 7 marks each 14 marks

(will contain some preclinical/Para clinical aspects)

PAPER II :

Topics :Gynaecology, Family Welfare and Demography -

Section A :30 min. duration

- Separate paper
- Twenty eight MCQs- 1/2 mark each 14 marks
- Single based response
- MCQ will cover whole syllabus of Paper II

Section B & C : 2 hours duration

Section B - Three /five (SAQ)short notes -4 marks each 12marks

- **Section C** - Two long questions (LAQ) of 7 marks each 14 marks
(will contain some preclinical/Para clinical aspects)

Scheme Of Practical & Oral Examination For Obstecrics & Gynaecology

PRACTICAL : Total – 60 Marks

1) LONG CASE : 40 Marks
   - A) History 10 Marks
   - B) Clinical Exam 10 Marks
   - C) Investigations & diagnosis 10 Marks
   - D) Management 10 Marks
2) SHORT CASE : 10 Marks
   - A) Presentation 05 Marks
   - B) Discussion 05 Marks
3) FAMILY PLANNING 10 Marks

Total : 60 Marks

4) **ORAL / VIVA** **20 Marks**
   - A) Obstetric Viva 10 Marks
   - B) Gynaecology Viva 10 Marks

TOTAL MARKS FOR PRACTICAL & ORAL (60+20) = 80 Marks

Marks of VIVA will be added to Theory marks

It is mandatory to obtain 50% marks in theory+viva/oral.

REVISED INTERNAL ASSESSMENT EXAMINATION SCHEME w.e.f. JUNE 2007 EXAMINATION

YEAR: - Third (I) MBBS

SN.	Subject	1st Term End			2nd Term End			Preliminary Examination		
		Semester	Theory	Practical	Semester	Theory	Practical	Semester	Theory	Practical
			(A)	(B)		(C)	(D)		(E)	(F)
1.	PSM	IV	60	20	VI	60	20	VII	120	40
2.	ophthalmology	VI	40	40	-	-	-	VII	40	40
3.	ENT	VI	40	40	-	-	-	VII	40	40

(B) Calculation Method:-

I) For PSM Theory Marks to be send to the University out of 20 $= \frac{(A)+(C)+(E)}{12} = \frac{60+60+120}{12} = \frac{240}{12} = 20$

II) For PSM Practical Marks to be send to the University out of 20 $= \frac{(B)+(D)+(F)}{4} = \frac{20+20+40}{4} = \frac{80}{4} = 20$

III) For Ophthalm & ENT Theory Marks to be send to the University out of 10 $= \frac{(A)+(C)+(E)}{8} = \frac{40+0+40}{8} = \frac{80}{8} = 10$

IV) For Ophthalm & ENT Practical Marks to be send to the University out of 10 $= \frac{(B)+(D)+(F)}{8} = \frac{40+0+40}{8} = \frac{80}{8} = 10$

REVISED INTERNAL ASSESSMENT EXAMINATION SCHEME w.e.f. JUNE 2007 EXAMINATION

YEAR: - Third (II) MBBS

SN.	Subject	1st Term End			2nd Term End			Preliminary Examination		
		Semester	Theory	Practical	Semester	Theory	Practical	Semester	Theory	Practical
			(A)	(B)		(C)	(D)		(E)	(F)
1.	Medicine	VI	60	60	VIII	60	60	IX	120	120
2.	Surgery	VI	60	60	VIII	60	60	IX	120	120
3.	Obstetrics/Gynecology	VI	40	40	VIII	40	40	IX	80	80
4.	Pediatrics	VI	20	20	VIII	20	20	IX	40	40

(B) Calculation Method:-

I) For Medicine & Surgery Theory Marks to be send to the University out of 30 $= \frac{(A)+(C)+(E)}{8} = \frac{60+60+120}{8} = \frac{240}{8} = 30$

II) For Medicine & Surgery Practical Marks to be send to the University out of 30 $= \frac{(B)+(D)+(F)}{8} = \frac{60+60+120}{8} = \frac{240}{8} = 30$

III) For Obstetrics/Gynecology Theory Marks to e send to the University out of 20 $= \frac{(A)+(C)+(E)}{8} = \frac{40+40+80}{8} = \frac{160}{8} = 20$

IV) For Obstetrics/Gynecology Practical Marks to be send to the University out of 20 $= \frac{(B)+(D)+(F)}{8} = \frac{40+40+80}{8} = \frac{160}{8} = 20$

V) For Pediatrics Theory Marks to be send to the University out of 10 $= \frac{(A)+(C)+(E)}{8} = \frac{20+20+40}{8} = \frac{80}{8} = 10$

VI) For Pediatrics Practical Marks to be send to the University out of 10 $= \frac{(B)+(D)+(F)}{8} = \frac{20+20+40}{8} = \frac{80}{8} = 10$

Note:- For Surgery and Orthopedics Scheme will be as follows, however these marks should be combined and send to the University out of 30.

SN.	Subject	1st Term End			2nd Term End			Preliminary Examination		
		Semester	Theory	Practical	Semester	Theory	Practical	Semester	Theory	Practical
			(A)	(B)		(C)	(D)		(E)	(F)
1.	Surgery	VI	48	48	VIII	48	48	IX	96	96
2.	Orthopedics	VI	12	12	VIII	12	12	IX	24	24

SECTION C :

INTERNSHIP PROGRAMME

Internship discipline related and curriculum in family welfare shall be according to norms laid down by Medical Council of India

SECTION D :

CURRICULAI FOR THE FAMILY WELFARE :

It shall be as per M.C.I. and is included in respective subjects.

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

P.G. CURRICULUM IN THE SUBJECT OF ANATOMY

A. Goal: To prepare the postgraduate student to become an exemplary teacher and a research scientist par excellence. To achieve this goal, the postgraduate student in Anatomy should be given an overall exposure to the subject, teaching methodologies and a sound grounding in research technologies.

B. Learning objectives: To achieve this goal, the following objectives must be fulfilled.

I. Cognitive domain: At the end of three years of postgraduate training the student should be able to

1. Describe the gross anatomy of the human body and correlate the knowledge of structure and function.
2. Describe the microanatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
3. Interpret the anatomical basis of symptoms and signs of clinical conditions, diagnostic procedures and treatment modalities.
4. Describe the developmental aspects of human body and interpret the developmental basis of various congenital anomalies.
5. Describe the neuroanatomy in its entirety and interpret the neuroanatomical basis of various clinical conditions.
6. Explain various aspects of genetics and describe genetic basis of disorders and principles of genetics counseling.
7. Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
8. Comprehend surface and living anatomy of the human body.
9. Relate forensic anatomy to the study with medicolegal aspects of bone in particular.
10. Explain the general principles of Anatomy Act and Transplant of Human Organ Act.
11. Explain the process of embalming.
12. Comprehend ethical aspects of biomedical research.
13. Comprehend the basis of disposal of biomedical waste.
14. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.

II. Psychomotor domain: At the end of the training, the student should be able to

1 Dissect and demonstrate various parts of adult human body

2. Demonstrate surface landmarks and living anatomy pertaining to mucle power, testing of nerves and palpating vessels.

3. Dissect and demonstrate various parts of a fetus .

4. Prepare tissue blocks ,perform H&E staining and is able to explain the principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson trichome, Verhoeff and Orcein stains .

5. Prepare and deliver lectures on various topics of human anatomy using audio-visual aids.

6. Operate computers so as to prepare documents, tables, charts and projection slides.

7. Identify research topics; carry out research and prepare a dissertation on a topic.
8. Present paper / poster in conferences.
9. Set undergraduate theory question paper, evaluate students and able to compute results including internal assessment marks.

III. Affective domain: At the end training the students should be able to

1. Co-operate with and react and respond in a cordial manner in his /her interaction with peers, superiors and subordinates.
2. Project a cheerful persona to the students.
3. Inspire the students to reach greater heights.
4. Arouse an element of curiosity and wonder in the minds of students.
5. Maintain a log book (Appendix - I).
6. Develop a healthy personality and a liking and respect for the subject.

C. COURSE DESCRIPTION

I. Eligibility: As per the guidelines of Medical Council of India and affiliated university.
II. Duration: 3 years
III. Desirable qualities: The student should have an aptitude for teaching and reasonable command over spoken and written English language

IV. Details of Training: **T**he P.G. student would be a resident in the department for 3 years. The time-plan and the proposed division of curriculum will be on the following lines.

1. FIRST YEAR OF RESIDENCY

- ***a.*** ***Orientation programme***- Institutional and departmental orientation including duties and responsibilities of a postgraduate student.
- ***b.*** ***Time Management*** - should be conducted within 3-6 month.
- ***c.*** ***Stress Management***- should be conducted within 3-6 months.
- ***d.*** **Gross anatomy**: Dissection of one whole human body and study of gross anatomy and acquisition of embalming skills.
- ***e.*** **Microanatomy**: Basic techniques in tissue processing, preparation of blocks, microtome sections and H & E and principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson's trichome, Verhoeff and Orcein stains.
- ***f.*** To attend all undergraduate lectures held in the department of Anatomy and all the lectures organized by the university by various PG teachers at different colleges.
- ***g.*** To present the topic for dissertation and the research design in front of a dissertation committee comprising of all senior and PG teachers in the department within first six months of registration. Thereafter periodic assessment of the progress of the dissertation (every 6 monthly) will be done by the concerned PG teacher and if required, by the dissertation committee.
- ***h.*** Get trained to use computer for teaching and use the internet
- ***i.*** Scan Anatomy journals and periodicals.
- ***j.*** **OPTIONAL yet DESIRABLE**: To attend all the orations/ seminars/ workshops held for the subject in the city colleges, attend general orations held in the institution and attend regional /national conferences.

k. **TEACHING**

i. 70 hours of small group teaching with at least l/3 of these under supervision by a senior teacher.
ii. **Microteaching sessions** are mandatory before small group teaching for each and every session.
iii. Should be exposed to evaluation techniques
iv. Exposure to Medical Education Technology Workshops
v. Presentation in Journal club.
vi. Presentation in Seminars and symposia.
vii. Should complete gross and microanatomy journals.

l. **RESEARCH**

i. Basic techniques like review of literature for a given topic and collection of data.
ii. Exposure to computer for various applications.

2. II YEAR OF RESIDENCY

a. SPECIAL POSTING

Interaction with other pre, para and clinical specialties so as to prime the mind of the P.G. students in Anatomy to the growing needs of application of anatomical knowledge to other branches of medicine .This will be achieved through **horizontal and vertical integration**.

Posting

i. Horizontal Integration

(Selected topics should be taken as PG lectures by the concerned departments.)

Physiology and Biochemistry

ii. Vertical integration (Lectures to be arranged by the various departments for PG students)

Radiology, Surgery, Orthopaedics, Medicine, Obs &Gynac, Genetic Laboratory Pathology, Microbiology& Forensic.

(Posting in pathology - to gain knowledge about Frozen-sections, use of cryostat. special immunohistochemical techniques and immunological techniques and morbid and medicolegal anatomy from postmortem.)

During vacation.

b. RESEARCH

Starting the work on thesis by the beginning of second year of residency with the aim to complete the data collection & analysis by the end of second year.

c. TEACHING

i. From middle of IInd year, the P.G. students in Anatomy should be capable of giving lectures for the entire batch of students.
ii. Start teaching Embryology and Genetics in small groups after microteaching Sessions.
iii. Should be conversant with the use of various audiovisual aids

d. Presentation in Journal Club

e. Presentation in Seminars / Symposia at the departmental and institutional level

f. FETAL DISSECTION: Should have dissected at least one fetus

3. III YEAR OF RESIDENCY

a. RESEARCH

i. Completion of Dissertation
ii. Presentation of paper in conference (optional but desirable)
iii. Writing articles for publication

b. TEACHING

i. Full fledged lectures, lecture-demonstration, small group teaching
ii. Seminars / Symposia
iii. Journal Club

c. DISSECTION - Exercise in window-dissection of various regions.

V. SYLLABUS

1. Postgraduate curriculum shall include the entire undergraduate curriculum as spelt out below (Appendix III) with modifications as under:
Levels 1 & 2 of U.G. curriculum will become Level 1 of P.G curriculum.
Levels 3 of U.G curriculum will become Level 2 of P.G. Curriculum
Levels.3 of P.G. Curriculum will include current trend and recent advances in the Concerned topic and historical aspects.

2. Additional topics to be covered

a. History of anatomy
b. Embalming techniques
c. Microanatomy
   i. Principles and types of Electron microscopy: TEM, SEM
   ii. Identification of various cell organelles and their EM appearance

a. Embryology: Stem Cell.
b. Genetics : a)Exposure to various DNA technologies, including cell culture, Karyotyping, Polymerase Chain Reaction (PCR) and Fluorescent-in-Situ-Hybridization (FISH)
c. Neuroanatomy: Limbic system and Reticular Systems - Details
d. Clinical Anatomy: Application of anatomical knowledge to explain the anatomical basis of various clinical symptoms and signs, diagnostic procedures and treatment modalities
e. imaging Modalities
   i. Radiology
   ii. Ultrasonography (USG): - Principles of USG, Orientation of anatomical organs, in various USG plates. Structures as seen in 2-D echocardiography axes used and orientation of heart in various axes in 2-D echocardiography.
   iii. PET scan: Principles.

f. Forensic Anatomy: Estimation of age and sex
   i. With reference to bones including ossification
   ii. With reference to radiology pictures
g. Cross-sectional Anatomy and its correlation to C.T. scan images and MRI images
h. Comparative Vertebrate Anatomy: Basic outline
l. Anthropology: Basic principles and anthropometry

D. EVALUATION

I. FORMATIVE: Internal assessment based on

1. Teaching: to be evaluated based on a given proforma (Appendix II)
2. Dissection
3. Log Book
4. Journals-Microanatomy and Gross anatomy
5. Examinations

a. Theory:

i. At the end of first year, two papers on general anatomy, gross anatomy, and microanatomy of the

* Upper half of the body: Head (without neuroanatomy), neck, upper limb, thorax and general anatomy.

** Lower half of the body: Diaphragm (Thoracoabdominal), abodomen, lower limb and general microantomy.

ii. At the end of second year, two papers on

* Embryology and Genetics (Including a. i. **).

** Neuroanatomy and applied anatomy (Including a. i. *)

30% of the paper will be constituted by multiple choice questions of the following types: Single best response, multiple true false, multiple completion and assertion reason.

iii. At the end of third year, preliminary examination as per the university examination

b. Practicals and viva

i. At the end of first year,

* Prepare a tissue block, stain and discuss. 10 microanatomy spots.

** Window dissection and viva on Osteology and soft parts.

ii. At the end of second year

* Viva on embryology models (Including b. i. *)

** Viva on brain (Including a. i. **)

iii. At the end of third year, preliminary examination as per the university examination.

II. SUMMATIVE

1. By points system – The following point scale should be strictly adhered to Points in fractions should not be assigned.

Point System	Remarks
0(Zero)	Very poor
1(one)	Poor
2(Two)	Below Average
3(Three)	Average
4(Four)	Good
5(Five)	Very Good
6(Six)	Outstanding

a. Theory: 4 papers (***As per Direction No. 01/2008 dtd. 26/05/2008 & practical scheme is as per revised practical marksheet.)***

E. LIST OF RECOMMENDED BOOKS

I. Textbooks:

1. Cunningham's Manual of Practical Anatomy - Latest editions of volumes I, II, III
2. Regional & Applied Anatomy - R. J. Last
3. Clinical Anatomy for Medical Students - Richard Snell
4. Synopsis of Surgical Anatomy - McGregor
5. Functional Histology - Wheater, Burkit,
6. Langman's Medical Embryology
7. Embryology by Keith Moore
8. Clinical Neuroanatomy – Snell
9. The Human Nervous System - Murray Barr, John Kieman
10. Genetics by Emery
11. Human Genetics - S.D. Gangane
12. Essential of Human Genetics by Bhatnagar, Kothari and Mehta
13. Cross-sectional anatomy by Bo, Meehan and Kruger
14. Principles of General anatomy by A. K. Dutta
15. Comparative anatomy A.S. Romer.

II. Reference Books:

1. Gray's Anatomy
2. Clinical Anatomy _ NMS Series
3. Anatomy for Surgeons - Henry Hollinshead
4. Surgical Anatomy - Harold Ellis
5. Bailey's Textbook of Microscopic Anatomy
6. Embryology - Boyd & Mossman
7. Clinically oriented anatomy _ Keith Moore
8. Atlas of Human Histology – Di fiore
9. Tissues of the Human Body by Le Gros Clerk
10. Genetics by Thompson and Thompson
11. History of Anatomy - Charles Singer
12. History of Anatomy Indian Medicine - Kutumbiah
13. Dorlands Medical Dictionary

III. Journals:

1. Journal of Clinical Anatomy
2. Surgical & Radiological Anatomy
3. Journal of Anatomy
4. Development Dynamics
5. Anatomical Record
6. Journal of Anatomical Society of India

Appendix I (LOG BOOK)- Not yet FINALIZED

Log book details

Sr.No.	Date	Time	Topic /Activity	Teacher	Remarks and sign of PG teacher

*Topic – Topic of lecture/Demonstration attended
Topic of Lecture/Demonstration taught

*Activity- Dissection – Part

- Microanatomy- Practical
- Special posting- Department

** Fortnightly submission of the logbook to the concerned PG teacher and signature obtained

Appendix II

Direction- Please tick the statement, which most closely corresponds to your observation.

Name of the teacher : _____

Topic : _____

Date : _____

SrNo	Skill		Teacher Action	Yes	To some extent	No
1	Set Induction	a)	Aroused interest at the beginning			
		b)	Specified objectives of presentation			
2	Planning	a)	Organised material in a logical sequence			
		b)	Used relevant content matter			
3	Presentation	a)	Fluency in language			
		b)	Used non verbal cues, eye contact etc			
4	Interaction	a)	Allowed questions from students			
		b)	Asked Questions			
		c)	Rewarded pupil effort			
		d)	Clarified doubts			
5	Use of A V aids	a)	Used proper A V aids			
		b)	Used the aid effectively			
6	Summarization	a)	Summarized the important points at the end			
		b)	Checked that all the students understood the Points			
		c)	Lesson on the whole was effective			
7	Any suggestions for the speaker to improve the Teaching/earning exercise					

TO BE CIRCULATED TO COLLEGES CONDUCTING PG COURSE
CURRICULUM

M. D. HUMAN PHYSILOGY

POST GRADUATE TEACHING / TRAINING COURSE FOR M.D.DEGREE

I. GOAL

The aim of the course is to prepare P.G. Student in the subject of Human Physiology who shall

1) Teach and train future under-graduate & Post-graduate medical students in Human Physiology in Medical Colleges and Research Institutions.

2) Carry out & guide research & contribute to advancement of the subject.

3) Organise & manage administrative responsibilities for routine day to day departmental work.

LEARNING OBJECTIVES

At the end of training course a P.G. student have thorough knowledge of the body with respect to

1) Cognitive domain

All the systems of the body should be studied with respect to –

a) Historical aspect
b) Evolution & development
c) Comparative physiology
d) Structure – gross & electron microscopic & functions at cellular level.
e) Qualitative & quantitive aspects
f) Regulating mechanisms.
g) Variations in physiological & pathological conditions
h) Applied physiology
i) Recent advances.

2) Psychomotor domain
P.G.Students should be able –
a) to perform human & animal experiments, Haematology experiments & experiments based on biophysical principles.
b) To acquire history taking & clinical examination skills.

3) Affective domain

a) The P.G.Students should develop communication skills to interact with students, colleagues, superiors & other staff members.
b) They should be able to work as a member of a team to carry out teaching as well as research activities.
c) They should have right attitude towards teaching profession.

II. COURSE DISCRIPTION

1) Eligibility M.B.B.S.
2) Selection shall be through a competitive written examination of the objective variety conducted by state entrance board.
3) Duration of course shall be of 3 Years.

COURSE CONTENT

Since the students would be working in the department for 3 years, the time plan & proposed division of course content will be on the following lines.

1st Year :

1) Theory :

- To attend the U.G. lectures and study in detail the following topics:

Topics – General physiology, Environmental physiology, Nerve, Muscle, Blood, Endorcrines, Reproduction, Alimentry system.

- To attend P.G. lectures at other P.G.Centres.

2) Practicals –

- To attend the practicals & demonstrations tought by senior teachers for U.G.Students.

1st term – Haematology, Nerve, Muscle, Heart.
2nd term – clinical examination.

- To learn basic techniques & instruments used for U.G. Practicals.
- Micro teaching sessions for practicals.

3) To learn evaluation techniques.

4) Research :

- To attend Jornal club / seminars.
- Vists to library to get aquainted with scientific journals.
- 2nd half of 1st year – review of literature for topic of thesis.

5) Exposure to Medical Education Technology Workshops.

2nd Year :

1) Theory :

- To attend the U.G. lectures and study in detail the following topics.

Topics – Renal physiology Cardio Vascular system.
Respiratory system, Exercise physiology, Special senses, Central Nervous System.

- To attend the P.G. lectures at other P.G.Centres.

2) Practicals :

- To perform amphibian & mammalian experiments, inclusive of basic techniques of handling of laboratory animals, anaesthia, dissection & instruments.

3) To learn in detail the teaching learning methods and the methods of evaluation in practicals & theory.

4) Teaching :

- Small group teaching in practicals / demonstrations.
- Should learn to use audiovisual aids.

5) Research :

- To carryout thesis work & to learn basic topics in statistics.

6) To attend meeting organised by clinical departments.
7) To attend local and national conferences.

3rd Year :

1) Research :

- Completion & submission of thesis in first 6 Months
- Writing articles for publication.

2) Teaching :

- To teach all practicals to U.G. Students.
- To conduct microteaching sessions for 1st year P.G. Students.
- To teach theory topics in small groups for U.G. Students.

3) Practicals :

- To carry animal experiments independently.

THEORY TOPICS :

In Addition to U.G. Syllabus

1) General Physiology :

- Biological membranes with details of membrane receptors.
- Physiology of growth & senescence.

2) Environmental Physiology :

- Physiology of deep sea diving.
- Space physiology
- High altitude physiology.
- Temp. regulation-Hypothermia, Hyperthermia.

3) Nerve :

- Experimental techniques to study bioelectrical phenomena (Voltage clamp technique, cathod ray oscilloscope, S.D.Curve, nerve, conduction studies)

4) Muscle :

- E. M. G. details.
- Smooth muscle.
- Pathophysiology of muscle disorders.

5) Blood :

- Immunity – details.
- Plasmin system
- Tissue typing.

6) Cardio Vascular System :

- Echocardigraphy & vector cardiography.
- Stress test.
- Cardiac catheterisation & other invasive procedures.
- Flowmeters.

7) Repiratory sustem :

- Lung function tests – details
- Blood Gas analysis.
- Hyperberic oxygen.

8) Endocrines :

- Radio immuno Eassay.

9) Reproductive System :

- Invitro Fertilization.
- Contraceptives – details
- Neonatal & Foetal physiology.

10) Alimentary System :

- Gastro intestinal hormones – details
- Gastro intestinal motility – details
- Absorption of nutrients.
- Renal Physiology :

- Artificial Kidney
- Acid – base balance – details
- Cystometry.

11) Central Nervous System :

- Higher function

(Speech, Memmory, Learning, Behavioural physiology, sleep & wakefulness.)

- Voluntary movements.
- Details of the following topics covering physiological anatomy, connection – Intrinsic, Extrinsic, Methods of study of functions with diagnostic techniques, functions.

i) Cerebral Cortex
ii) Basal ganglia
iii) Cerebellum
iv) Reticular formation.
v) Thalamus
vi) Hypothalamus
vii) A.N.S.
viii) Limbic System.

12) Special Senses :

- Audiometry
- Retinoscopy, Fundoscopy, Nystagmography
- Electrophysiology of retina, chochlea.

13) Exercise Physiology :

- Concept of health fitness
- Physical fitness, its components & evaluation.
- Adaptations due to prolonged conditioning.

14) Nutrition :

- Relationship of diet & diseases.

PRACTICALS :

In Addition to U.G. Syllabus

Mammalian experiments :

1) Recording of blood pressure & respiration in dog.

- Effects of Vagal stimulation and ablation.
- Effects of Asphyxia
- Actions of Adrenalin
- Actions of Acetylcholine
- Clamping of carotid arteries
- Circulatiory shock.

2) Perfusion of mammalian heart.

- Effects of Various factors.

3) Recording of smooth muscle activities & effects of various factors.

II. TEACHING LEARNING METHODS :

The teaching learning activities would consists of

1) Attending U.G. lectures.
2) Attending P.G. lectures.
3) Microteaching sessions.
4) Journal clubs moderated by teachers.
5) Seminars, symposia, panel discussion of suitable topics moderated by teachers.
6) Lectures & Practicals prepared & presented by students under supervision.
7) Attend & participate in conferences, workshops & share knowledge & experiences with others.
8) Visits to various clinical departments to gain the knowledge of various techniques used to study the functions of various systems.

Recommended reading :

Textbooks of physiology –

- Guyton
- Best & Taylor
- S. Wright
- Ganong
- Berne & Levy
- NMS Physiology
- Starling
- Monographs.

Journals –

- Annual review of physiology
- American J. of Phy.
- Physiological review
- Canadian J. of Phy. & Pharamcology
- Indian J. of Phy. & Pharm. & other related clinical Journals.

IV EVALUATION : (***As per Direction No. 01/2008 dtd. 26/05/2008 & practical scheme is as per revised practical marksheet.)***

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES,NASHIK.

SYLLABUS FOR M.D. BIOCHEMISTRY

May 2006 ONWARDS.

Goal :

The broad goal of teaching & training of postgraduate students in Medical Biochemistry is to make them understand the scientific basics of the life processes at the molecular level and to orient them towards the applications of the knowledge acquired in solving clinical problems. At the end of his/her training, the student shall be able to take up a career in Teaching Institution or in diagnostic laboratory or in Research.

OBJECTIVES:

A) KNOWLEDGE:

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

1) Explain the structure, function & inter-relationships of bimolecules & their deviation from normal & their consequences.
2) Summarize the fundamental aspects of enzymology & alteration on enzymatic activity with reference to clinical applications.
3) Explain the molecular & biochemical basis of inherited disorders with their associated sequel.
4) Explain the mechanisms involved in maintenance of body fluids & pH homeostasis.
5) Integrate the various aspects of metabolism & their regulatory pathways.
6) Outline the molecular mechanisms of gene expression & regulation, the principles of genetic engineering & their application in medicine.
7) Explain the molecular concept of body defenses & their applications in medicine
8) Explain the biochemical basis of environmental health hazards, biochemical basis of cancer & Carcinogenesis.

9) Familiarize with the principles of various conventional & specialized laboratory investigations & instrumentation analysis and interpretation of a given data.
10) Effectively organize & supervise diagnostic laboratory to ensure quality control/Assurances.

B) SKILLLS:

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

1) Make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening & diagnosis.
2) Analyze & interpret investigative data.
3) Demonstrate the skills of solving scientific & clinical problems and decision-making.
4) Develop skills as a self-directed learner, recognize continuing educational needs, select & use appropriate learning resources.
5) Demonstrate competence in basic concept of research methodology & be able to critically analyze relevant published research literature.

C) INTEGRATION:

The knowledge acquired in Biochemistry shall help the students to integrate molecular event with structure & function of the human body in health & disease.

1) Eligibility – Recognized degree of M.B.B.S. or its equivalent recognized qualification.
2) Duration of course shall be of 3 (Three) years from the date of admission.

PERIOD OF TRAINING:

Duration of the course shall be of three years (six academic terms) from the date of admission.

1) The students will attend all U.G. lectures and practicals and will work in central clinical laboratory of the hospital and do all the routine, emergency and special investigations.

2) The students will be posted in the Dept. of Pathology & Microbiology for a period of one month each to learn hematology ,Blood grouping & serology etc.
3) The students will be posted in the Dept. of Medicine to study the Clinical cases for a period of 3 months. However, they will attend P.G. activities and duties in in the Department of Biochemistry & Central Clinical Laboratory of the Hospital.
4) Students will paticipate in P.G. activities ; viz, Seminars ,Group discussion, Journal club etc. and will attend P.G. Lecture
5) Students should learn basic knowledge of computers and medical statistics.
6) Training in Medical audit ,management , health economics , health information system,basics of medical statistics & bioinformatics , exposure to human behavioural studies & medical ethics shall be imparted to the P.G. students.
7) They will be required to participate in the teaching & traning programmes of U.G. students.
8) They will be granted a term provided they will put 80% attendance during the academic term.

SCHEME OF EXAMINATION

(*As per Direction No. 01/2008 dtd. 26/05/2008)*

Syllabus For M.D. Biochemistry

Paper I (General Biochemistry and Instrumentation)

1) History & scope of Biochemistry.
2) Cell structure & biochemical functions .Membrane structure & functions.
3) Transport through biological cell membrane
4) Chemistry & biological importance of carbohydrates ,proteins & amino acids, lipids , nucleic acids, porphyrins glycosaminoglycans, glycoproteins.
5) Chemistry of blood & hemoglobin, plasma proteins,Blood coagulation.
6) Enzymes & coenzymes –chemistry ,nomenclature properties & mode of action of enzymes,Enzyme kinetics, factors affecting enzyme activity,enzyme inhibitions,applications of enzymes & isoenzymes.
7) Bioenergetics & biological oxidation-General concept of oxidation & reduction.Electron transport Chain (ETC)- functioning of ETC & inhibitors of ETC, Oxidative phosphorylation,Uncouplers and theories of Biological oxidation & oxidative phosphorylation.
8) Principle, working & applications of, a) Colorimetry b)Spectrophotometry c)Flame photometry d) Flurometry e)Atomic absorption spectroscopy g) ultra centrifugation
9) Principle, types& applications of , a)Electrophoresis b)chromatography
10) Autoanalyzers, Blood gas analyzers
11) Automation in clinical chemistry
12) pH, electrodes & methods of pH determination.
13) Basics of Mass spectroscopy, Nuclear Magnetic Resonance, chemiluminescence and Electron - microscopy
14) Environmental Biochemistry – Definition, importance of pollution free & ecofriendly environment, exposure to cold stress, exposure to heat , air pollution water pollution & food pollution
15) Immunochemistry – The Immune system, Immunoglobins, antigen –antibody mediated immunity, mononuclear phagocytes –macrophages ,elements of clinical immunity.

Paper- II: METABOLISM AND NUTRITION

1) Digestion & absorption from gastrointestinal tract.
2) Intermediary metabolism, metabolism of Carbohydrates, Lipids, Proteins , and Amino acids , Nucleic acids,Hemoglobin, metabolic control, energy production & regulation.
3) Metabolic interrelationships & regulatory mechanisms
4) Metabolic changes during starvation
5) Energy metabolism-Calorimetry, BMR- its determination & factors affecting it, SDA of food.
6) Macro & micro –elements & their role in health & disease, water metabolism & its regulation.
7) Vitamins- chemistry, biological importance , deficiency manifestations & recommended daily allowance.
8) Principles of Nutrition –Balanced diet & its planning, Nutritive importance of various food sources, Calorific value of food , toxins & additives , Obesity, Protein Energy Malnutrition (PEM)- Kwashirkor & Marasmus .
9) Diet in management of chronic diseases viz, Diabetes mellitus, Coronary artery disease, Renal disorders, Cancer, Hypertension, Anemia ,Rickets & Osteomalacia.
10) Diet for over weight person, pregnant woman and during lactation

PAPER –III CLINICAL BIOCHEMISTRY

1) Chemistry, composition & functions of lymph, CSF, ascitic fluid, pleural fluid, & synovial fluid.
2) Urine formation, excretion & urine analysis.
3) Composition, chemistry & functions of specialized tissues like muscle, bone, nerve, connective tissue, & brain adipose tissue.
4) Chemistry of respiration & acid base balance& imbalance
5) Hormones-: Communication among cells & tissues. Hormone- General mechanism of action of hormones, chemistry, functions, synthesis of steroid hormones , polypeptide hormones, & thyroid hormones. Chemistry & functions of hormones of pancreas, and parathyroid. Local hormones. Clinical disorders of hormones, Hormone receptors.
6) Biochemistry of Diabetes mellitus, Atherosclerosis, Fatty liver, and obesity.
7) Organ function tests
   a) Liver function tests
   b) Kidney function tests
   c) Thyroid function tests.
   d) Adrenal function tests
   e) Pancreatic function tests
   f) Gastric function tests
8) Radioisotopes & their clinical applications.
9) Biochemistry of aging.
10) Neurochemistry in Health & Disease.
11) Biochemical changes in pregnancy & lactation.
12) Water & electrolytes balance & imbalance.
13) Total Quality Management of Laboratories.
   a) Internal Quality control
   b) External Quality control
   c) Accreditation of laboratories
14) Basics of Medical statistics
15) Inborn errors of metabolism.
16) Biotrasformations of Xenobiotics
17) Basic concepts of Biochemical Defense Mechanisms

Paper IV

MOLECULAR BIOLOGY , BIOTECHNOLOGY & RECENT ADVANCES IN CLINICAL BIOCHEMISTRY

1) Central dogma, genetic code, protein biosynthesis & its regulation.
2) DNA: structure, functions, replications, Mutation & repair of DNA, Sequencing of nucleotides in DNA, Mitochondrial DNA, and DNA recombination.
3) RNA: composition, types, structure & functions.
4) Role of Nucleic acids in diagnosis of Molecular diseases & infectious diseases
5) Mitochondrial DNA & diseases.
6) Human Genome Project.
7) Genes & chromosomes, Gene mapping, Chromosome walking etc.
8)Gene expression & gene amplification & gene regulation, Oncogenes, & biochemistry of cancer.
9) Genetic engineering: Recombinant DNA technology & its applications. Restriction endonucleases, Plasmids, Cosmids, Gene cloning, Gene libraries.
10) Basics techniques in genetic engineering.
    a) Isolation & purification of DNA, Methods of DNA assay.
    b) Blotting techniques – Southern, Northern & Western blotting.
    c) Polymerase chain reaction & its applications.
    d) Ligase chain reaction & its applications.
11) Tumor markers & growth factors
12) Biotechnology: Gene therapy, Nucleic acid hybridization, and DNA probes, Microarray of gene probes.
13) Genomics and Proteomics
14) Medical Bioinformatics
15) Lipid peroxidation, free radicals & antioxidants, Nitric oxide formation & its metabolism & its role in Medicine.
16.)Biochemistry of AIDS
17.)Genetic control of Immunity
18.)Research Methodology & Medical ethics.

SYLLABUS FOR PRACTICALS :

1) All undergraduate practicals and routine emergency and special investigations carried out in central clinical laboratory of the hospital,which are useful for diagnosis and prognosis of the disease.
2) Total Quality Management of Laboratory
   a)Specimen collection , handling & storage of sample.
   b) Methods of standardization & calibration.
   c) Methods of quality control & assessment.
3) Fractionation & Identification of,

   a) Amino acids b) Sugar c) Proteins d) Lipoproteins by

   i) Thin Layer Chromatography ii) Paper chromatography (circular, Uni-dimensional& two dimentional iii) Gel electrophoresis- agarose, starch, & Polyacrylamide Gel Electrophoresis iv) paper electrophoresis & cellulose acetate paper electrophoresis .

4) a) Estimation of total activity of following enzymes .
   i. LDH & seperation of its isoenzymes by Polyacryamide gel electrophoresis, Cellulose acetate electrophoresis & quantitation by densitometry.
   ii. AST(GOT)
   iii. ALT(GPT)
   iv. Alkaline phosphatase
   v. Acid phosphatase
   vi. Amylase
   vii. Creatine kinase its Isoenzymes

   b) Enzyme kinetics and Determination of Km value and effect of pH substrate concentration & temperature on Enzyme activity.
   c) Endocrinology: Estimation of Hormones.

5) Isolation of DNA and PCR technique.

6) Estimation of serum lipid profile .

i) Serum total cholesterol

ii) Serum HDL cholesterol

iii) Serum VLDL & LDL

iv) Serum Triglycerides

v) Serum Phopholipids

7) Estimation of Fe & Total Iron Binding capacity,& ferritin

8) Estimation of Glycosylated Hb.

9) Body fluid analysis - Urine
- CSF
- Ascitic fluid
- Pleural fluid

10) Estimation of VMA.

11) Estimation of Na, K & Lithium by Flame photometer.

Dissertation:

The dissertation is compulsory for candidates registered for P.G. degree & should include candidates own work under a supervisor , qualified for the purpose & recognized as a P.G. teacher by the University. The subject of dissertation along with synopsis (about 200 words) signed by P.G. teacher, H.O.D.& Head of the Institution will be submitted to the University. Ethics Committee of the Institution must approve the topic of dissertation.

Completed dissertation will be submitted to the University in the 5th term, that is, 6 month before the date of final examination.

Books recomonded:

1)Bichemistry Ed Lubert Stryer . W.H. Freeman & company ,New york.

2)Principles of Biochemistry . Ed. Lehninger , Nelson & Cox .
CBS publishers & distributers .

3)Harpers Biochemistry Ed. R.K. Murray , D.K. Granner, P.A. Mayes & V.W.Rodwell.
Appleton & Lange ,Stanford ,Conneticut.

4)Textbook of Biochemistry with clinical correlations. Ed. Thomas M. Devlin.
Wiley Liss Publishers.

5)Genes VI Ed. Benjamin Lewin .
Oxford University press.

6) Tietz Textbook of Clinical chemistry, Ed. Burtis & Ashwood W.B.
Saunders Company.

7)Principles & techniques of practical Biochemistry Ed. Keith Wilson & John Walker
Cambridge University press .

8)Biochemistry Ed. Donald Voet & Judith G. Voet
John Wiley & Sons ,Inc.

9)Molecular cloning –A laboratory Manual .J. Sambrook , E.F. Fritsch & T.Maniatis
Cold Spring Harbor Laboratory Press.

10)Molecular cell Biology , H.Lodish,A. Berk, S.L. Zipursky, P. Matsudaira ,D. Baltimore , J.Darnell.

11)Bio-technology 1st edition . U. Satyanarayan.
Books & Allied Publisher (p) Ltd.Kolkatta.

M.D. IN Pathology

CURRICULUM FOR POST GRADUATE COURSE IN PATHOLOGY

M.D. IN PATHOLOGY

GOAL :

The goal of postgraduate medical education shall be to produce competent specialist.

(i) Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy;

(ii) Who shall have mastered most of the competencies, retaining to the speciality, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.

(iii) Who shall be aware of contemporary advances and developments in the discipline concerned.

(iv) Who shall have acquired a spirit of scientific inquiry and oriented to the principles of research methodology and epidemiology ;and

(v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

OBJECTIVES :

At the end of the course a candidate must be able to

(i) Understand and explain about the factors in causation of disease.

(ii) Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.

(iii) Understand and explain the basis of evolution of clinical signs and symptoms.

(iv) Should be able to perform procedures designated for laboratory detection of diseases. Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.

(v) Should be able to recognize and report morphological changes in cells, tissues and organs.

(vi) Should be able to plan, perform and report specific research projects.

(vii) Should be able to perform clinical autopsy and present CPC (Clinico Pathological Correlation)

METHODS OF TRAINING

Duration of course – 3 years.

1.On job training

- Histopathology including techniques and reporting
- Cytology including FNAC ,fluid cytology ,exfoliative cytology- techniques and reporting
- Haematology including blood banking and transfusion medicine- techniques and reporting
- Clinical pathology- techniques and reporting
- Museum techniques
- Autopsy techniques and interpretation
- Serology- techniques and reporting
- Handling of hazardous material
- Handling, maintenance and calibration of instruments used in laboratory
- Undergraduate teaching

2.P.G. Teaching sessions

- Journal review
- Subject seminar
- Grossing discussions for autopsies and surgical material
- Slide seminar including histopathology ,haematology, and cytopathology
- Clinical case- group discussion
- Interdepartmental seminars

Post graduate students should be encouraged to attend CME, Workshops, Conferences & present papers.

TEACHING /LEARNING CONTENT

A. THEORY

I BASIC SCIENCES

1. Anatomy/histology of all structures in human body/organs
2. Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines
3. Genetics-Fundamental / applied aspects
4. Biostatistics
5. Biomedical ethics-ethical issues related to Medical practice and research

II PATHOLOGY

1. Historical aspects
2. General pathology
3. Systemic pathology
4. Haematology
5. Blood banking and Transfusion Medicine
6. Cytopathology
7. Clinical Pathology
8. Medical autopsy: Techniques and interpretation
9. Recent advances in all fields ,related to Pathology
10. Organization of laboratory including quality control

III CLINICAL BIOCHEMISTRY

Routine biochemical investigations and various organ function tests i.e. LFT ,RFT etc.

B. PRACTICAL

Proficiency of technological methods should include the following:

1. Fields in which high degree of professional competence and theorotical knowledge is expected:-

a) Gross pathology and histopathology
b) Haematology
c) Cytopathology
d) Clinical pathology and Blood banking

2. Fields in which student is expected to achieve reasonable working knowledge and skills to be able to run laboratory services independently

a) Clinical chemistry
b) Serology

3. Fields in which student is expected to achieve general acquaintance of techniques to understand and interpret data

a) Immunopathology
b) Histochemistry
c) Immunohistochemistry
d) Cytogenetics
e) Molecular biology
f) Medical statistics

POSTING SCHEDULE:

1) Histopathology and Autopsy	:-	15 months
2) Clinical pathology Haematology Cytopathology Blood Bank	:-	15 months
3) Biochemistry	: -	1 month
4) Serology	:-	15 days
5) Museum	:-	15 days
6) Revision in all sections	:-	4 months
TOTAL		36 months

RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS

BOOKS:

1 Cotran, Kumar, Collins. Robin's Pathologic Basis of Disease, published by W.B. Saunders & Company.

2.Ivan Damjanov, James Linder. Anderson's Pathology, published by C.V. Mosby Company.

3. J. B. Walter, M.S. Israel. General Pathology, published by Churchill Livingstone.

4. Emeritus W.ST. Symmers Systemic Pathology, published by Churchill Livingstone.

5. Juan Rosai, Ackerman's Surgical Pathology, published by C.V. Mosby Company.

6. Leopold G Koss, Diagnostic cytology and its histopathologic basis published by J.B. Lippincott Company.

7. Marluce Bibbo, Comprehensive cytopathology, published by W.B Saunders Company

8. Winnifred Grey, Diagnostic cytopathology, published by Churchill Livingstone

9. Orell, Sterrett- Walters and Whittaker, Fine Needle Aspiration Cytology (Manual & Atlas), published by Churchill Livingstone

10.Greer J.P, Foerster J,Jukens J et. al Wintrobe's Clinical Haematology, published by Lippincott Williams and Wilkins

11. Firkin F , Chesterman C, Penington D, de Gruchy's Clinical Haematology in Medical Practice, published by Blackwell Sciences

12. Henry J.B Clinical Diagnostics and Management by Laboratory Methods. published by W.B. Saunders & Company.

13. Lewis S.M, Bain D.J, Bates I, Dacie & Lewis Practical Haematology published by Churchill Livingstone.

14. Hoffbrand A.V, Catovsky D, Tuddenham G.D, Postgraduate Haematology – published by Blackwell publishing

15 R.Anantnarayan , C.K.Paniker, Textbook of Microbiology , published by Orient Longman.

16. Harshmohan ,Textbook of pathology , published by Jaypee.

17. Parasitology (Protozoology & Helminthology.) in relation to clinical medicine – K.D.Chatterjee – published by Chatterjee Medical Publication.

18. Sudha R.Kini ,Colour Atlas of differential diagnosis in exfoliative and aspiration cytopathology , published by Lippincott, Williams & Wilkins.
19. Praful B. Godkar ,Clinical Biochemistry – Principles & practice , published by Bhalani Publishing House, Bombay.
20. Theory & practice of Histological Techniques edited by John .D.Bancroft- published by Chruchill Livingstone.
21. Enzinger & Weiss, Soft Tissue Tumours, Published by B.I.Publications (India.) C.V.Mosby company.
22. Elder D.E, Lever's Histopathology of the skin – Published by J.B.Lippincott Company.
23. Novak & Woodruff Edited, Novak's Gyanaecologic and Obsteric Pathology, published by – Kiaku Shoin/Saunders.
24. Christopher D.M. Fletcher, Diagnostic Histopathology of Tumours Vol.1 & 2- published by Chruchill Livingstone.
25. Recent advances in Histopathology, Haematology, Blood coagulation etc.
26. AFIP, Atlas of tumour pathology.
27. Interpretation of Breast Biopsies - Carter
28. Day D.W, Jass J.R, Price A.B, Morson and Dawson's Gastrointestinal Patholgy, published by Blackwell publishing .
29. Ellison D, Love S, Chimelli L et. al, Neuropathology , published by Mosby
30. Epstein Prostate Biopsy Interpretation, published by Lippincott- Raven
31. Fogo A.B,Kashgarian M, Diagnostic Atlas of Renal Pathology, published by Elseiver Saunders
32. Foster C.R, Pathology of the Urinary Bladder, published by Saunders
33. Fox H, Wells M ,Haines & Taylor - Obstetric and Gynaecological Pathology, published by Chruchill Livingstone
34. Ioachim H.L,Lymphnode Pathology, published by Lippincott
35. Kilpatrick, Renner, Diagnostic Musculoskeletal Surgical Pathology, Clinicoradiologic & cytologic correlations,published by Saunders
36. Kurman R.J, Blaustein's pathology of the female genital tract, published by Springer
37. LeslieK.O,Wick M.R, Practical pulmonary pathology; a Diagnostic approach, published by Churchill Livingstone
38. MacSween, Butt, Portman et al,Pathology of the liver- published by Churchill

Livingstone
39. Mills S.E, Sternberg's diagnostic surgical pathology, published by Lippincott Williams and Wilkins
40. Montgomery E.A, Biopsy interpretation of the Gastrointestinal Tract Mucosa, published by Lippincott Williams and Wilkins
41. Odze R.D, Surgical pathology of the GI Tract, Liver, Biliary Tract and Pancreas, published by Saunders
42. Owen D, Pathology of the Gall Bladder , Biliary Tract, and Pancreas, published by Saunders
43. Pilch B.Z, Head and Neck surgical pathology, published by Lippincott Williams and Wilkins
44. Rosen P,Pathology of Breast, published by Lippincott Williams and Wilkins
45. Silverberg S.G, Atlas of Breast pathology, published by Saunders
46. Weedon ,Skin Pathology, published by Churchill Livingstone
47. Wickremsinghe, Blood and Bone marrow pathology, published by Churchill Livingstone
48. Atkinson B, Atlas of diagnostic pathology, published by Saunders
49. Cibas E.S, Cytology:Diagnostic principles and clinical correlates, published by Saunders
50. Geiinger, Modern cytopathology
51. Naib Z.M,Cytopathology, published by Little Brown and company
52. Meisels A, Morin C, Cytopathology of the uterine Cervix, published by ASCP Press
53.Miettinen M,Diagnostic soft tissue pathology, published by Churchill Livingstone
54. Chandler F.W,Pathologic diagnosis of fungal infection,published by ASCP Press
55. Collins R.D, Paediatric Haematopathology, published by Churchill Livingstone
56. Hoffman , Benz, Shattil,Haematology :Basic principles and practice,published by Churchill Livingstone
57. Naeim F, Atlas of bone marrow and blood pathology, published by W. B Saunders
58. Tkachuk D.C,Atlas of clinical haematology, published by Saunders
59. WHO Classification of tumours, published by IARC Press.
60. Mollison P.L, Blood transfusion in clinical medicine, published by Oxford, ELBS & Blackwell Scientific Publication
61. Chitale A, Pathology of urinary & male genital system for urologists, general surgeons & Pathologists published by B.I. Publications
62. Saran R.K., Transfusion medicine technical manual, published by WHO

JOURNALS:

1. British Journal of Haematology, published by Blackwell Sciences.
2. CANCER, International journal of American Cancer Society, published by John Wile & Sons Inc.
3. Journal of Clinical Pathology, published by B.M.J.
4. Haematology/Oncology Clinics of North America, published by W.B. Saunders & Company.
5. American Journal of Surgical Pathology, published by Lippincott & Raven
6. Indian Journal of Pathology & Microbiology, published by IAPM.
7. Indian Journal of Cancer, published by Indian Cancer Society.
8. Indian Journal of Cytology, published by IAC.
9. LANCET published by Elsevier
10. I.C.M.R. Bulletin, published by ICMR
11. Histopathology , journal of the British Division of the International Academy of Pathology-Published by Blackwell Science
12. Acta Cytologica,The Journal of Clinical Cytology and Cytopathology
13. Archives of Pathology and Laboratory Medicine-Published by American Medical Association
14. Human Pathology- Published by W.B. Saunders & Company.
15. American Journal of Clinical Pathology published by ASCP
16. Indian Journal of Cytology
17. WHO Bulletin published by WHO
18. Indian Journal of Urology
19. Modern Pathology
20. Indian journal of Leprosy published by Indian Leprosy Association
21. New England Journal of Medicine published by Massachusetts Medical Society

ADDITIONAL READINGS:

1. Compendium of recommendations of various committees on health and development (1943 to 1975) DGHS, 1985 Central Bureau of Health Intelligence, DGHS, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335.

2. National Health Policy, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335. 1983.
3. ICMR, Policy, Statement of ethical considerations involved in research on Human subjects, 1982 ICMR, New Delhi.
4. Code of Medical Ethics framed under Section- 33 of Indian Medical Council Act , 1956 . MCI, Kotla road, New Delhi.
5. Santosh Kumar,The elements of Research ,writing and editing 1994,Dept. of Urology,JIPMER,Pondicherry
6. Srinivas D.K et al ,Medical Education Principles and Practices,1995.National Teacher Training Centres, JIPMER, Pondicherry
7. Francis C.M Medical Ethics, J.P.Publication,Banglore 1993
8. Indian National Science Academy, Guidelines for care and use of animals in scientific research, New Delhi,1994
9. International Committee of Medical Journal Editors, Uniform Requirements for manuscripts submitted to biomedical journal. N. Engl J Med 1991;424-8
10. Kirkwood B.R. Essentials of Medical Statistics, 1st ed. Oxford Blackwell Scientific Publications 1988
11. Mahajan B.K.Methods in Biostatistics for medical students,5th ed New Delhi, Jaypee Brothers Medical Publishers,1989
12. Raveendran B. Gitanjali, A Practical Approach to PG dissertation, New Delhi.J.P Publications 1998.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

Student's Record Book

M.D (Pathology)

DEPARTMENT OF PATHOLOGY

Name of the Student :

Dr. _____

Name of the Institute & Address:

_____

_____

_____

ABOUT THE LOG BOOK:

The log book has been prepared to maintain a record of academic and service activities of postgraduates and to provide an account of progress made by him/her. Maintenance of such log books will also allow a review of training programme and incorporation of improvements in the programme.

Postgraduates are required to carry the log book and get the entries made regularly. Faculty is requested to countersign. Log books have to be submitted to the head of the department before submitting the final examination form.

PERSONAL BIO-DATA

Paste Passport size Photograph here

Name of the Student : _____

Date of joining : _____

Probable date of appearing

for Examination : _____

Date of Birth : _____

M.B.B.S from : _____

Year of passing MBBS : _____

Name of the State

Medical Council : _____

Registration No.

with date : _____

Permanent Address : _____

_____ PIN- _____

Phone No. : (_____) _____

Local Guardian's

Address : _____

_____

_____ PIN _____

Phone No. : (_____) _____

_____

POSTING SCHEDULE :

SECTION	MONTH & YEAR		REMARKS	SIGNATURE OF SECTION I/C
	From…	To…..		
Clinical Pathology				
Cytopathology				
Haematology				
Blood Banking				
Histopathology				
Autopsy				
Biochemistry				
Serology				
Museum				
Revision in all sections				

ATTENDANCE AT P.G. TEACHING SESSIONS:

Month & Year	No. of Teaching Programmes held	No. of Teaching Programmes attended	Remarks	Signature of P.G. Teaching I/C

PARTICIPATION IN P.G. TEACHING ACTIVITY

Subject Seminars presented:

Date	Topic	Remarks	Signature of faculty

Journal Articles presented:

Date	Topic	Remarks	Signature of faculty

Group discussion of clinical cases:

Date	Topic	Remarks	Signature of faculty

Slide Seminars presented/participated:

Date	Topic	Remarks	Signature of faculty

SCIENTIFIC CONTRIBUTIONS

CME/ Workshops attended :

SN	Name of CME/ Workshop	Held at	Dates

Conferences attended :

SN	Name of Conference	Paper presented Yes/No	If yes, title of paper

Publications:

1. _____

_____

2. _____

_____

Awards:

_____

CERTIFICATE

This is to certify that Dr…….

has completed the tenure for M.D. satisfactorily .

P.G.Teacher.	**P.G.Teaching Programme Incharge**	**Professor & Head. Department of pathology**

EVALUATION SYSTEM

A. DISSERTATION

a) Thesis / Dissertation is compulsory. Every candidate is required to carry out the work on a selected research project under the guidance of a recognized post graduate teacher. The results of such work shall be submitted in the form of a Dissertation.

b) The Dissertation is aimed at training the candidate in research methods and techniques. It includes identification of a problem , formulation of a hypothesis , search and review of relevant literature , getting acquaintance with recent advances, designing of research study , collection of data , critical analysis of results and drawing conclusions.

c) The title of the topic along with the plan of work not exceeding 500 words in prescribed proforma should be submitted to the University with the recommendation of guide through proper channel within a period of 3 months from the date of registration for the postgraduate course. There should not be an overlap of topic, cases, material or the related data among the candidates within the department during the period of actual Dissertation work. Prior approval by the local Ethical Committee is essential .

Unless communicated otherwise within a period of 2 months from the date of receipt of plan of work by University, it shall be assumed that topic of Dissertation is approved and no communication is necessary in this regard. The last date for submission will not be extended without prior permission from the University. In case of delay in submission of topic of Dissertation and plan of work , the period of training of the candidate will be proportionately extended for which the entire responsibility shall be upon the candidate .

d) The volume of the Dissertation should be reasonable and may vary depending on the topic. The bibliography should be as per Vancouver system.

e) Four copies of the Dissertation complete in all respect certified by the guide should be submitted to the University through proper channel 6 months before the final examinations to the registrar (evaluation)

f) The identity of the candidate/ teacher/ Department /College / Place should not be disclosed in the Dissertation .Acknowledgement should not be included in the Dissertation.

g) Certificates issued by guide, countersigned by Head of the Department and the Dean certifying therein that the work done by the candidate has been carried out under the supervision of the guide to his/her entire satisfaction, should be submitted separately to the University.

h) Dissertation approval is a prerequisite for appearing at the University exam. In case the Dissertation is not accepted, the same shall be communicated to the candidate along with reasons for rejection at least 2 months prior to the commencement of theory exam.

i) The candidate may make necessary corrections and resubmit the Dissertation at least 1 month prior to the commencement of theory exam.

B. LOG BOOK (Work diary)

The postgraduate students should include all their activites in the log book. The annual assessment based on the work diary shall be done by the guide, teacher in charge of postgraduate teaching programme and HOD.

C. UNIVERSITY EXAMINATION (*As per Direction No. 01/2008 dtd. 26/05/2008)*

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

CURRICULUM
POSTGRATUATE MEDICAL EDUCATION
IN
MICROBIOLOGY

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES,NASHIK

DRAFT CURRICULUM FOR POSTGRADUATE COURSE

M.D. (MICROBIOLOGY)

The aim of this course is to train the students of Medicine in the field of Medical Diagnostic Microbiology. Knowledge and practical skills shall be acquired by the candidates in the sub-specialities of Bacteriology including Mycobacteriology, Virology, Parasitology, Immunology, Serology & Mycology so as to be able to deal with diagnosis and prevention of infectious diseases in the community. They will be trained in basic research methodology including molecular biology so that they are able to conduct fundamental and applied research. They will also be trained in teaching methods so that they can take up teaching assignments.

GOAL:

The goal of the postgraduate medical education shall be to produce a competent specialist and Medical teacher:

- Who shall recognize the health needs of the community and carry out professional obligations ethically in keeping with the objectives of the national health policy;
- Who shall have mastered most of the competencies, pertaining to Medical diagnostic Microbiology that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- Who shall be aware of the contemporary advances and developments in the field of medical and diagnostic Microbiology
- Who shall have acquired the spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology
- Who shall have acquired the basic skills of teaching of the medical and paramedical professionals.

EDUCATIONAL OBJECTIVES:

KNOWLEDGE:

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

1.State and explain the clinical features, etiology, pathogenesis and methods of laboratory diagnosis of infectious diseases and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.

2.State and explain the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.

3. Establish and practice “laboratory medicine” for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology, serology and immunology in the light of clinical findings.

4. Organize the prevention and control of communicable diseases in the community.

5. Understand and practice the principle of prevention and control of health

care associated infections and rational antibiotic policy.

6. State the recent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopathogenesis and diagnosis of diseases caused by micro-organisms.

7. Carry out fundamental or applied research in the branches of medicine involving microbiological work.

8. Develop specialization in any of the above subspecialities.

9. Undertake teaching assignments in the subject of medical Microbiology.

(B) Skills

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

1. Plan the laboratory investigations for the diagnosis of infectious diseases

2. Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.

3. Perform and interpret immunological and serological tests.

4. Operate routine and sophisticated instruments in the laboratory.

5. Develop microteaching skills and Pedagogy

6. Successfully implement the chosen research methodology

COURSE CONTENT (SYLLABUS)

DURATION OF COURSE:

The minimum period of training shall be three calendar years and the candidates can be admitted to this training after their full registration with the Medical Council. No exemption shall be given from this period of training of three years either for doing housemanship or for any other experience or diploma.

TRAINING PROGRAM:

The candidates joining the course must work as full time residents during the whole period of their postgraduate training. They will be required to attend a minimum of 80% of training period. Candidate shall be given full time responsibility and assignments and their participation in all facets of the educational process assured.

Postgraduate students must maintain a record book of the work carried out by them and the training undergone by them during the period of training. These record books shall be checked and assessed by the faculty.

TEACHING /LEARNING METHODS:

Learning in M. D. (Microbiology) will essentially be self-learning.

Following teaching-learning methods shall be followed-

Group teaching sessions:

- Journal review
- Subject seminar presentation
- Group discussion
- Slides seminars
- Clinical case presentations pertaining to infectious diseases
- Presentation of the findings of an exercise on any of the sub-specialities
- Participation in CME programs and conferences

Hands on experience (practical training)

Practical training shall be imparted by posting the students in various sub-specialities (sections) as detailed in the intrinsic and extrinsic rotation.

Student shall be actively involved in day to day working of all the sections. He/she will be trained under the guidance of teachers in all the aspects of Clinical Microbiology and applied aspects of laboratory medicine including collection and transport of specimens, receiving of samples, preparation of requisite reagents, chemicals, media and glassware, processing of specimens, performing required antimicrobial susceptibility testing and reporting on the specimens, interpretation of results, sterilization procedures, bio-safety precautions, infection control practices, maintenance of equipments, record keeping and quality control in Microbiology.

Suggested schedule of rotation:

Intrinsic rotation:

1.	Bacteriology(Aerobic and anaerobic)	6 months
2.	Mycobacteriology	3 months
3.	Hospital infection surveillance	3 months
4.	Serology/Immunology	6 months
5.	Mycology	3 months
6.	Virology/HIV	3 months
7.	Parasitology	3 months
8.	Clinical Microbiology(OPD)	2 months
9.	Molecular Diagnostics	1 month

Extrinsic rotation:

Clinical Pathology		3 months
*Elective posting		3 months
	Total	36 months

Emergency duty:

Student shall be posted for managing emergency laboratory services in Microbiology. He/she will deal with all the emergency investigations in Microbiology.

Training in research methodology:

Training in research methodology shall be imparted by planning of a research project by the student under the guidance of a recognized guide to be executed and submitted in the form of a dissertation.

The dissertation is aimed at training the candidate in research methods and techniques. It will include identification of a research question, formulation of a hypothesis, search and review of relevant literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis of the results and drawing conclusions.

The topic shall be communicated to the university within six months of registration and at least 12 months should be spent on the research project.

The dissertation shall be completed and submitted by the student six months before appearing for the final university examination.

Teaching experience:

Student shall be actively involved in the teaching of undergraduate students. He/she will be trained in teaching methods and use of audiovisual aids.

BROAD AREAS OF STUDY

General Microbiology; Systematic Bacteriology, Mycology, Virology, Parasitology; Serology,Immunology, molecular diagnostics and Applied Clinical Microbiology including recent advances in Microbiology.

GENERAL MICROBIOLOGY

1. History and pioneers in Microbiology
2. Microscopy
3. Morphology of bacteria and other micro-organisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilization and disinfection.
8. Biomedical waste disposal
9. Bacterial toxins.
10. Bacterial antagonism: Bacteriocins.
11. Bacterial genetics, gene cloning.
12. Antibacterial substances used in treatment of infections and drug resistance in bacteria.
13. Bacterial ecology-normal flora of human body, hospital environment, air, water and milk
14. Host parasite relationship.
15. Quality control and Quality Assurance in Microbiology.
16. Laboratory Biosafety
17. Health care associated infections- prevention and control

IMMUNOLOGY AND APPLIED ASPECTS

1. The normal immune system.
2. Innate immunity.
3. Antigens.
4. Immunoglobulins.

5. Complement.
6. Antigen and antibody reactions.
7. Hypersensitivity.
8. Cell medidated immunity.
9. Immunodeficiency.
10. Autoimmunity.
11. Immune tolerance.
12. Transplantation immunity.
13. Tumour immunity.
14. Prophylaxis and immunotherapy
15. Measurement of immunity.
16. Immunity and immunopathogenesis of specific infectious diseases
17. Molecular Biology Techniques. For e.g. PCR, DNA probes.

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by them
2. Staphylococcus and Micrococcus; Anaerobic Gram positive cocci.
3. Streptococcus and Lactobacillus.
4. Neisseria, Branhamnella and Moraxella.
5. Corynebacterium and other coryneform organisms.
6. Bacillus: the aerobic spore-bearing bacilli.
7. Clostridium: the spore-bearing anaerobic bacilli.
8. Non-sporing anaerobes
9. The Enterobacteriaceae.
10. Vibrios, Aeromonas, Plasiomonas, Campylobacter and Spirillum,H.pylori
11. Erysipelothrix and Listeria
12. Pseudomonas.
13. Chromobacterium, Flavobacterium, Acinetobacter and Alkaligens.
14. Pasteurella, Francisella.
15. Haemophilus and Bordetella.
16. Brucella.
17. Mycobacteria.
18. The spirochaetes.
19. Actinomyces, Nocardia and Actinobacillus.
20. Mycoplasmatales: Mycoplasma, Ureaplasma and Acholeplasma.
21. Rickettsiae.
22. Chlamydiae.
23. Emerging bacterial pathogens.

VIROLOGY

1. The nature of viruses
2. Classification of viruses
3. Morphology :virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Vaccines and antiviral drugs
9. Bacteriophages
10. Pox viruses
11. Herpes viruses
12. Vesicular viruses
13. Togaviridae

14. Bunyaviridae
15. Arenaviridae
16. Marburg and Ebola viruses
17. Rubella virus
18. Orbi viruses
19. Influenza virus
20. Respiratory disease: Rhinoviruses, adenoviruses, corona viruses
21. Paramyxoviridae
22. Enteroviruses : Polio, Echo, Coxsackie viruses
23. Other enteric viruses
24. Hepatitis viruses
25. Rabies virus
26. Slow viruses
27. Human immunodeficiency viruses
28. Oncogenic viruses
29. Teratogenic viruses
30. Viruses of gastroenteritis
31. Prion diseases
32. Emerging viral infections – SARS, Avian influenza

PARASITOLOGY

1.Protozoan parasites of medical importance : Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Balantidium,Isospora, Cyclospora,Microsporidium etc.

2. Helminthology : All those medically important helminths belonging to Cestoda, Trematoda and Nematoda.

Cestodes : Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Dypyllidium, Multiceps etc.

Trematodes : Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc.

Nematodes : Trichuris, Trichinella, Strongyloides, Ancylostoma, Nicator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.

3. Ectoparasites : Common arthropods and other vectors viz.,Mosquito, Sandfly, Ticks, Mite, Cyclops.

MYCOLOGY

1. The morphology and reproduction of fungi and antimycotic agents
2. Classification of fungi
3. Contaminant and opportunistic fungi
4. Fungi causing superficial mycoses
5. Fungi causing subcutaneous mycoses
6. Fungi causing systemic infections
7. Antifungal agents

APPLIED CLINICAL MICROBIOLOGY

1. Epidemiology of infectious diseases
2. Hospital acquired infections
3. Infections of various organs and systems of the human body
4. Molecular genetics as applicable to Microbiology
5. Automation in Microbiology
6. Rapid diagnostic techniques for microbial diseases.
7. Vaccinology : principle, methods of preparation, administration of vaccines
8. Outbreak investigations & disaster management
9. Biological warfare

PRACTICALS (SKILLS)

BACTERIOLOGY

Must acquire:

1. Care and operation of Microscopes viz. Light, Dark ground, Phase contrast, Inverted, Fluorescent microscopes.
2. Preparation of stains viz. Gram's, Albert's, Ziehl- Neelson and other special stains - performing of staining and interpretation of stained smears.
3. Washing and sterilization of glassware including plugging and packing.
4. Operation of incubator, autoclave, hot air oven, inspissator, distillation plant, filters like Seitz and membrane and sterility tests.
5. Care and maintainance of common laboratory equipments like water bath, centrifuge, refrigerators, incubators etc.
6. Preparation and pouring of liquid and solid media - Nutrient agar, Blood agar, MacConkey agar, sugars, TSI agar, Robertson's cooked meat, Lowenstiein- Jensen's, selective media.
7. Preparation of reagents – oxidase, Kovac, etc.
8. Tests for beta-lactamases including ESBLs.
9. Collection of specimens for Microbiological investigations such as blood, urine, throat swab, rectal swab, stool, pus, OT specimens.
10. Preparation, examination and interpretation of direct smears from clinical specimens,viz. Sputum for AFB – ZN & auramine O, slit smears for *M..leprae,-*ZN stain, conjunctival smear for Chlamydiae – Giemsa/Iodine.
11. Techniques of anaerobiosis – Gaspack system,anaerobic jars-evacuation & filling with H_2, CO_2
12. Identification of bacteria of medical importance upto species level (except anaerobes – upto generic level)
13. Quantitative analysis of urine by pour plate method and semiquantitative analysis by standard loop test for significant bacteriuria.
14. Plating of clinical specimens on media for isolation, purification identification and quantitation.
15. Tests for motility: hanging drop, Craige's tube, dark ground microscopy for Spirochaetes – Treponema & Leptospira.
16. In-vitro toxigenicity tests – Elek test, Nagler's reaction
17. Special tests – Bile solubility, chick cell agglutination, sheep cell haemolysis, niacin and catalase tests for mycobacterium, satellitism, CAMP test, catalase test and slide agglutination tests, and other as applicable t identification of bacteria upto species level
18. Preparation of antibiotic discs; performance of antimicrobial susceptibility testing by Kirby-Bauer disk diffusion method; estimation of Minimum

inhibitory /Bactericidal concentrations by tube/plate dilution methods. Tests for drug susceptibility of Mycobacterium tuberculosis
19. Skin tests like Mantoux, Lepromin etc.
20. Testing of disinfectants- Phenol coefficient and 'in use' tests.
21. Quality control of media reagents etc. and validation of sterilization procedures.
22. Aseptic practices in laboratory and safety precautions.
23. Disposal of contaminated material like cultures.
24. Bacteriology of food, water, milk, air
25. Maintenance of stock cultures.

Desirable to acquire:

1. Care and breeding of laboratory animals viz. Mice, rats, guinea pigs and rabbits.
2. Techniques of withdrawal of blood from laboratory animals includingsheep.
3. Inoculation of infective material in animals by different routes.
4. Animal pathogenicity /toxigenicity tests for *C.diphtheriae, Cl.tetani, S. pneumoniae, S.typhimurium, K. pnumoniae etc.*
5. Performance of autopsy on animals.
6. Isolation of plasmids and Conjugation experiments for transfer of drug resistance
7. Serum antibiotic assays eg. Gentamicin
8. Phage typing for staphylococci, *S.typhi etc.*
9. Bacteriocine typing eg. Pyocine, Proteocin etc.
10. Enterotoxigenicity tests like rabbit ileal loop, intragastric inoculation of mouse, Sereny's test.
11. Mouse foot pad test for *M.leprae*

IMMUNOLOGY/ SEROLOGY

1. Collection of blood by venepuncture, seperation of serum and preservation of serum for short and long periods.
2. Preparation of antigens from bacteria or tissues for widal, Weil-Felix, VDRL, etc. and their standardisation.
3. Preparation of adjuvants like Freund's adjuvant.
4. Raising of antisera in laboratory animals.
5. Performance of serological tests viz. Widal, Brucella tube agglutination, indirect haemagglutination, VDRL, Paul-Bunnel, Rose-Waaler, IFA.
6. Immunodiffusion in gels, counter immunoelectrophoresis- visualization and interpretation of bands.
7. Performance and interpretation of Enzyme linked immunosorbant assay.
8. Latex and staphylococcal co-agglutination tests.

Desirable to acquire:
1. Leucocyte migration inhibition test.
2. T-cell rosetting.
3. Flow Cytometry
4. Radial immunodiffusion.
5. Immunoelectrophoresis.
6. Neutrophil phagocytosis.

MYCOLOGY

Must acquire:

1. Collection of specimens for mycology.
2. Direct examination of specimens by KOH, Gram, Kinyoun's, Giemsa, Lactophenol cotton blue stains.
3. Examination of histopathology slides for fungal infections.
4. Isolation and identification of pathogenic yeasts and moulds and recognition of common laboratory contaminants.
5. Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slide culture.
6. Maintenance of stock cultures.
7. Animal pathogenecity tests viz. Intracerebral and intraperitoneal inoculation of mice for cryptococcus.

PARASITOLOGY

Must acquire:

1. Examination of faeces for parasitic ova and cysts etc. by direct and concentration methods (salt floatation and formol – ether methods)and complete examination for other cellular features.
2. Egg counting techniques for helminths.
3. Examination of blood for protozoa and helminths by wet mount, thin and thick stained smears.
4. Examination of other specimens for e.g. urine, C.S.F., bone marrow etc. for parasites.
5. Histopathology sections – examination and identification of parasites.
6. Performance of stains – Leishman, Giemsa, Modified Acid Fast, Toluidine Blue O.
7. Identification of common arthropods and other vectors viz. Mosquito, sand fly, ticks, mite and cyclops.
8. Collection of specimens.
9. Preservation of parasites – mounting, fixing, staining etc.

Desirable to acquire:

1. In-vitro culture of parasites like entamoeba, leishmania, P.falciparum.
2. Maintainance of toxoplasma gondii in mice.
3. Preparation of media – NIH, NNN etc.
4. Copro-culture for larva of hook worms.
5. Antigen preparation viz. Entamoeba , Filarial , Hydatid for serological tests like IHA and skin test like Casoni's .
6. Permanent staining techniques like iron haematoxylin

VIROLOGY

Must acquire:

1. Preparation of glassware for tissue culture(washing, sterilization)
2. Preparation of media like Hanks, MEM.
3. Preparation of clinical specimens for isolation of viruses.
4. Serological tests-ELISA and rapid tests for HIV, RPHA for HbsAg, Haemagglutination inhibition for influenza, AGD and

couterimmunoelectrophoresis for detection of viral antigens or antiviral antibodies.
5. Chick embryo techniques- inoculation and harvesting.
6. Handling of mice, rats, guinea pigs, rabbits for collection of blood, pathogenicity test etc.

Desirable to acquire:

1. Preparation of Monkey Kidney Cells (Primary) maintenance of continuous cell lines by subcutures. Preservation of cell cultures.
2. Recognition of CPE in tissue cultures.
3. Performance of haemadsorption, haemagglutination, immunofluorescence, neutralization tests for identification of viruses.

SUGGESTED READING:
BOOKS:

Reference books (Please refer the most recent edition)

1. Topley and Wilson's Microbiology and Microbial infections. 8 volumes 2005, 10th edition
2. Color Atlas and Textbook of Diagnostic Microbiology: Elmer W Koneman -2006, 6th edition
3. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases -2004, 6th edition
4. Microbiology and Clinical Practice: Shanson-1999, 3rd edition
5. Immunology: Janis Kuby- 2003.
6. Basic Clinical Immunology.
   Fudenburg, Stites, Caldwell, Weils.
7. Control of Hospital Infection- A practical handbook (most recent edition)-2000, 4th edition
8. Bailey and Scott's Diagnostic Microbiology.
9. Text book of Parasitology.
   Chatterjee K.D.
10. Microbiology in Clinical Practice.
    Shanson D.C.
11. Beaver's Parasitology Textbook

Further Reading

1. Mycology - Rippons
2. Essentials of Immunology- Roitt
3. Virology- Clinical Virology by Rich
4. Gradwohl's Clinical Laboratory Methods and Diagnosis.
5. Biochemical tests for the Identification of Medical Bacteria- MacFaddin JF
6. Manual of Clinical Microbiology- ASM press

Journals

1. Indian Journal of Medical Microbiology
2. Clinical Microbiology Reviews
3. Journal of Clinical Microbiology
4. Journal of Medical Microbiology
5. Journal of AIDS
6. Journal of Hospital Infection
7. Indian Journal of Tuberculosis and Lung Diseases.

8. Indian Journal of Medical Research
9. JAAC
10. Parasitology Today
11. Journal of Infection
12. Infection Control and Hospital Epidemiology
13. Indian Journal of Tuberculosis
14. Journal of Associations of Physicians of India
15. Lancet-Infectious Diseases
16. Emerging Infectious Diseases-online
17. New England Journal of Medicine- online
18. British Medical Journal
19. Scandinavian Journal of Infectious Diseases
20. ICMR Bulletin
21. AIDS Research & Review
22. MMWR
23. Tubercle
24. WHO Bulletin
25. Journal of American Medical Association
26. Paediatric infectious diseases
27. Indian Journal of Leprosy
28. International Journal of Leprosy
29. Immunology
30. American journal of Epidemiology

Important Websites:

1. Center for Disease Control -**www.cdc.gov**
2. World Health Organization- **www.who.int**
3. Infectious Disease Society of America- **www.idsociety.org**
4. United Nations Program on HIV/ AIDS- **www.unaids.org**
5. Johns Hopkins Infectious Diseases- **www.hopkins-id.edu**
6. National Library of medicine- **www.pubmed.com**
7. MD Consult- **www.mdconsult.com**
8. Global Infectious Disease epidemiology network- **www.gideononline.com**
9. National AIDS Control Organization**- www.nacoindia.org**
10. Tuberculosis Research Centre- **www.trc-chennai.org**

EVALUATION :
(As per Direction No. 01/2008 dtd. 26/05/2008)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

STUDENT'S RECORD BOOK

POSTGRADUATE DEGREE COURSE
M.D. (MICROBIOLOGY)
DEPARTMENT OF MICROBIOLOGY

STUDENT'S RECORD BOOK

Students undergoing postgraduate training in M.D. (Microbiology) are required to maintain a record of their academic and service activities to provide an account of progress made by them.

Residents are required to carry the record book and get the entries made regularly. Faculty is responsible for countersigning the entries made by the student. The record book has to be submitted to the Head of the Department at the end of the course. The internal assessment is partly calculated on the basis of progress made by the student during his tenure in the department as detailed in the syllabus.

The aim of this course is to train the students of Medicine in the field of Medical and Diagnostic Microbiology including molecular diagnostics . Knowledge and practical skills shall be acquired by the candidates in the sub-specialities of Bacteriology including Mycobacteriology, Virology, Parasitology, Immunology, Serology & Mycology so as to be able to deal with diagnosis and prevention of infectious diseases in the community. They are trained in basic research methodology so that they are able to conduct fundamental and applied research. They are also trained in teaching methods so that they can take up teaching assignments.

GOAL :

The goal of the postgraduate medical education shall be to produce a competent specialist and Medical teacher:

- Who shall recognize the health needs of the community and carry out professional obligations ethically in keeping with the objectives of the national health policy;
- Who shall have mastered most of the competencies, pertaining to Medical and Diagnostic Microbiology that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- Who shall be aware of the contemporary advances and developments in the field of Medical and Diagnostic Microbiology
- Who shall have acquired the spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology
- Who shall have acquired the basic skills of teaching of the medical and paramedical professionals.

EDUCATIONAL OBJECTIVES :

KNOWLEDGE :

At the end of the course the students shall be able to

1. State the etiology pathogenesis and methods of laboratory diagnosis and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.
2. State the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.
3. Establish and practice "laboratory medicine" for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology and immunology.
4. Organise the prevention and control of communicable diseases in the community.
5. State the recent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopathogenesis and diagnosis of diseases caused by micro-organisms.
6. Carry out fundamental or applied research in the branches of medicine involving microbiological work.
7. Develop specialization in any of the above subspecialities.
8. Undertake teaching assignments in the subject of Microbiology.

(B) Skills

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

1. Plan the laboratory investigations for diagnosis of infectious diseases
2. Perform laboratory procedures to arrive at the etiological diagnosis of diseases caused by bacteria, fungi, viruses and parasites.
3. Perform and interpret immunological and serological tests
4. Operate routine and sophisticated instruments in the laboratory.

PASSPORT

SIZE
PHOTOGRAPH

PERSONAL BIO-DATA

FULL NAME OF STUDENT ----------

DATE OF JOINING ----------

DATE OF BIRTH ----------

PERMANENT ADDRESS ----------

TEL.NO. (O)---------- (R) ---------- **MOBILE ---------- PAGER -------**

LOCAL/GUARDIAN ADDRESS ----------

CAMPUS ADDRESS **HOSTEL ROOM NO.----------**

BLOOD GROUP ----------

EDUCATIONAL QUALIFICATIONS

SN.	Degree	Institution/University	Year of passing	Awards/Distinctions

SERVICE RECORD

SN.	Position	Name of Hospital/Institute	From	To	Remarks

POSTING SCHEDULE

MONTH	YEAR AND SIGNATURE OF FACULTY							
	YEAR	SIGN.	YEAR	SIGN.	YEAR	SIGN.	YEAR	SIGN.
JANUARY								
FEBRUARY								
MARCH								
APRIL								
MAY								
JUNE								
JULY								
AUGUST								
SEPTEMBER								
OCTOBER								
NOVEMBER								
DECEMBER								

THESIS/DISSERTATION

Name of the Student :

Topic of Thesis :

Guide :

Co-guide/s:

Protocol presented on:

Progress of Thesis:

Semester	Work done	Sign. Of Guide
1st		
2nd		
3rd		
4th		
5th		

Thesis Presented on :

Thesis submitted on :

SCIENTIFIC CONTRIBUTIONS

Name of the Student:

CME/Workshops attended:

SN	Name of CME/Workshop	Venue	Date	Sign. Of Faculty

Conferences attended:

SN	Name of conf. & Venue	Paper Presented Yes/No	If yes, Title of Paper

Publications:

Awards:

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

CURRICULUM OF M.D. IN COMMUNITY MEDICINE

GOAL

The overall goal of training programme is to produce a competent public health specialist who can function as a leader of health team and is able to provide effective health care at the primary, secondary and tertiary levels.

GENERAL OBJECTIVES

The general objectives of the training programme in Community Medicine will be to enable a candidate to be a :

Public Health specialist to

1. Define and manage the health problems of the community, which he/she serves. He/she should be able to organize epidemiological studies to identify health problems.
2. Plan, implement and evaluate various health programs in his/her area, especially National Health, Family Welfare and disease control / eradication programmes.
3. Select, train supervise and manage various categories of health personnel working with him/her.
4. Organize health care services, routine and for special groups and during periods of special needs such as disasters/calamities and epidemics.
5. Should update himself / herself on latest advances / developments in the field of Public Health

Teacher / Trainer to

1. Plan and conduct an educational session/ programme. He/she will be able to draw up lesson plan with details of educational objective, content, process and essential inputs.
2. Assist in development of curriculum, teaching and learning activities and methods of evaluation
3. Assist in manpower planning and development. He/she should be able to participate in programmes for the selection, training and supervision of various cadres of health personnel

Research to

1. Plan and execute a research study including clinical trails. Use/Organize Biostatistical analysis using computers and softwares and prepare reports/papers.
2. Critically evaluate research activities
3. Make recommendations on policy and procedures.

Special Objectives

At the end of the MD program in Community Medicine the student will

1. Know the structure and functioning of the health system at the National and International levels and its historical perspectives.
2. Know the principles of nutrition, maternal health and family welfare and put the same into practice.
3. Apply the principles of Epidemiology and Biostatistics to health practice including the design and implementation of health related research studies and clinical preventive medicine trails.
4. Know the principles of Communicable and Non-communicable diseases control and assist in the implementation of National Health programmes at a program level.
5. Identify the socio-cultural dimension in Health and disease and apply this knowledge in the design and implementation of an integrated Health and development program.
6. Apply the principals of environmental and occupational health in the design of health programmes aimed at improving health status.
7. Access specific health situations in a population, plan, organize , implement and evaluate programs aimed at improving health situations.
8. Identify the health needs of the special groups within populations especially the aged, the disabled and the worker and to respond to that need.
9. Know the principles of learning and apply this knowledge in facilitating the learning process in groups of people involved in health.
10. Relate his/her knowledge of curative medicine to the improvement of the health status of a given population.
11. Identify the role of the Government, Private and Voluntary sector in health and understand the principles of innovations in health practices and research.

COURSE CONTENTS.

Health Systems in India and The World – Historical Perspective

1. History of Public Health in India
    - History of Health Services in India
    - Indigenous Systems of Medicines in India
    - Bhore Committee's and other "Committee Reports on Health Services, Health care and Health Professional Education in India.
    - National Health Policy
    - An update of achievements of the country vis-à-vis the Health for all Indicators
2. History of Public Health in the World
    - Influence of the various systems of Medicine i.e. Chinese, Mesopotamian, Egyptian, Geek etc.
    - Concepts in Public Health
        - Disease Control
        - Health Promotion
        - Social Engineering
        - Health for All
3. Primary Health Care
    - Concepts of Primary Health Care
    - Principles of Primary Health Care
    - Elements of Primary Health Care
    - Models of Delivery of Primary Health Care
    - Current status of Primary Health care the world over

4. The Health Care System in India – Structure and Function
    - Central Level
    - State Level
    - District Level
    - Taluka Level
    - Primary Health Centre Level
    - Village Level
    - Urban Level

SOCIO- CULTURAL DIMENSION IN HEALTH

1. Principles of Sociology and the Behavioral Sciences
    - Concepts of Sociology and Behavioral Sciences
    - Influence of Social and Cultural Factors on Health and Disease
    - Social Structures and Social Organisation
2. Principles of Social Psychology
    - Principles of psychology
    - Principles of behavioral sciences
    - Principles of social anthropology
3. Application of Sociology in Health and Development
    - Social Problems in Health and Disease
    - Use of Sociology in addressing problems in Health and Disease

PRINICIPLES OF EDUCATIONAL SCIENCE AND TECHNOLOGY

- Curriculum Planning, Educational objectives
- Principles of Learning
- Teaching/ Learning methods
- Teaching skills including Micro Teaching
- Preparation and Use of Teaching Aids and Learning Research Materials.
- Methods of Evaluation

PRINCIPLES AND PRACTICE OF INFORMATION, EDUCATION AND COMMUNICATION.

1. Principles of IEC Health Education
    - Objectives of Health Education
    - Content of Health Education
2. Communication Skills
    - Principles of Communication
    - Communication blocks
    - Body Language
3. The use of Media for IEC
4. Practice (Methods) of IEC and its application in Community Health
5. Evaluation of impact

PRINICIPLES OF NUTRITION AND APPLIED NUTRITION

1. Nutrients, Daily Requirements, Balanced Diet, Primordial Prevention of Lifestyle related disease.
    - Classification of Foods
    - Daily Requirements of Nutrients
    - Balanced Diet
    - Nutritional Profiles of Major Foods
2. Nutritional Deficiencies
    - Nutritional Requirements
    - Protein Energy Malnutrition

- Vitamin Deficiencies
- Mineral Deficiencies
- Deficiencies of Trace elements

3. Assessment of Nutritional status in a community and approach to a programme
    - Assessment of an Individual's Nutritional Status
    - Assessment of Community Nutritional Status
4. Nutritional Programmes in India – Critical Review
    - Nutritional Problems in India
    - Programmes to combat these problems
    - Nutritional Surveillance
    - Social Problems in Nutrition
5. Other Aspects of Nutritional
    - Food Borne Disease
    - Food Hygiene
    - Food Adulteration including PFA Act

PRINICPLES OF ENVIRONMENTAL HEALTH

1. Water
    - Sources of water
    - Water Pollution
    - Purification of water
    - Water Quality Standards
    - Water borne disease – Epidemiology and Control – Investigation of outbreak of water borne disease and report including water testing
2. Air
    - Indices of thermal comfort
    - Air Pollution including monitoring
    - Effects of air pollution and prevention and control
    - Ventilation
3. Housing including domestic and industrial housing standards
4. Noise and noise pollution
5. Radiation
6. Meteorological Environment including temperature, humidity and rainfall
7. Lighting
8. Disposal of Waste and Sanitation
    - Sources and Classification of wastes
    - Disposal of Solid Wastes
    - Excreta Disposal
    - Sewage Disposal
    - Health Care and Hospital Waste Management
9. Environmental Pollution
    - Sources of Environmental Pollution
    - Monitoring of Environmental Pollution
    - Prevention and Management of Environmental Pollution

10. Medical Entomology
    - Insecta: Mosquito, Flies, Lice, Fleas and Bugs
    - Arachnida: Ticks and Mites
    - Crustacea: Cyclops
    - Identification of the arthropods
    - Diseases transmitted by arthropods
    - Control of Arthropods and Disease borne by them
    - Insecticides and Insecticide Resistance
    - Rodents and Anti-Rodent Measures
    - Integrated Vector Control

MATERNAL HEALTH, CHILD HEALTH AND FAMILY WELFARE (RCH)

1. Common Maternal and child health problems at an individual level
    - Antenatal Care
    - Risk Approach
    - Antenatal visits
    - Preventive services
    - Intranetal Care
    - Postnatal Care
    - Care of the mother
    - Child Health Problems
    - Low Birth Weight
    - Growth and Development
    - Childhood Infections
    - Care of the infant
2. Genetics and Health
    - Common genetic problems
    - Management of Genetic Problems
    - Preventive and Social Measures in Genetics

3. Structure of MCH and Family Welfare services in India
    - Problems of Maternal Health in India
    - Delivery of Maternal and Child Health Services
    - Trends in the MCH services
    - MCH related programmes in India eg.RCH,CSSM,ICDS
    - Family Planning
    - Methods of family planning
    - Indicators of MCH care
4. Demographic Trends in India
    - Demographic Cycle
    - Trends in the world
    - Demography related indicators
    - Demographic trends in India
5. School Health services
    - Objectives
    - Components of school health services
    - Planning for school health services
    - Care of handicapped children
    - Behavioral and Learning Problems in Children

6. Social Paediatrics
    - Juvenile Delinquency
    - Child Abuse
    - Child Labour
    - Street Children
    - Child Guidance Clinic
    - Child Marriage
    - Child Placement

PRINICIPLES AND APPLICATION OF EPIDEMIOLOGIC METHODS IN HEALTH RESEARCH

1. Research Methodology
2. Principles of Epidemiology
3. Epidemiologic Studies
    - Descriptive
    - Analytical
    - Experimental

BIOSTATISTICS

Collection/ Organisation of data / Measurement scales
Presentation of data
Measures of Central Tendency
Measures of variability
Sampling and planning of health survey
Probability, Normal distribution and inductive statistics
Estimating population values
Tests of significance (Parametric/Non-parametric including qualitative methods)
Analysis of variance
Association, correlation and Regression
Vital statistics
Evaluation of health and measurement of morbidity / mortality
Life table and its uses
Use of computers
Census

PRINCIPLES OF TROPICAL MEDICINE

1. Infectious and non Infectious Disease Epidemiology
    - Respiratory Diseases such as Small Pox, Chicken Pox, Measles, Mumps, Rubella, Diphtheria, Pertussis, Influenza, Tuberculosis, ARI etc.
    - Intestinal Infections such as Poliomyelitis, Hepatitis, Food Poisoning, cholera, Enteric Fevers, Amoebiasis, Worm Infestations etc.
    - Arthropod Borne Infections such as Malaria, Filaria, Dengue and others
    - Zoonotic Diseases such as Brucellosis, Rickettsial Diseases, Parasitic
    - Surface Infectious Diseases of Public Health Importance
    - Non-Infectious Diseases of Public Health Importance
    - Cardiovascular diseases, diabetes, blindness, accidents, cancers
    - Emerging and reemerging disease

NATIONAL HEALTH PROGRAMMES

The origin, historical development, interventions, current state and critique of the different National Health Programmes: National Family Welfare Programme (NFWP)

- National Tuberculosis Control Programme
- National Leprosy Eradication Programme
- National Diarrhoeal Diseases Control Programme
- National Malaria Eradiation Programme
- National Filariasis Control Programme
- National Acute Respiratory Infections (ARI) Control Programme
- National AIDS Control Programme
- National Guinea Worm Eradication Programme
- National Kala Azar Control Programme
- National Japanese Encephalitis (JE) Control Programme
- National Iodine Deficiency Disorders (IDD) Programme
- National Programme for the Control of Blindness
- National Cancer Control Programme
- National Mental Health Programme
- National Diabetes Control Programme
- Child Survival and Safe Motherhood (CSSM)
- Reproductive Child Health (RCH)
- Universal Immunization Programme (UIP)
- National Water Supply and Sanitation Programme
- Minimum Needs Programme
- National Rural Health Mission

The implementation of NHPS at a programme level and in the community

COMMUNITY MENTAL HEALTH

1. Principles of Mental Health
    - Types, Causes and Warning signals of Mental Illness
    - Preventive aspects of mental Health
2. The Approach to Mental Health Problems in a Community
    - Primary Health Care approach to mental health problems
    - Mental Health Services in the country

OCCUPATIONAL HEALTH

1. Principles of Occupational Health
    - Occupational Environment
    - Occupational Hazards
    - Absenteeism
    - Problems of Industrialization
    - Health Protection of Workers
    - Prevention of Occupational Disease
2. Legislation in Occupational Health
    - Factories Act
    - Employees State Insurance Act
    - Workmen's Compensation Act
    - Mines Act
    - Plantation Labour Act
3. Basics of Industrial Toxicology
4. Principles of Industrial Psychology
5. Basics of Ergonomics

HEALTH CARE OF THE AGED AND THE DISABLED

1. Community Geriatrics
    - Implications of demographic charges in Indian Population
    - Health Problems of the aged
    - Preventive Health Services for the aged
2. The Disabled and Rehabilitation
    - Problem of disabled in the country
    - Types of disabilities and their management
    - Rehabilitation of the disabled
    - Community Based Rehabilitation

Health Care of Tribal people

VOLUNTARY SECTOR IN HEALTH

Role of the Voluntary Sector in Health

- Activities undertaken by Vos in the Health Sector
- Activities of specific Vos in Health
- Innovative Approaches in the Voluntary Effort in Health

HEALTH CARE ADMINISTARTION AND HEALTH MANAGEMENT

1. Principles of Planning and Evaluation
    - Plan Formulation
    - Execution
    - Evaluation
    - Planning Cycle
2. Health Management
    - Methods and Techniques of Health Management
    - Behavioral Sciences in Management
    - Quantitative Methods in Health Management
3. Basics of Health Systems Research
4. Basics of Health Economics
5. Basics of Health Information Systems

RECENT ADVANCES AND TOPICS OF CURRENT INTEREST

1. Rational drug policy, Nutrition Policy, Health Policy, Population Policy
2. Computers in Health
3. Agricultural Medicine and Plantation Health
4. Introduction to Counseling
5. Community Ophthalmology
6. Qualitative Research and Operational Research
7. Disaster Management and Public health emergencies
8. Nosocomial Infection and Hospital Infection Control
9. Other Free Topics

COURSE CONTENTS FOR PRACTICALS

1. Microbiology applied to Public Health (Dept.of Microbiology)
    - Hands off experience in staining techniques and interpretation of:
    - Leishmann stain
    - Grams Stain
    - JSB Stain
    - Alberts Stain
    - Ziehl-Neilson Stain
    - Peripheral blood examination of Thick and Thin Smears and Reporting
    - Collection and Dispatch of Samples to Laboratory
    - Experience in the collection, examination and interpretation of simple laboratory tests on blood, stool and urine.
    - Interpretation of commonly used serological tests such as Widal/HIV/Hepatitis B/VDRL/Viral Antibody Titres
2. Medical Entomology
    - Collection of mosquitoes/fleas/ticks/other
    - Hands on experience on mounting and reporting
    - Entomological Survey
3. Public Health Chemistry
    - Interaction of Commonly used tests with reference water solutions / water purifiers
4. Epidemiological Exercises and Case Studies (including family studies) to illustrate principles and practice of community Health
    - Statistical Exercises to illustrate Principles and Practice
    - Investigation of an Outbreak of a disease and Measures to control
5. Exercises in Public Health Administration
    - Planning Exercises
    - VED Analysis etc
    - Beneficiary Need Analysis
    - Preparation of Annual Plan
    - Budgeting at the PHC level
    - Supervision of a PHC/SC
    - Requirement of Vaccines, Medicines, Stationary at the PHC level
    - Organisation of a Family Welfare Camp
    - Conduction of an Immunization Camp
6. Diet and Nutritional Survey of a Community
    - Collection and Dispatch of Food Samples
7. Study of Environment and its influence on health in
    - Work Places
    - House-hold
    - Community
    - This includes the study of air pollution, noise pollution, temperature, humidity and other meteorological factors and their effect on health.
8. Study of sanitation problems to illustrate the principles and practice of community health
9. Environment Sanitation
    - Collection of Water Samples / Analysis / Reporting
    - Analysis of physical, chemical and microbiological quality of water
    - Study of Waste Management Methods
    - Adaptation of water supply methods and waste disposal methods to an industry or Plantation setting
    - Study of Requirement of Water in Urban and Rural Setting

10. Visits/ Postings to the following institutions

- District Health Office
- District Hospital
- Taluka Hospital
- PHC/ SC/CHC
- ICDS office / Anganwadi Centre
- Public Health Laboratory
- Sewage Treatment Plant
- Visit to Local Ward Office
- Infectious disease Hospital
- Malaria/DTC/Filaria units
- Visit to factory/Inspectorate of factories/ visit to Industry
- Home for the aged
- Blindness Rehabilitation schools
- Deaf and Dumb schools
- Spastic society
- Physically Handicapped Centre
- Market Place
- Slaughter Home
- Hotel
- Milk Dairy
- Food and Beverages Processing Units

Posting to Obstetric and Gynecology

1. Obstetrics (Urban and Rural Health Centres)
    - Antenatal Care
    - High Risk pregnancy
    - Intranetal care – The Management of normal Labour
    - Postnatal Care
    - Family Welfare
2. Gynecology
    - Adolescent Health
    - Reproductive Tract Infections
    - Cancer of the reproductive tract especially Carcinoma cervix

Posting to Paediatrics (Hospital and ICDS)

1. Paediatric Infectious diseases
2. Nutrition problems
3. Immunization
4. Neonatal Problems
5. Growth and development monitoring

Students doing MD Community Medicine can be allowed to do one semester / Posting in Obst Gynace / Medicine / Paediatric in 2nd Year.

TRAINING ACTIVITIES (for 3 years)

The entire training and the facilitation of the learning process will be aided through the following methods of learning:

1. Lecture Discussions
2. Problem Based Learing
3. Practical Demonstarions
4. Field visits – Family Studies / Clinico-Social Case Studies/ Site Visits
5. Institutional Visits
6. Seminars
7. Journal Clubs
8. Epidemiological Exercises
9. Supervised Training of undergraduates including Lesson Planning
10. Involvement in Specific Departmental Project works
11. Plan, Design, Conduct Surveys

METHODS OF MONITORING :

1. Self Evaluation – Through daily Work Diary
2. Faculty Evaluation – Through scrutiny of Diary and Log Book by Head of Department and staff
3. Technique of skills in Pedagogy – Through lesson plans and supervised taking of classes for undergraduates
4. Skill Evaluation – through demonstration and practical and field reports
5. Knowledge Evaluation – through journal clubs, seminars and tests.

FORMATIVE EVALUATION : The students will be evaluated by work diary and log book. It is mandatory to get a score of five in all items in order to get a final certification for appearing for M.D.University Exam.

THESIS

Objectives: By carrying out a research project and presenting his work in the form of thesis. The student will be able to :

- Identify a relevant research questions;
- Conduct a critical review of literature;
- Formulate a hypothesis;
- Determine the most suitable study design;
- State the objectives of the study;
- Prepare a study protocol;
- Undertake a study according to the protocol;
- Analyze and interpret research data; and draw conclusions;
- Write a thesis

GUIDELINES: While selecting thesis topics, following should be kept in mind:

- The scope of study should be limited so that it is possible to conduct it within the resources and time available to the student;
- The emphasis should be on the process of research rather than the results;
- The research study must be ethically appropriate.
- The protocol, interim progress as well as final presentation must be made formally to the entire department.
- Only one student per teacher/thesis guide
- There should be a training programme on Research Methodology for existing faculty to build capacity to guide research.
- Within 3 months of thesis submission the candidate should be communicated the acceptance / rejection of the thesis.
- The thesis should be sent to at least 2 reviewers and rejected if only both reject it.

Within 6 months the topic to be selected, protocol to be presented at Department level. Local Ethical Committee approval to be obtained at the end of 6 months. The title and synopsis to be communicated to the University

First 6 months : Topic Identification
Protocol Presentation
Submission of title and
Synopsis to University

Thesis submission to the university 6 months before the Final University Exam.

EVALUATION

SCHEME OF EXAMINATION (*As per Direction No. 01/2008 dtd. 26/05/2008)*

RECOMMENDED BOOKS AND JOURNALS

1. Maxy Roseman John M.Last, Maxcy-Roseman **Public Helath and Preventive Medicine**, Appleton-Centrury-Crofts, Newyouk
2. Hobson W, **The Theory and Practice of Public Health**, Oxford Med. Publication
3. Barker D J P, **Practical Epidemiology**, Churchill Livingstone
4. Park J E & K Park, **Text Book of P & S.M.**, M/s Banarsidasm Bhanot, Jabalpur
5. Mahajan B K and M/C.Gupta, **Text Book of P & S.M.**, Jaypee Publications
6. Bradford Hill, **Principles of Medial Statistics**, The Lancet Ltd. No.7 Adam Street, Adelphine, London, 1967
7. Mac, Mahon & Pugh, **Epidemiology-Principles and Methods**, Little Brown and Co.Boston, U.S.A.
8. **Hunter's Diseases of Occupations**, Edited by P.A.B.Raffle, P.H.Adams, P.J.Baxter and W.R.Lee Edward Arnold Publishers (1994), Great Britain.
9. Text book of PSM : A P Kulkarni and Dr. Baride
10. Epidemiology and Management for Health Care, Fifth Edition- P.V. Sathe and P.P. Doke, Vora Medical Publications, Mumbai
11. COMMITTEE REPORTS AND POLICY DOCUMENTS – MEDICAL EDUCATION AND HEALTH POLICY:
    1. Bhore Committee Report (1946) **Health Survey and Development Committee**, Govt.of India, Delhi.
    2. Mudaliar Committee Report (1961) **Health Survey and Planning Committee**, Govt. of India, Delhi
    3. Shrivastav Report (1974), **Health Services and Medical Education – A programme for immediate action, Group on Medical Education and Support Manpower, Ministry of Health and Family Welfare**, Govt.of India, New Delhi.
    4. ICSSR/JCMR (1981), **Health for All- An alternative strategy – Report of a Joint study group of ICSSR/ICMR**, Indian Institute of Education, Pune.
    5. National Health Policy, (1982) **Ministry of Health and Family Welfare**, Government of India, New Delhi.
    6. **Compendium of Recommendations of various committees on Health and Development** (1943-1975), Central Bureau of Health Intelligence (1985) Directorate General of Health Services, Ministry of Health and Family Planning, New Delhi.
    7. Bajaj, J.S. etal (1990) **Draft National Education Policy for Health Sciences**, I.J.M.E. Vol.29, No.1 & 2 (Jan-August 1990)

12. Epidemiology and Health Management: By Dr.P.V.Sathe
13. National Health Programmes of India : J.Kishore
14. Text Book of Infection Diseases : Christae
15. Preventive Paediatrics : O.P.Ghai
16. Statistics : K.Vishvesh Rao
17. Medical Entomology : A. K.Hati
18. Oxford Text Book of by Public Health : Holland & Detel

Journals

1. Indian Journal of Community Medicine
2. Indian Journal of Public Health
3. Indian Journal of Community Health
4. Journal of Communicable Diseases
5. Indian Journal of Medical and Child Health
6. Indian Journal of Preventive and Social Medicine
7. Indian Journal of Occupational Health and Industrial Medicine
8. Indian Journal of Medical Research
9. National Medical Journal of India
10. Indian Journal of Malariology
11. Indian Journal of Environmental Health
12. Indian Journal of Medical Education
13. Journal of Indian Medical Association
14. Journals of Medicine, Paediatrics, OBG, Skin & STD, Leprosy, Tuberculosis & Chest Diseases (For Reference)

International Journals

1. WHO Publications – All
2. Journal of Epidemiology & Community Health
3. Tropical Diseases Bulletin
4. Vaccine
5. American Journal of Public Health
6. Lancet
7. New England Journal of Medicine.

ADDITIONAL READING

1. Compendium of recommendations of various committees on Health and Development (1943-1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Helath Services, min.of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi.P-335.
2. National Health Policy, Min.of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983.
3. Santosh Kumar, The elements of Research, writing and editing 1994, Dept. of Urology, JIPMER, Pondicherry
4. Srinivasa D K etal, Medical Education Principles and Practice, 1995 National Teacher Training Centre, JIPMER, Pondicherry
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subject", 1982, I.C.M.R., New Delhi.
6. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
7. Francis C M, Medical Ethics, J P Publications, Bangalore,1993.
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.

9. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991;424-8
10. Kirkwood B R, Essential of Medical Statistics for Medical students, 1st Ed.Oxford: Blackwell Scientific Publications 1988.
11. Mahajan B K, Methods in Bio statistics for medical students, 5th Ed. New Delhi, Jaypee Brothers Medical Publishers, 1989
12. Raveendran B Gitanjali, A Practical Approach to PG dissertation, New Delhi, J P Publication, 1998
1. Hunter (Donald), **Diseases of the Occupations**, 6th edition, Hodder and stooughton (1978)
2. Schilling (1978), **Occupational Health Practice**, Butterworth & Company, Great Britain
3. Plunkett (E.R), **Occupational Diseases**, Barret Book Company, Stanford (1977)
4. Johastone (R.T), **Occupational Diseases and Industrial Medicine**, Saunders, Philadelphia (1960)
5. French (Geoffery), **Occupational Health**, Medical Technical Publishers, Lancaster
6. Mayers (May R), **Occupational Health etc.**, Williams and Wilkins, Baltimore (1969)
7. Government of India, Ministry of HRD, **Occupational Health : issues of women in the unrecognized sector**, New Delhi (1988)
8. Plunkett (E.R), **Handbook of Industrial Toxicology**, 3rd Edition, Arnold Publishers, USA (1987)
9. Charles Wn Sharp and L Thomas Carroll, **Voluntary Inhalations of Industrial Solvents**, U.S. Department of Health, Education and Welfare, National Institute on Drug abuse, U.S.A. (1978)
10. Patric Kinnersly (1979), **The Hazards of Work, How to fight them**, Pluto Press U.K.
11. Plunkett (E.R) (1977), **Occupational Diseases,A Syllabus of Sings and Symptoms**, Barret Book Company, Stamford, Connecticut (1977)
12. Edited by Robert j.Mc Cunney, **Handbook of Occupational Medicine**, Little Brown and Company, Boston/Toronto (1988)
13. WHO (1986) Geneva, **Earely detection of Occupational Disease**
14. **Hunter's Diseases of Occupations**, Edicted by P.A.B. Raffle, P.H.Adams, P.J.Baxter and W.R.Lee Edward Arnold Publishers (1994), Great Britain
15. Carl Zenz (1994), **Occupational Medicine**, 3rd Edition Mosby, U.S.A.
16. ILO Publications Geneva, **Encycloperia of Occupational Health and Safety**, (1983) 3rd Edition Vol.122.

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

Syllabus / Curriculum for

MD (General Medicine)

GOAL

A postgraduate in a general medicine is expected to diagnose and treat common medical illnesses and have a sufficient knowledge of rare diseases, advances and technologies in medicine. He should be able to manage medical emergencies and carry out research and undergraduate medical teaching.

OBJECTIVES: To achieve the goal following objectives must be fulfilled:

A) COGNITIVE DOMAIN:

1. Proper history, examination and diagnosis.
2. Relevant investigations, their interpretation with reasonable accuracy.
3. Appropriate treatment and early disposal.
4. Prompt diagnosis and management of emergencies.
5. Update knowledge
6. Teach and guide undergraduate (MBBS) students.
7. Carry out research and publication.

B) PSYCHOMOTOR DOMAIN:

1. To perform diagnostic/ therapeutic procedures like central venous line insertion, lumbar puncture, pleural/ pericardial/ ascites tapping, bone marrow aspiration, liver/ kidney/ pleural biopsy, and interventions such as mechanical ventilation, tube thoracostomy, cardiopulmonary resuscitation, temporary pacing etc.
2. To be familiar with complication of procedures and be equipped in their management.

C) AFFECTIVE DOMAIN:

1. Ethical principles during work
2. Seek and give consultation when required.
3. Sympathetic behavior with patients and their relatives.
4. Respects patients' rights and privileges.
5. Supplement information about their illness.
6. Consider seeking second opinion when requested by patients.
7. Develop communication skills to interact with colleagues, senior and paramedical staff.
8. To realize that patient management is a team work.

COURSE DESCRIPTION

Duration: 3 years Residency program

SCOPE OF TRAINING

Diseases related to general medicine, relevant radiology techniques, emergency and intensive care management, maintaining records, use of computers and basic research. Patient care in the settings of outdoor, day care, indoor, emergency and intensive/ critical care.

COURSE CONTENTS

I) Knowledge a) Applied basic science knowledge
b) Diseases with reference to General Medicine **(appendix -1)**
c) Recent advances
d) Biostatistics and clinical epidemiology

2) Skills:- a) Decision making
b) Diagnostic investigation and procedures
c) Monitoring seriously ill patients
d) Counseling patients and relatives
e) Ability to teach undergraduate students
f) Ability to carry out research

TEACHING & LEARNING ACTIVITIES

a) Ward/OPD patient management
b) Long and short topic presentations
c) Ward rounds, case presentations and discussions
d) Clinico-radiological and clinico-pathological conferences
e) Journal conferences
f) PG Case presentation clinics
f) Research review
g) In-house and guest lectures
h) Conferences, symposia, seminars and CMEs
i) Participations in workshops, updates, conferences
j) Teaching undergraduates
k) Use and maintenance of biomedical equipments

STRUCTURED TRAINING PROGRAMME

(Broadly conceived):

1) First Year Residency:
   a) Outpatients/inpatients care
   b) Managing medical emergencies
   c) Learning diagnostic/ therapeutic procedures and interventions
   d) Interpreting Reports
   e) Starting Dissertation
   g) Use of computers in medicine

2) Second Year Residency:
   a) Outpatients/inpatients care
   b) Rotation (six months to one year) in existing allied specialities such as Cardiology, Neurology, Endocrinology, Hematology, Nephrology and MICU.
   c) Conducting medical procedures independently.
   d) Continuation of dissertation work.

3) Third Year Residency:-
   a) Out-patients and in-patients care
   b) Independent management of emergencies
   c) Teaching junior Residents / under-graduate students enrolled in the subject
   c) Finalisation and submission of dissertation.

DISSERTATION

- The topic should be assigned to the student by the end of 6th month of enrollment.
- The topic should be communicated to the MUHS through Head of Department and Head of Institution by 7th month of enrollment.
- The duration of the study shall be upto 17 months.
- The last date of submission of the completed dissertation to the MUHS should be six months prior to the date of commencement of the degree examination.

EVALUATIONS

Regular evaluation of the postgraduate will be carried out by assessment of postgraduate activity like case presentation, seminars etc. **(appendix-2)** and evaluation at the end of each clinical posting including superspeciality postings**. (appendix- 3).** The overall performance has to be to the satisfaction of the HOD for recommendation of candidature for MD examinations.

RECOMMENDED READING

Books.-

- Harrison's Principles of Medicine
- Oxford Textbook of Medicine
- Cecil Textbook of Medicine

Reference Books:

- API Text Book of Medicine
- Wintrobe's Hematology
- Kelly's Textbook of Rheumatology
- Patten's Neurology
- Brain's Neurology
- Crofton and Douglas Respiratory Medicine
- Hepatology by Sheila Sherlock
- Electrocardiography by Shamroth
- Braunwauld's Cardiology

Journals:

- Lancet
- British Medical Journal
- Chest
- ICMR Bulletin
- WHO Bulletin
- New England Journal of medicine
- Journal of Association of Physicians of India
- Journal of Postgraduate Medicine
- Annals of Internal Medicine
- APICON Medicine Update
- Medical Clinics of North America
- Indian Practitioner
- Journal of Applied Medicine
- Journal of General Medicine

Appendix-1

Diseases in General Medicine

HAEMATOLOGY

I. Red cell disorders

Approach to a patient with anemia, nutritional, iron deficiency, aplastic, megaloblastic, haemolytic anemia, (special emphasis on thalassemia & sickle cell anemia), hereditary spherocytosis, anemia of chronic disease, autoimmune hemolytic anemia, paroxysmal nocturnal hemoglobinuina, myelodysplastic syndromes, iron overload, and sideroblastic anaemias.

II. White cell disorders

Eosinophilia, febrile neutropenia, approach to a patient with splenomegaly & lymphadenopathy, lymphomas, multiple myeloma & related plasma cell disorders, leukemias , hairy cell leukemia.

III. Bleeding & coagulation disorders

Approach and investigations in patients with bleeding disorders, hemophilia, von willebrand's disease, immune thrombocytopenic purpura, vascular purpuras, henoch-schonlein purpura, thrombotic thrombocytopenic purpura, disseminated intravascular coagulation, anticoagulant and anti-platelet therapy.

IV. Miscellaneous

Approach to a patient with thrombosis, blood groups, transfusion related diseases, blood transfusion reactions, blood component therapy, hematological manifestations of systemic diseases, drug induced hematological disorders, hypersplenism, chemotherapy, bone narrow transplantation, thrombophilias, platelet function disorders, estimation of hemoglobin/ total and differential white cell count/ erythrocyte sedimentation rate, preparation and staining of blood smears.

ENDOCRINE

I. Disorders of glucose metabolism

Glucose metabolism, physiology of insulin & glucagon secretion, glucose tolerance test, diabetes mellitus, insulin preparations, hypoglycemia, glycosuria of causes other than diabetes mellitus, glucagon secreting tumors.

II. Thyroid gland & its disorders

Iodine metabolism, anatomy & physiology of thyroid gland, thyroid function tests, goiter, hypothyroidism and hyperthyroidism, myxedema, cretinism, thyroid carcinoma, other rare syndromes of thyroid dysfunction.

III. Disorders of anterior pituitary

Anatomy & physiology of various hormones & their regulation, acromegaly, gigantism, sheehan's syndrome.

IV. Disorders of posterior pituitary
Anatomy and physiology, diabetes insipidus, syndrome of inappropriate anti-diuretic hormone (SIADH) secretion, obesity.

V. Disorders of adrenal cortex
Regulation of secretion of glucocorticoids, mineralocorticoids & adrenal sex hormones, adrenal insufficiency, Cushing's syndrome, pheochromocytoma.

VI. Miscellaneous
Dwarfism, Frohlich's syndrome, Lawrence Moon Biedel syndrome, anorexia nervosa & bulimia, hypothalmus in health & disease, Conn's disease, gynaecomastia, non-puerperal galactorrhoea, multiple endocrine neoplasia syndromes, hirsutism, adreno-genital syndromes, disorders of sexual differentiation.

CARDIO–VASCULAR SYSTEM

ECG & it's interpretation, diagnosis of arrhythmias & their management, ischaemic heart disease, hypertension, rheumatic fever & rheumatic heart disease, congenital heart diseases, heart failure, pericardial diseases, peripheral vascular diseases, deep vein thrombosis, cardiomyopathies, principles of echocardiography & abnormalities in common disorders, pacemakers, nuclear medicine in cardio-vascular disorders, tumors of the heart, aneurysm & dissection of the aorta, thoracic outlet syndrome, cardiac catheterisation, cardiac interventions.

RESPIRATORY SYSTEM

Approach to a patient of respiratory system involvement, pulmonary function tests, arterial blood gases, bronchoscopy, imaging studies, pulmonary angiography, therapeutic interventions: pulmonary artery embolisation/ video assisted thoracic surgery/ thoracotomy/ mediastinoscopy, diseases of the upper airway including avian influenza, bronchial asthma, occupational lung diseases, pneumoconioses, organic dusts & environmental carcinogens, pneumonia, bronchiectasis, obstructive airways diseases, interstitial lung diseases, diseases of the pleura: effusion/ pneumothorax/ empyema/ haemothorax, air pollution, respiratory failure, adult respiratory distress syndrome, severe acute respiratory syndrome (SARS), mechanical ventilation, mediastinal diseases, infections including tuberculosis, tumors, primary and metastatic carcinomas, hypersensitivity pneumonitis, eosinophilic pneumonias, pulmonary hypertension, sleep apnea, pulmonary thromboembolism, lung transplant.

NERVOUS SYSTEM

Investigations: lumbar puncture/ cerebrospinal fluid examination/ electroencephalography/ evoked potentials/ nerve conduction studies/ electro-myography/ imaging studies/ angiography, migraine, seizures/ epilepsy, cerebrovascular diseases, sub-arachnoid haemorrhage, dementia, extra pyramidal disorders, Parkinson's disease, motor neurone disease, disorders of cranial nerves, meniers syndrome, benign positional vertigo, diseases of the spinal cord, cranio-vertebral anomalies, tumors of the nervous system, demyelinating diseases, meningitis, infections of nervous system, nutritional and metabolic disorders, central pontine myelinolysis, Wernicke's encephalopathy, alcoholic cerebral degeneration, pellagra, subacute combined degeneration, polyneuropathies, acute and chronic inflammatory demyelinating polyneuropathies, diabetic neuropathies,

mononeuritis multiplex, mononeuropathy, leprosy, neuromuscular junction disorders including myasthenia gravis, myopathies (hereditary/ endocrine/ metabolic/ thyroid diseases/ parathyroid diseases/ diabetes mellitis), periodic paralysis, approach to a patient paralysis, dizziness & vertigo, diplopia, syncope and transient loss of consciousness, involuntary movements, delerium, ataxia, parasthesias & sensory loss, unconsciousness, bowel & bladder abnormalities, progressive supranuclear palsy, dystonia, spinocerebeller ataxia, drug induced movement disorders, inherited ataxia, traumatic injuries, subdural & epidural hematoma, radiation & chemotherapy in treatment of nervous system tumours, subdural empyema, progressive multifocal leucoencephalopathy, subacute sclerosing pan encephalitis, progressive rubella, panencephalitis, kuru, molecular treatment of neurological disorders, disorders of the autonomic nervous system, details of traumatic injuries to skull & spine, hereditary & metabolic disorders of late onset, mitochondrial myopathies, lipid storage disorders.

INFECTIOUS DISEASES

Sepsis syndromes, pyrexia of unknown origin, infective endocarditis, acute infectious diarrhoeal diseases & food poisoning, infections of the urinary tract, infections of skin/ muscle/ soft tissues, infections in intravenous drug abusers, hospital acquired infections, infection control in hospital, bacterial infections, specific infections: pneumococcal/ staphyloccal/ tetanus/ streptococcal/ diphtheria/ botulism/ gas gangrene/ meningococcal/ gonococcal/ salmonella/ shigella/ vibrio cholera/ brucella/ plague/ syphilis/ mycobacteria/ leptospira/ mycoplasma/ pseudomonas/ helicobacter pylori, viruses: herpes/ varicella/ ebstein barr virus/ cytomegalo virus/ rabies/ respiratory viruses/ influenza/ measles/ mumps/ rubella/ arboviruses, fungal: candidiasis/ aspergillosis/ mucormycosis, parasites: ameobiasis/ giardiasis/ pneumocystis carinii/ malaria/ leishnianiasis/ cryptosporidium/ microspondium/ isospora/ filariasis/ neurocysticerosis/ worm infestations, tropical diseases, pancreatitis, osteomyelitis, infections due to bites/ scratches/ burns, tularemia, pertussis, bartonellosis, arenaviruses, moraxella, legionella, nocardia, actinomycetes, borellia, chlamydiae, rickettsia, newer emerging infections: avian influenza, chikungunya, others.

HIV/AIDS: Aetiology & pathogenesis, clinical presentations, modes of transmission, universal precautions, opportunistic infections, management and treatment of the disease, opportunistic infections, complications, anti-retroviral therapy, prophylaxis: post exposure and of opportunistic infections, recent advances, historical record.

HEPATO-BILIARY SYSTEM

Liver function tests, jaundice, hepatitis, cirrhosis of liver, portal hypertension, hepatic encephalopathy, hematemesis, amoebic hepatitis, granulomatous hepatitis, hydatid cyst, primary and metastic carcinomas, liver transplant, gall bladder diseases: cholelithiasis/ cholecystitis/ diseases of bile-duct/ cholangiocarcinoma.

GASTROINTESTENAL TRACT

Peptic ulcer disease, gastrointestinal bleeding, gastritis, endoscopy, radiological procedures, infections, inflammatory bowel disease, functional gut disorders, motility disorders, malabsorption syndromes, pancreatitis, cystic fibrosis, malignancy.

KIDNEY

Renal failure, renal replacement therapies, hematuria, proteinuria, polyuria, oliguria, anuria, contrast nephropathy, urinary tract infections, glomerulonephritis, nephrotic syndromes, tubulo-interstitial diseases, kidney in systemic diseases, tumours of the urinary tract, renal calculous disease, barter's syndrome, fabry's disease, malignancy.

GERIATRIC MEDICINE

Theories of ageing, demographic patterns (world / Asia / India) and their significance to health care system, physiological changes in the elderly, diseases in elderly, pharmaco-therapy in the elderly, rehabilitation, physiotherapy, occupational therapy, psychotherapy, legal aspects (elderly abuse), psychiatric illnesses in elderly population, geriatric assessment, geriatric emergencies.

GRANULOMATOUS DISEASES

Tuberculosis, leprosy, syphilis, sarcoidosis, Wegener's granulomatosis, histoplasmosis, coccidoidomycosis, mucocutaneous leishmeniasis, midline granuloma, lymphomatous granuloma, pseudotumor of the orbit.

ETHICAL & LEGAL ISSUES IN MEDICINE

Importance and procedures of informed consent, emergency & life saving intervention & treatment, information to be given to patient & relatives, rights of patients including confidentiality, withdrawing life support systems, organ transplant from cadaver, euthanasia, consumers protection act, clinical decisions for a patient who lacks decision of signing of will, ethics committee & its role in medical research, procedures (medico legal) followed in cases of poisoning, suspected rape, adverse reaction to drugs and interventions, absconded patients, in-hospital injuries and suicide, treatment of pregnant patients with drug and interventions likely to cause fetal harm, cloning, stem cells usage and preservation, crimes performed by addicts.

POISONINGS

Diagnosis and management of specific and unknown poisonings, universal & specific antidotes, acids and alkalis, kerosene, petroleum products, organophosphates and carbamates, household disinfectants, mosquito repellants, aluminium phosphide, zinc phosphide, yellow phosphorus, heavy metals, paracetamol, barbiturates, snake and scorpion bites, botulism, drug over-dosages, international classification of poisonous chemicals, environmental hazards and poisonings, industrial toxicology, toxidromes, nuclear, biological, chemical warfare.

PREGNANCY MEDICINE

Maternal & foetal physiology, principles of maternal morbidity & fetal outcome, medical disorders during pregnancy, infections in pregnancy, metabolic disorders, hyponatremia, thyroid disorder, hypertension and eclampsia, renal failure, disseminated intravascular coagulation, diabetes, valvular heart disease, bronchial asthma, cardiomyopathies,

jaundice, HIV/AIDS, hypercoagulable state and its sequelae and complications, cortical venous sinus thrombosis in pregnancy, post partum sepsis, aminotic fluid embolisation, Epilepsy, drugs in pregnancy, poisonings in pregnancy, smoking, alcoholism, surgery and pregnancy, psychiatric diseases in pregnancy, medical disorders and infertility, genetic disorders & genetic counseling, ethical issues in pregnancy (brain death).

RADIOLOGY

Roengenograms of chest/ abdomen/ spine/ skull/ paranasal sinuses/ bones and joints, computerized tomography (CT) and magnetic resonance (MR) imagings, angiography, digital substraction angiography, imaging techniques for hepatobiliary system, barium studies, intravenous urography, scintigraphy, radionuclide imaging of kidney/ bone/ heart/ liver/ lung/ gall bladder/ thyroid/ parathyroid/ whole body, echocardiography, ventriculography, positron emission tomography (PET) scan, lymphangiography, cardiac catheterization, ultrasound, color doppler, developing and newer imaging techniques.

DISORDERS BONE & MINERAL METABOLISM

Calcium and phosphorous homeostasis, parathroid gland disorders, vitamin-D in health & disease, metabolic bone disease, osteoprosis, osteomalacia, endocrine hormonal influences on bone metabolism, phosphorus metabolism, hypophosphatemia, hyperphosphatemia, disorders of magnesium metabolism, Pãget's disease of bone, osteomyelitis, bone dysplasias, osteoarthritis, spondylosis, bone in systemic diseases.

IMMUNOLOGY

Normal immune system and its functions, hypersensitivity reactions, T-cell mediated diseases, mechanism of tissue damage, cytokine mediated injury, cytokine inhibitors, interaction of T and B cells, complement system, apoptosis, immunotherapy, immuno-modulators, immunosuppressive agents, monoclonal antibodies, stem cell transplant in immune disorders, HLA system, primary immune deficiency diseases, amyloidosis, disorders of immediate type hypersensitivity, biological response modifiers, immunologically mediated skin disorders.

RHEUMATOLOGY

Pathophysiology of inflammation, autoantibody revelance in disease processes, rheumatoid arthritis including extra-articular manifestations, glucocorticoid therapy in connective tissue diseases, systemic lupus erythematosis (SLE), organ targeted therapy, vasculitides, ankylosing spondylitis, reactive arthritis, undifferentiated spondyloarthropathy, polyarteritis nodosa, Wegener's granulomatosis, Churg Strauss disease, Takayasu's arteritis, cutaneous vasculitis, imaging techniques in systemic vasculitis, approach to acute and chronic monoarthritis & polyarthritis, diagnostic imaging in joint disease, crystal arthropathies, gout, infectious arthritis, infections in patients with connective tissue diseases, anti-phospholipid antibody syndrome (APLA), drug induced rheumatic diseases, scleroderma, sarcoidosis, fibromyalgias, haemophilic arthropathy, dermatomyositis, polymyositis, overlap syndromes, sjogrens syndrome, calcium oxalate deposition disease, psoriatic arthritis, neuropathic joint disease, osteo-arthritis.

FLUID& ELECTROLYTE

Choice of intravenous fluids, plasma expanders, potassium/ calcium/ sodium/ magnesium/ phosphate disorders, acid base balance and disorders.

CRITICAL CARE

Cardio-pulmonary resuscitation, non-invasive and invasive cardiovascular monitoring, circulatory failure, heart failure, acute myocardial infarction, pulmonary embolism, respiratory failure, pulmonary aspiration, nosocomial pneumonia, mechanical ventilation, toxicology, renal failure, status epilepticus, Guillian Barre syndrome, myaesthenia, use of blood products, intravenous immunoglobulins, plasmapheresis, hyperthermia, hypothermia, diabetic ketoacidosis, addisonian crisis, myxedema coma, endotrachial intubation, pacemakers, strokes, subarachnoid haemorrhage, near-drowning, circulatory and ventilatory support in adult respiratory distress syndrome (ARDS), asthma, obstructive airways disease, renal replacement therapy.

EMERGENCY MEDICINE

Basic and advanced life support, disaster management, use and maintenance of equipment used in life support, acute sever asthma, status epilepticus, poisonings, heart failure, shock, acute myocardial infarction, angina, arrhythmias, hypertensive emergencies, medical emergencies in pregnancy, gastro-intestinal bleeding, hepatic encephalopathy, acute gastroenteritis, hemoptyses, obstructive airways disease, tension pneumothorax, adult respiratory distress syndrome (ARDS), respiratory failure, cor-pulmonale, stroke, sub-arachnoid haemorrhage, oliguria/ anuria, coma, pneumonia, meningitis, infections, sepsis syndromes, multi-organ failure, bleeding manifestations, endocrine emergencies, electric shock, poisonings, snakebite, scorpion stings, anaphylaxis, nuclear/ biological/ chemical exposures, toxidromes, rabies, burns, strangulation, interventions and procedures: mechanical ventilation/ temporary cardiac pacing/ invasive monitoring/ needle and tube thoracostomy/ cricothyrotomy.

Appendix -2

PG - ACTIVITY ASSESSMENT SHEET

Student's Name……. Date……..

PG – CLINIC (Case presentation)

a. History & Examination
b. Investigations
c. Diagnosis & Clinical co-relation
d. Management
e. Questions & Answers

CLINICAL SEMINAR (Case discussion)
a. Case details
b. Discussion (content, update references, etc)

c. Presentation (Clarity, time, language, etc)
d. Audio-visual aides
e. Questions & Answers

SEMINAR (Problem/ syndrome based discussion)
a. Content
b. Update with references
c. Presentation (Clarity, time, language. etc)
d. Audio-visual aides
e. Questions & Answers

Appendix 3

CLINICAL WORK EVALUATION SHEET

For posting under one Unit (including super-specialty postings)
Student's Name ……. Posting period. ……to …….

Points for Assessment:
1. Punctuality and discipline
2. Quality of Ward-work
3. Maintenance of Case-Records
4. Presentation of cases in Rounds
5. Investigation Work-up
6. Bedside manners
7. Rapport with the patients
8. Rapport with Colleagues
9. Undergraduate Teaching (if applicable)
10. Counseling patient's relatives

Name of the Unit head Signature
Dated

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

Department of Pediatrics

Curriculum

For

Post-graduate Degree Course
M.D. (Pediatric Medicine)

Index

1. Goal

The Goal of M.D. (Pediatrics) Program is to provide training in Pediatrics and Neonatology to produce competent specialists who are able to provide basic and speciality care of the highest order to neonates, infants, children and adolescents at the community level and at primary, secondary and tertiary levels of health care, and to act as future trainers, teachers, and researchers in the field of Pediatrics and Neonatology.

2. Course Description

MD (Pediatrics)

Duration: 3 years

Eligibility: MBBS

3. Intramural and Extramural Rotation

MD (Pediatrics):

- At least 4 and not more that 8 months in Neonatology.
- At least 3 and not more than 6 months in sub-speciality areas: Intensive Pediatric Care Unit (IPCU), Genetic Clinic, Thalassemia Care Centre, Emergency Pediatric Services.
- At least nil and maximum 6 months in Allied areas: Hematology, Infectious Diseases, Dermatology, Cardiology, Nephrology, Chest Medicine, Gastroenterology.

The Department of Pediatrics will decide the posting of students in Neonatology and Allied Branches and Sub- speciality areas.

4. Syllabus

I) Basic Sciences and Laboratory Medicine as applied to Pediatrics and Childhood Diseases.

II) Clinical Epidemiology

III) Ethics in Pediatrics and Child Care

IV) Computers in Pediatrics

V) Pediatric and Neonatal Therapeutics

- Effects of physical and physiological changes on the pharmacokinetics of commonly used medications in Pediatrics.
- Recognition of drugs that are contraindicated, and used with extreme caution in specific pediatric populations.
- Effects of maternal therapy on the fetus and the neonate.
- Secretion of drugs in the breast-milk.
- Patient education and parent education for appropriate drug dosing, formulations and administration techniques.

VI) Preventive Pediatrics

- National Health programs relevant to Pediatrics and Child Care.
- Epidemiology of common health problems and diseases.
- Vital statistics: Maternal Mortality Rate, Perinatal Mortality Rate, Neonatal Mortality Rate, Under-5 mortality Rate: Definitions, National Status, Determinants, Interventions aimed at reduction of the rates.
- National Immunization Programs and policies.
- Other vaccines not included in national immunization program.

VII) Social Pediatrics

- Child labour, Child abuse, Child neglect, Failure to thrive, Social issues relevant to Pediatrics.
- Media and children
- Children at special risk
- Adoption
- Environmental health hazards.

VIII) Psychological Behavioral manifestations disorders

- Identification and assessment of Psychological and behavioral disorders.
- Intervention and management strategies for Psychological and behavioral disorders.

IX) Growth and Development

- Normal pattern and factors affecting growth and development. Recognition of normal variants of growth and development.
- Developmental assessment in infancy and childhood.
- Physiological changes during adolescence and problems facing adolescents.
- Assessment of growth.
- Deviations from normal patterns of growth and development: Recognition, Prevention, Early intervention and Management.
- Tools for assessment of growth and development at various ages including Indian adaptations.

X) Nutrition

- Understanding of energy balance in humans.
- Basic biochemistry of proteins, carbohydrates and fats.
- Proximate Principles, Vitamins, Minerals and Micronutrients: Biochemistry, Physiological Functions, Daily Requirements, Manifestations and Management of deficiency and excess states.
- Normal requirement of protein, fat, carbohydrate for newborns, children, adolescents and pregnant and lactating women.
- Nutritional values of common Indian foods.
- Breastfeeding and lactation management
- Infant feeding and weaning foods.
- Balanced diet.
- Assessment of nutritional status.
- Nutritional disorders-Etiology, Clinical features, patho-physiology, pathogenesis and management
- Pathological features of various nutritional disorders.
- Planning of diet during illness.
- Total parental nutrition.

XI) Fluids and Electrolytes

Pathophysiology of body fluids, fluid therapy, electrolytes, acid-base balance, parenteral and enteral fluid therapy

XII) Emergency pediatric services

- Pediatric resuscitation
- Evaluation of critically ill child.
- Pediatric Emergencies and poisoning.
- Pediatric injuries and injury control and accidents.
- Insect, animal and snakebites.
- Planning and management of pediatric intensive care unit
- Anesthesia, perioperative care and pain management.
- Principles of drug therapy.

XIII) Genetics

- Principles and molecular basis of genetic disorders.
- Clinical features and management of genetic and chromosomal disorders.
- Prenatal diagnostic techniques and neonatal screening tests.
- Effects of teratogenic agents.
- Genetic counseling.
- Gene therapy.

XIV) Metabolic diseases

Metabolic diseases of protein (amino acids), carbohydrates, fats, mucopolysaccharides, purines, pyrimidines, heme and others

XV) Neonatology: The fetus and neonatal infant

- High-risk pregnancy
- Assessment of fetal growth, wellbeing and maturity.
- Fetal distress: Manifestation, identification and management
- Maternal diseases and their effects on the fetus and newborn.
- Assessment of fetal wellbeing.
- Identification and management of various fetal diseases.
- High-risk infant – identification and management.

- Delivery room emergencies, resuscitation of newborn and care of normal new born.
- Birth injuries.
- Adaptation of newborn.
- Examination of newborn and assessment of maturity.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various diseases of newborn.
- Neonatal transport.
- Neonatal procedures.
- Developmental assessment, and early intervention programmes for infants at high risk for developmental delay.
- Care of newborn in the community.
- Planning and organization of level I, level II, Level III Neonatal care centers.

XVI) Infectious diseases

- Clinical features, management of viral, bacterial, fungal, spirochetal, rickettsial, parasitic, protozoal and other infections.
- Prevention and management of nosocomial infections.
- Infection control and preventive measures.
- Immunization against infections diseases.
- Fever
- Laboratory techniques for diagnosis of infections diseases.
- Infections in immunocompromized host.
- Clinical syndromes caused by various infections agents.

XVII) Immunological system and its disorders

- Components of immune system and their functions.
- Disorders of immune system – Etiology, Clinical features, pathophysiology, pathogenesis and management.
- Pharmacotherapy.
- Transplantation medicine.
- Allergic diseases – etiology, clinical features, patho-physiology, pathogenesis and management.
- Relevant diagnostic and therapeutic modalities in various immunological and allergic disorders.

XVIII) Rheumatic diseases and connective tissue disorder of childhood.

Etiology, pathogenesis, manifestation, laboratory diagnosis and management of Rheumatic diseases in childhood and adolescents

XIX) Respiratory system

- Development of respiratory system, congenital anomalies.
- Physiology of respiration and mechanics of ventilation.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various respiratory diseases.
- Pathological features of various respiratory diseases.
- Relevant diagnostic and therapeutic modalities in respiratory diseases in children.
- Pharmacotherapy of respiratory diseases.

XX) Cardiovascular system

- Embryology of heart and vascular system.
- Adaptations of cardiovascular system at and after birth.
- Etiology, pathophysiology, pathogenesis, clinical features and management of congenital and acquired heart and vascular diseases and rheumatic heart disease.
- Rheumatic fever – Epidemiology, clinical features, pathophysiology, pathogenesis, prevention and management.
- Relevant diagnostic and therapeutic modalities in heart diseases in children.
- Congestive cardiac failure – Etiology, pathophysiology, pathogenesis, clinical features and management.
- Pharmacotherapy of cardiovascular diseases.

XXI) Gastrointestinal tract

- Development of gastrointestinal tract, hepatobiliary system and their abnormalities.
- Physiology of digestion.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various gastrointestinal and hepatobiliary and other abdominal diseases.
- Pathological features of gastrointestinal, hepatobiliary and pancreatic disorders.
- Surgical emergencies in gastrointestinal tract diseases.

XXII) Hematology and Neoplastic diseases

- Physiology of erythropoiesis, leukopoiesis and physiology of hemostasis.
- Etiology, pathophysiology, pathogenesis, clinical features and management of hematological and oncological diseases.
- Laboratory diagnosis and other relevant diagnostic and therapeutic modalities in hematological and oncological disorders.
- Pharmacotherapy of Hematological and Oncological Diseases.
- Component therapy in Pediatric Practice.

XXII) Nephrology and genitourinary tract

- Development and developmental anomalies of the kidneys and the genitourinary tract.
- Physiology of urine formation and metabolic functions of the kidney.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various disorders of the kidney and the genitourinary tract.
- Pathological features of diseases of the kidney and genitourinary tract.
- Relevant diagnostic and therapeutic modalities for diseases of the kidney and the genitourinary tract.
- Pharmacotherapy of renal and genitourinary disorders.
- Management of end stage renal disease.

XXIV) Central and peripheral Nervous System

- Development of the brain, spinal cord and peripheral nervous system and their anomalies.
- Neurological evaluation of newborns, infants and children.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various diseases affecting central nervous system and peripheral nervous system.
- Seizures in childhood.
- Neuromuscular diseases – etiology, clinical features, pathophysiology and management.

XXV) Endocrine system

- Synthesis, physiological functions and pharmacological actions of various hormones.
- Disorders of the endocrine glands.
- Pubertal development and its disorders.

XXVI) Congenital and acquired disorders of eye, ear, nose, throat, bones and joints.

XXVII) Miscellaneous diseases

- Unclassified diseases including SIDS, Sarcoidosis, Progeria histiocytosis, chronic fatigue syndrome.
- Metabolic bone diseases.
- Genetic skeletal dysplasias.

XXVII) Development of diagnostic approach for and interpretation of symptomatology and clinical signs in infants, children and adolescents.

XXVIII) Basics of Research Methodologies and Ethical aspects of Clinical Research

5. List of skills

1. Elicitation of history from parents, guardians, relatives and patients regarding complaints previous diseases and therapy, events around birth, prenatal period, growth and development, diet and immunization, socio-educational and economic background and other relevant aspects.
2. Conduct physical examination of well and sick newborn babies, infants, children, adolescents and adults.
3. Accurately measure length or height, weight, head circumference and plot the data on an appropriate chart.
4. Accurately measure mid-arm circumference of children aged 1-5 years.
5. Identify abnormal growth patterns.
6. Interpret data obtained by anthropometric measurement and developmental assessment.
7. Assess nutritional status and determine if the child is getting adequate nutrition.
8. Provide nutritional advice for newborn babies, infants, children and adolescents.
9. Provide advice regarding breast-feeding, weaning and balanced diet.
10. Provide advice regarding healthy & hygienic practices with a view to prevent diseases, disorders, injuries, accidents and poisoning.
11. Develop a diagnostic approach for clinical problems in newborns, infants, children and adolescents.
12. Discuss the characteristics of the patient and of the illness that must be considered when making the decision to manage the patient in the outpatient setting or admit to hospital.
13. Discuss the differential diagnosis of symptoms, signs and presentations in neonates, infants, children and adolescents.
14. Undertake relevant investigations for diagnostic and prognostic evaluation taking into consideration the risks, benefits and costs involved.
15. Convince parents and guardians regarding undertaking investigations and obtain their co-operation and valid legal consent.
16. Interpretation of laboratory Reports.

Counseling parents regarding the child's health status, health needs, illness & disabilities

17. Performance of Diagnostic & Therapeutic Procedures:

- Venepuncture (10)
- Intravenous access for administration of drugs and intravenous fluids (10)
- Administration of drugs via intra-dermal, intra-muscular or subcutaneous routes (5 each)
- Administration of drugs and fluids through intra-osseous route (2)
- Lumbar puncture to draw out cerebro-spinal fluid for examination (5)
- Sub-dural tap (2)
- Ventricular tap (1)
- Peritoneal (Ascitic) tap for diagnostic and therapeutic purposes (2)
- Pleural tap for diagnostic and therapeutic purposes (4)
- Collection of blood from an artery for arterial blood gas analysis (4)
- Obtaining Central IV Access (3)
- End tracheal Intubation in Newborn babies, Infants, Children & Adolescents (5)
- Cardiopulmonary Resuscitation (5)
- Supra-pubic tap for obtaining a urine sample (5)
- Administration of drugs via a nebulizer (5)
- Catheterization of the urinary Bladder (5)
- Liver Biopsy (4)
- Kidney Biopsy (2)
- Arterial Cannulation for monitoring of Blood Pressure (5)
- Peritoneal dialysis (2)
- Cannulation of the umbilical vessels (7)
- Exchange Transfusion (5)
- Bone Marrow aspiration (2)
- Bone Marrow Biopsy (2)
- Pericardiocentesis (2)
- Cardioversion (4)

(The numbers in the brackets indicate the minimum number of the procedure that a post-graduate student needs to observe/ assist/ perform/ supervise)

6. Teaching/Learning Activities and Opportunities

Inpatient management

Outpatient Management

Presentation of cases on Clinical Rounds

Topic presentation.

Case discussions.

Clinicopathological conferences.

Clinicoradiological conferences.

Biopsy Meetings.

Mortality Review Meetings

Journal Club

Guest Lectures

In-house lectures

Conferences,

Seminars.

CME sessions

Participation in Workshops

Presentation of Papers

Teaching Undergraduate students.

Teaching Postgraduate students & paramedical staff.

Use and Maintenance of biomedical equipments and gadgets

Counseling regarding performance of procedures, disease process and prognostication

Group discussions Sessions

Assisting in diagnostic and therapeutic procedures.

Performing diagnostic and therapeutic procedures.

Patient/Health education.

7. Research

All the postgraduate students will be exposed to Research Methodologies through their participation in the Journal Club.

A candidate registered for M.D. (Pediatrics) will be submitting a dissertation to the university. This will be a pre-requisite for appearing for the MD examination. The dissertation will be done under the guidance and full satisfaction of the post-graduate teacher under whom the candidate is registered.

8. Reference Books and Suggested Reading

(A) Books & Textbooks

(I) General Medicine & Pediatrics

- Nelson Textbook of Pediatrics (Behrman)
- Forfar Textbook of Pediatrics (Campbell).
- Rudolph's Pediatrics (Rudolph).
- Pediatric Medicine (Avery).
- Textbook of Pediatrics (Udani).
- Manual of Pediatric therapeutics (Graef).
- Manual of Neonatal Care (Cloherty)
- Common symptoms (Illingworth).
- Pediatric diagnosis (Green).
- Signs and symptoms in Pediatrics (Tunnessen).
- Harrison's Principles of Internal Medicine.
- Mcleod's clinical methods.
- IAP Textbook of Pediatrics
- Harriet Lane Handbook (Barone).
- Handbook of Pediatric Physical diagnosis (Barness)

(II) Super-speciality Reference Books

Neurology : Pediatric Neurology : Principles and Practice(Swaiman)
Clinical Pediatric Neurology :A Signs and symptoms approach (Fenichel)

Nephrology: Pediatric kidney diseases (Edelmann).
Pediatric Nephrology (Holliday).
Clinical Pediatric Nephrology (Kher & Makker).

Cardiology: Nada's Pediatric Cardiology (Fyker).
Heart Disease in Infants, children and Adolescents (Adams-Moss's).
Rheumatic fever (Markowitz).
Peroiff - Pediatric Cardiology for Practitioner's (Myung Park).
How to read Pediatric ECGs (Park).

Hematology: Clinical hematology in medical practice (de Gruchy's).
Blood diseases of infancy and childhood (Miller).
Nathan & Oski's Hematology of Infancy and childhood (Nathan).
Living with Thalassemia (Aggarwal)

Gastroenterology: Pediatric Gastroenterology (Sheila Sherlock)
Liver disorders in childhood (Mowat)
Paediatric Gastroenterology (Anderson).

Respiratory: Kendig's disorders of the respiratory tract in children (Chernick).

Infectious Diseases & Parasitology:
Poliomyelitis (Huckstep).
Tuberculosis in Children. (Miller)
Essentials of Tuberculosis in children. (Vimlesh Sheth)
Parasitology (Charterjee)
Textbook of Pediatric Infections diseases(Fegin & Cherry)

Growth & Development :
The Development of the Infant and Young Child – Normal & Abnormal (Illingworth)
The Normal Child (Illingworth).

Miscellaneous : Protein Energy Malnutrition
a) Alleyne,
b) Waterlow.
Essentials of Human Genetics (Kothari & Mehta)
Genetics in Medicine (Thomson & Thomson).
Birth Defects encyclopedia (Buyses).
Smith's Recognizable Patterns of Human Malformation (Jones).
Breastfeeding – A Guide for the medical profession (Lawrence)
Medical Embryology (Langman).
Frontiers in social Pediatrics (Patwari)
Medical emergencies in children (Singh)

Immunization : Immunization in Practice (Mittal)
Immunization update (Mittal)

(B) Journals in Pediatrics & Other Periodicals

Year Book of Pediatrics – Stockman III

Indian Pediatrics

Indian Journal of Pediatrics

Pediatrics Today.

Archives of Diseases in Childhood

Pediatrics

Journal of Pediatrics

Drugs.

State of the World's Children (UNICEF)

Perinatology Clinics of North America

Recent Advances in Pediatrics

Advances in Pediatrics

Recent Advances in Pediatrics – Suraj Gupte (Ed.)

(C) Sub-speciality Journals

Pediatric Nephrology

Pediatric Cardiology

Pediatric Neurology

Pediatric Radiology

Pediatric Neurosurgery

Journal of Infection

9. Evaluation Form

(A) Postgraduate Seminars

Name: Date:

Seminar Topic:

Evaluation Points:

1. Presentation:
2. Completeness of Preparation:
3. Cogency of presentation:
4. Use of audiovisual aids.
5. Understanding of subjects:
6. Ability to answer questions:
7. Time scheduling:
8. Consulted all relevant literature:
9. Overall performance.

Guidance for Scoring	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Form

(B) Case Presentation

Name: Date:
Case Title:

1. Logical order in presentation:
2. Cogency of presentation:
3. Complete /Relevant history:
4. Accuracy of General Physical Examination:

   All signs elicited correctly.
5. Accuracy of Systemic Examination:
6. Diagnosis – Logical flow based on History & findings:
7. Order of differential diagnosis (logical):
8. Investigations required:

   (Complete list, Relevant order, Interpretation of investigations, Unnecessarily investigations asked)
9. Treatment: Principles & details
10. Patient/Relatives communication

    (Diagnosis & Management
    Health education)

Overall:

1. Abilities to react to questioning:
2. Abilities to defend diagnosis:
3. Ability to justify differential diagnosis:
4. Acceptability of plan of management
5. Confidence

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Sheet

(C) Journal Club

Name: Date:

Points for consideration: Score

1. Choice of article relevant:
2. Cogency of presentation:
3. Whether understood and conveyed the purpose of the article:
4. How did he defend article:
5. Whether cross references have seen consulted:
6. Understood explained basics of statistic in article:
7. Whether relevant information mentioned from other similar articles.
8. Use of audio visual aids:
9. Presentation:
10. Response to questioning:

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Evaluation Form

(D) Clinical Work

Name: Date:

Points to be considered:

1. Punctuality:
2. Regularity of attendance:
3. Quality of ward work (procedures):
4. Maintenance of case records:
5. Presentation of cases during rounds (approach):
6. Investigation work up:
7. Bedside manners:
8. Rapport with patients:
9. Rapport with colleagues:
10. Motivation for blood donation:
11. UG teaching (if applicable):
12. Counseling patient's relatives:
13. Management of emergencies:
14. Knowledge of Pediatrics as a subject:

Score	**0**	**1**	**2**	**3**	**4**
	Poor	**Below average**	**Average**	**Above average**	**Very Good**

Faculty members:

1.

2.

3.

Mean Score:

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

BOARD OF STUDIES MEDICAL FACULTY(P.G.EDUCATION) MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES NASHIK-422004.

GOAL

1. **To develop competent specialist and medical teachers who can appreciate health needs of the community, perform professional obligations observing ethics and keeping in view the objectives of national health policy at various levels of health care delivery system as well as be aware of contemporary and recent developments in the concerned discipline and updating with latest advances.**

A) General suggestions .

i) Uniform nomenclature – it is unanimously decided that the nomenclature of Post graduate degree and diploma should be broad based. (either Respiratory Medicine / Pulmonary Medicine) eg. MD (Branch V) Respiratory Medicine,
Diploma in Respiratory Medicine (DRD) or Diploma in Pulmonary Medicine.

ii) Duration -PG Diploma should be of two years duration & PG degree should be of three years duration

iii) Affiliation- The department of a Medical College / Institution should be affiliated. It should be confirmed/ approved and then the teacher functioning in approved department should be recognized.

a. Criteria for affiliation-

- Institution should be first affiliated to university as per laid down norms under 11.2 minimum requirements for PG institution (M.C.I).
- Department on clinical side should have:

1. No. of units – (at least one)

2. Teaching component – teacher should posses the qualifications and experience prescribed by Medical Council of India

Total teaching experience in the subject of 8 years for which recognition is sought out of which at least five years as lecturer or Asst. Prof.

a) HOD Professor (preferably either recognized or eligible to be recognized for PG teacher ship)

b) Unit head – Prof./ Addl. Prof / Asso. Prof. (preferably either recognized or eligible to be recognized for PG teacher ship) if there is one unit it should be headed by Professor only but second or subsequent additional unit may be headed by either Prof ./ Addl. Prof/ Asso. Prof.

c) Other faculty – at least one more qualified teaching faculty (preferably either recognized or eligible to be recognized for PG teacher ship)

Any PG teacher can simultaneously be recognized for MD and PG diploma and can enroll students for both. In addition their teachership should be accorded permission for DNB (National Board of examinations) , Diploma / fellowship of college of Physicians and Surgeons Mumbai, along with certification / fellowship courses that are likely to be started by MUHS in the light of paucity of registration available for Maharashtra State students.

d) Bed strength – minimum 30 sanctioned beds in an indoor unit (at least one unit) For MD / MS and minimum 20 sanctioned beds in an indoor unit for PG Diploma if recognition is for both MD & PG Diploma minimum 30 sanctioned beds in an indoor unit (at least one unit) required.

e) Residents – minimum one resident per 10 beds- (3-residents per 30 beded unit) They are name as Junior Residents for broad specialty JR I (first year) JR II (second year) JR III (third year) Fourth year residency may be adopted to complete three years teaching experience to fulfill eligibility criteria for lecturer post. This post should only be given to PG degree qualified resident.

One teaching unit should have minimum two qualified teaching faculty (preferably either recognized or eligible to be recognized for PG teacher ship)

f) Other staff :

In addition to teaching faculty staff the strength of technical paramedical staff shall be as per the staff strength prescribed for admitting 50 – 100 – 150 or multiple of 100 MBBS admissions regulations

G. Enrolment :

Each PG teacher can enroll only one student for MD / MS per year and one PG Diploma students per year.

4) Laboratory facilities:

a) Central Lab facilities -for training Postgraduate students should be available preferably computerized automatic analytic type equipments be available.Central Direct microscopy, Fluorescent microscopy, Culture & Susceptibility for organism inclusive of AFB be available

b) Equipments -should be functional throughout the year quality control and accuracy be monitor periodically. The facilities should be updated in lieu of the advancement in knowledge, technology and research.

c) Central Biomedical waste management is mandatory.

5) Radiology :

Conventional, Ultrasound, Spiral CT/ Multislice CT, MRI, 2D Echo, Colored venous and arterial Doppler, CT guided Biopsy are few of the facilities that should be available. Further as per the advancement in our knowledge the facilities should be updated.

Department as well as Central **Medical Record Section** should be available (preferably computerized).

6)Library:

Department as well as Central medical library in possession of standard text books, index journals, year books, recent advances periodical should be available.

At least central Library should have PC's with colored laser printer, Internet facilities, Fax, Xeroxing machine along with educational CD's.

7) Equipments:

Each unit of the department should have clinical/ procedure room with facilities for pleural tapping and biopsy, FNAB, Pulse oximeter, multifunction bed, trolleys, with at least four X-ray and scanplate mountable viewing box, four to five nebulizers.

a)Pulmonary Function Laboratory having facilities to perform spiormetry, Airways resistance and conductance, diffusion study, Bronchial challenge test, allergy-testing facility with emergency management arrangement, six minutes walk work test facilities.

b)Bronchoscopy room having flexible fibroptic bronchoscope, with standard accessories, leakage tester, monitor , CCTV camera, recording facilities, nebulizer scope sterilization tray central cupboard to hang the scope with punch biopsy, brush biopsy, channel cleaning forceps, suction and oxygen ports or portable machine and cylinder.

c)Respiratory critical care/ high dependency ward: to take care of seriously/ critically ill patients. Preferably at least four bedded ward having facilities of centralized oxygen and suctioning Non – invasive/ invasive ventilators and different types of masks and oxygen canulae. If departmental critical center is not available hospitals central intensive care unit must be available with easy access to the patient from the department.

d) Sleep Laboratory:

1. Polysomnography machine with adequate channels, SPO2 measurement having facilities for up gradation
2. Monitoring treatment modality with unilevel / bilevel positive airway pressure equipment.
3. Separate room with proper ventilation

CURRICULUM
(syllabus)
BASIC SCIENCES

I - ANATOMY OF THE LUNG & DEVELOPMENT & GENETICS OF LUNG DISEASES.

II - PHYSIOLOGY :

- Respiratory Mechanics
- Physiology of Respiration & Ventilation.
- Physiological basis of pulmonary function testing & arterial blood gases.
- Acid based disturbances
- Physiology aspects related to mechanical ventilation
- Physiology related to endocrine aspects of lung
- Sleep physiology
- Patho-physiology of all disorders pertaining to pulmonary medicine.

III - PUBLIC HEALTH & EPIDEMIOLOGY:

- Epidemiological aspects of major respiratory and public health problems like tuberculosis, asthma, interstitial lung disease & occupational & environmental disorders.

IV - PULMONARY REHABILATION

V -SURGICAL ASPECTS;

- Surgical interventions in various pulmonary disorders including trauma, infections & lung transplantation & minimally invasive interventions.

VI- MEDICO-LEGAL ASPECTS:

- Principles of care for patient requiring mechanical ventilation.
- Long term oxygen therapy
- Compensation (occupational lung disorders)
- Fitness & disability evaluation.
- Personal Protective measures for occupational health, biosafety guidelines for medical equipment & waste disposal.
- Human Rights, ethical aspects, consent for procedures/newer drug development. Aspects related to medical procedures & interventions performed in various pulmonary disorders.

VII- RECENT ADVANCES :

- Drug development in respiratory medicine.
- Sleep Medicine
- Invasive diagnostic techniques
- Lung in extreme conditions.

VIII- INFECTIONS :

- Tuberculosis (pulmonary & extrapulmonary)
- Opportunistic infections related to immunocompromised state & other infections in immunocompetent individuals.
- Infections related to systemic illnesses

IX - ENVIRONMENTAL MEDICINE RELATED TO PULMONARY MEDICINE WITH SPECIAL REFERENCE TO AIR POLLUTION & OCCUPATIONAL DISEASES.

X - PULMONARY CRITICAL CARE ASPECTS :

XI -CONVENTIONAL CHEST RADIOLOGY & LUNG IMAGING

XII - PULMONARY CIRCULATORY DISORDERS.

XIII - DISEASES OF AIRWAYS

XIV - NEOPLASTIC DISEASES

XV - DISEASES OF MEDIASTINUM

XVI - INTERSTITIAL LUNG DISEASE

XVII - PULMONARY INFECTIONS.

XVIII - PROBLEM BASED LEARNING FOR THEORY & PRACTICAL ON EACH ASPECT (REFERENCE : W.H.O.) :

- Cause of the complaint
- Ways to differentiate between possible causes
- Pathophysiological mechanisms responsible for the complaint and clinical conditions.
- Best possible management strategies.
- Prevention of recurrence.

In addition to the above-cited syllabus a student should acquire theoretical knowledge, dissertation, clinical and communication skills as well as training in research methodology.

B) Recognition of textbooks, reference books & journals

a) **Text Books**:
Respiratory Diseases (I & II) - Crofton & Douglas
Pulmonary Diseases & Disorders - A. Fishman
Diseases of Chest (I,II,III &IV) - Fraser & Pare

b) **Reference books:**
Principles of Critical Care - Farokh E. Udwadia
Pulmonary Function Testing - Gregg L. Ruppel
Bronchoscopy -Udaya B. S.Prakash
Principles & Practices of Sleep Medicine - Kryger & Roth
Clinical application of Blood Gases - Barry A.Shapiro
Occupational Lung Disorders - Park & Park
High Resolution CT of the Lung - W. Richard Webb
Surgical Aspects of Tuberculosis - Gibbons
Tuberculosis - Toman

c)**Journals:**
Thorax
American Review of Critical Care & Respiratory Diseases.
Indian Journal of Chest Diseases
European Journal of Respiratory Diseases.
Clinics in Chest Medicine.
Recent Advances in Respiratory Medicine.

C) Pattern of P.G.Degree and Diploma Examinations

(As per Direction No. 01/2008 dtd. 26/05/2008)

Appointment of examiners:

a. There will be two internal examiners and two external examiners (from out of state).

b. If the total number of the candidates are more than 39 then instead of four eight examiners four internal & four external can be appointed.

c.In the event of more than eight candidates the practical examination should be held for more than one day depending upon the number of candidates in the multiples of eight.

d.If a corum of four / eight examiners is not completed than the external examiners can be appointed from the existing list however at no point of time both external examiners will be retired internal examiners empanelled as externals.

e. In case of crisis examination can be carried out with minimum of three examiners of which at least one should be an external examiner with prior permission of M.C.I.

f.. An internal examiner ordinarily be appointed for not more than two terms in succession or with in two years at any turn of the college.

g.examination of MD/ MS and PG diploma can be held in Jan & July Each year .

h. For PG degree and diploma four examiners are to be appointed and the same set of examiners can conduct both MD/ MS and PG diploma in there respective term to void duplication and extra expenses thereof.

i.Same set of examiners should assess dissertations, theory and practical of all the candidates appearing for the same examination.

J.PG students only should be allowed to appear for examination on passing assessment of dissertations by the respective set of examiners.

k.There will be chairman/ convener who is supposed to moderate paper setting and practical examination, submission of result to the university. Such person should essentially be an internal examiner and who will officiate for only one term at the time and not more than one in succession.

Draft Syllabus Prepared by Sub Committee on 06/01/2014 as per meeting of BOS on 07/10/2013 & Faculty of Medicine 08/10/2013. To be Submitted to BOS on 20/03/2014 & Faculty on 21/03/2014

Final Syllabus passed by Academic Council on 21/05/2014 Item No. 28 /2014. Subject to Uniformity in the University Examination System.

FACULTY OF MEDICINE

SYLLABUS

FOR

M.D. & DDVL IN DERMATOLOGY, VENEREOLOGY AND LEPROSY

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK

DERMATOLOGY , VENEREOLOGY AND LEPROSY — M D & DDVL

Dermatology including Venereology (STD) and Leprology is one of the important basic clinical speciality. Considerable advances have taken place in the understanding of dermatological disorders and their treatment. Leprosy is still a public health problem of considerable magnitude in the country. The STDs are showing worldwide increase in incidence with new dimensions added to it.
There is a dearth of trained personnel in the speciality. Very few medical college in the country impart sufficient knowledge about these diseases at Undergraduate level and Postgraduate courses are not available in all medical colleges.
The curriculum of MD Dermatology has been made designed matching the other clinical specialities at the Institute. An attempt has been made to give a comprehensive training to the postgraduates including basic subjects and recent advances.

OBJECTIVES

At the end of this training a candidate should be able to
1. Diagnose and manage independently common skin diseases, sexually transmitted diseases and leprosy.
2. Manage independently and efficiently all medical emergencies related with skin, leprosy and venereal disease.
3. Adopt preventive measures at individual and community levels against communicable skin, venereal diseases and leprosy.
4. Teach requisite knowledge and laboratory skills to other medical/paramedical team members.
5. Adopt a compassionate attitude toward towards the patients (and their families) under his/ her charge.
6. Critically evaluate and initiate investigation for solving problems relating to skin, venereal diseases and leprosy.

SKILLS TO BE LEARNT

1. History taking for dermatology, venereology and leprosy
2. Describe cutaneous findings in dermatological terms in a systematic way.
3. Evaluate and manage the common diseases in dermatology and have a broad idea how to approach an uncommon diseases.
4. Evaluate and manage STD cases
5. Evaluate and manage HIV positive cases
6. Systemic examination relevant for dermatologic condition
7. Maintain basic skills like pulse, blood pressure chest and cardiac auscultation learnt in MBBS
8. Care of dermatologic emergencies like TEN, Pemphigus, necrotic ENL, angioedema, drug reactions etc.
9. Management of pediatric cases with skin diseases
10. To achieve adequate skills for tests done in side laboratory in day-to-day practice and be familiar with other sophisticated investigations.

Fundamentals of Cutaneous Diagnosis-

Basic skin lesions, history taking, examination of the patient including relevant diagnostic, clinical tests and aids.

Duration of Course –

Full Time: 3 Academic Years for PG Degree Course and Full Time 02 Academic Years for Diploma course.

SYLLABUS

Topics Related to Allied Basic Sciences

The structure, function and development of human skin. Skin as a barrier
Ultra structural aspects of epidermis, epidermal appendages, dermoepidermal junction, dermis, and sub-cutis
Immunology, Molecular biology and genetics in relation to the skin.
Epidermal cell kinetics and Keratinization
Lipids of epidermis and sebaceous glands
Percutaneous absorption
Biology of eccrine and apocrine sweat glands
Biology of hair follicles, sebaceous glands and nails
Biology of melanocytes and melanin formation
Disorders of keratinisation
Epidermal proteins
Dermal connective tissue : collagen, elastin, reticulin, basement membrane and ground substance
Metabolism of carbohydrates, proteins, fats and steroids by the skin
Cutaneous vasculature and vascular responses
Mechanism of cutaneous wound healing
Cellular and molecular biology of cutaneous inflammation
Immunoligic aspects of skin
HLA system, Immunoglobulins, cyto kines
Complement system
Hyper-sensitivity and allergy
Cutaneous carcinogenesis
Basic of cutaneous bacteriology, mycology, virology, parasitology and defence mechanism.
Common laboratory procedures, stains culture media and related serological tests
Basic pathologic reaction pattern in skin
Common and special histopathological stains and procedures used in the diagnosis of skin diseases and Special techniques such as immunofluorescence, immunoperoxidase and other related techniques.

Clinical Dermatology

Epidemiology of cutaneous diseases
Pyschologic aspects of skin disease and psycho-cutaneous disorders
Pathophysiology and clinical aspects of pruritus.

Papulo-squamous Diseases

Psoriasis, Pityriasis rubra pilaris, pityriasis rosea Licen Planus, lichenoid eruptions
Parapsoriasis, Palmoplantar Keratodermas.
Darier.s disease. Prorokeratosis
Ichthyoses and ichthyosiform dermatoses, Keratodermas

Vesiculo-bullous Disorders

Pemphigus group of disorders
Bullous pemphigiod

Chronic bullous disease of childhood
Familial benign pemphigus
Herpes gestationis
Mechanobullous (hereditary and acquired)
Epidermolysis bullosa acquisita
Dermatitis herpetiformis
Erythema Multiforme
Subcorneal pustular dermatoses

Disorders of Epidermal Appendages

Disorders of hair and nails
Disorders of sebaceous glands : Acne
Rosacea, Perioral dermatitis,
Disorders of eccrine and apocrine sweat glands

Tumours

Naevi and hamartomas
Precancerous Skin lesions, Squamous cell carcinoma and Basal cell carcinoma, malignant melanoma.
Pagets disease, Keratoacanthoma.
Benign epithelial tumours, appendageal tumours

Disorders of pigmentation

Vitiligo Albinism, Benign neoplasia and hyperplasias of melanocytes, Dyplastic melanocytic nevi, hyperpigmentation

Inflammatory Disorders of the Dermis

Acute Febrile Neutrophilic dermatosis
Erythema elevatum diutinum
Cutaneous eosinophilic diseases
Granuloma faciale
Pyoderma grangrenosum
Erythema annulare centrifugum and other Figurate Erythemas
Granuloma annulare
Malignant atrophic papulosis
Neoplasms, Pseudo neoplasms and Hyperplasias of the Dermis
Vascular Anomalies, Kaposi.s Sarcoma
Anetoderma and other Atrophic Disorders of the skin
Neoplasias and hyperplasias of Neural and Muscular origin
Elastosis Perforans Serpiginosa, Reactive Perforating Collagenosis, Kyrle.s disease

Lymphomas, Pseudolymphomas and Related Conditions

Disorders of Subcutaneous Tissue

Panniculitis
Lipodystrophy
Neoplasms of the subcutaneous Fat

Disorders of the Mucocutaneous Integument.
Biology and disorders of oral mucosa
Disorders of anogenitalia of males and females

Cutaneous changes in disorders of altered reactivity

Genetic Immunodeficiency Disease
Urticaria and Angioedema
Disorders associated with complement abnormalities
Graft-versus-Host Disease
Muco-cutaneous manifestations in immunosuppressed host other that HIV-infection
Contact Dermatitis
Auto sensitization dermatitis
Atopic dermatitis (Atopic Eczema)
Nummular eczematous dermatitis
Seborrhoeic dermatitis
Vesicular plamoplantar eczema
Erythrodermas

Skin Changes Due to Mechanical and Physical Factors

Occupational skin disease
Radiobiology of the skin.
Skin problems in amputee.
Sports Dermatology.
Skin problems in war field.
Decubituls ulcers.
Radiation to the skin
Skin diseases due to cold, heat

Photobiology of skin

Normal reaction to ultra violet rays and sun exposure

Disorders Due to Drugs and Chemical Agents

Erythema multiformae, Stevens-Jhonson syndrome, toxic epidermal necrolysis and
Cutaneous reactions and mucocutaneous reactions to chemicals and drugs
Pathological response to UVR and sun exposure
Cutaneous manifestations of drug Abuse

Abnormal vascular response

Erythemas including annular erythemas
Urticaria
Vasculitis

Dermatology and age of man

Ageing of skin
Neonatal dermatological problems
Pediatric and adolescent problems
Geriatric dermatological problems

Skin Lesions in nutritional, heritable and metabolic disorders

Cutaneous Changes in nutritional disorders.
Acrodermatitis enteropathica and zinc deficiency disorders.
Cutaneous Changes in errors of amino acid metabolism

Porphyrias
Xanthomas
Disorders of lipid metabolism and storage
Mucinosis
Amyloidosis
Angiokeratoma corpris diffusum
Lipid proteinosis
Malabsorbtion
Vitamin and mineral deficiency and excess

Skin Manifestations of systemic disorders

Skin and disorders of the alimentary tract
Hepatobiliary system and the skin
Cutaneous changes in renal disorders, cardiovascular, pulmonary
disorders and endocrinal disorders
Skin changes in pregnancy
Cutaneous changes in haematological disease (Langerhans Cells and other cutaneous histiocytosis, Mastocytoses Syndrome)
Cutaneous changes in endocrine disorder
Flushing and carcinoid syndrome.

Genodermatosis

Phacomatosis
Tubero sclerosis
Incontinentia pigmentation
Ectodermal dysplasia
Xeroderma pigmentosis

Connective tissue disorder and Skin manifestations of rheumatological diseases

- Reiter's syndrome.
- Arteritis and venulitis.
- Lupus erythematosus
- Dermatomyositis
- Scleroderma
- MCTD (Mixed connective Tissue Disorders)
- Relapsing polychondritis
- Rheumatoid arthritis, rheumatic fever and gout
- Sjogren.s syndrome
- Raynaud.s phenomenon
- Multicentric reticulohistiocytosis

Cutaneous Manifestations of Disease in Other Organ Systems

Sarcoidosis of the skin
Cutaneous Manifestations of Internal Malignancy
Acanthosis Nigricans
Papular Mucinosis
Neurocutaneous Disease
Tuberous Sclerosis Complex
Neurofibromatosis
Ataxia Telangiectasia
Behect.s Disease

Bacterial infections

Pyodermas : Staphylococcus aureus, Streptococcus, and others
Staphylococcal scalded-skin syndrome
Soft tissue infections : Erysipelas, Cellulitis
Systemic bacterial infections with cutaneous manifestations
Cutaneous tuberculosis and atypical mycobacterial infections
Actinomycetoma

Fungal infections

Superficial fungal infection : (dermatophytosis, yeast, others)
Deep fungal infections

Viral and rickettsial infections

Herpes simplex virus infections
Varicella . zoster infection
Human papilloma virus
Molluscum contagiosum
Hepatitis B, C
Rubella
Measles

Parasitic and protozoal infestations

Scalries
Pediculosis.
Arthropods and skin.

THERAPEUTICS

Topical Therapy

Pharmacokinetics and topical applications of drugs
Principles of topical therapy, topical formulations

Topical Agents
Glucocorticoids, analgesics, anesthetics, antinflammatory, anti microbial, anti parasitic, antiperspirants, antipruritic, antiviral, astringents, bleaching agents, keratolytics and keratoplastic agents.
Therapies, antiviral, topical antibiotics, topical antifungal agents, sunscreens, cytotoxic agents, retinoids, Vit D3 analogues, cosmetics and skin care in practice, emollients and moisturizer.

Systemic Therapy
Systemic glucocorticoids, antibiotics, antileprosy and antituberculous agenst, sulfones, aminoquinolines, cytotoxic and antimetabolic agents, oral retinoids, antihistamines, antiviral drugs, oral antifungal agents, immunosuppressive and immunomodulatory drugs, thalidomide. Antiparasitic drugs, antiandrogens, interferons, biologics, intravenous immunoglobulins, antiplatelet agents, psychotropic agents. other misc. systemic drugs

Dermatosurgery including Cosmetic dermatology
Local aneasthesia and nerve blocks, electrosurgery/ cautery, vitiligo surgeries, cryotherapy, electrolysis, tattooing, intra-lesional injections, iontophoresis, dermabrasion, biopsy techniques, hair and nail minor surgeries, excision surgeries.
Lasers in dermatology - for vascular, hair and pigmented disorders.

Skin resurfacing : chemical peels
Skin resurfacing : dermabrasion
Skin resurfacing : Laser
Skin punch grafting
Wound dressings
Sclerotherapy for varicose and telangiectatic veins
Botulinum injections.
Tumescent liposuction
Substances for soft tissue augmentation
Hair transplantation and alopecia reduction
Cryosurgery
Mohs micrographic surgery
Nail surgery

Photochemotherapy and Photo therapy including principles and use of Narrow band UVB, PUVA, UVB in Skin diseases.

STD
Clinical approach to the patient with STD
Anatomy of male and female genitalia
Epidemiology of STD's
Human Sexuality.
Viral STD.s including HIV, HSV, HPV, Molluscum contagiosum, EBV etc.
Bacterial STD.s : Syphilis, gonorrhoea, chancroid, donovanosis, bacterial vaginosis
Chlamydial and mycoplsma infections : Lymphogranuloma venereum, urethritis, cervicits, NGU
Fungal : Candidiasis
Protozoal : Trichomoniasis
Ectoparasitic : scabies, pediculosis infestations.
Syndromic management of STD.s
STD.s in reproduction health and paediatrics
STD.s and HIV
Post exposure prophylaxis
Prevention, counseling and education of different STD.s including HIV
National control programmes of STDs and HIV infection
Medicolegal, social aspects of STD.s including psychological and behavioural abnormalities in STD patients.

Management of Antiretroviral Therapy of Adults and Adolescents.
- Diagnosis of HIV Infection in Adults and Adolescents.
- Assessment of Adults and Adolescents with HIV Infection and pre- ART Care and Follow-up.
- Prophylaxis of Opportunistic Infections.
- ART in Adults and Adolescents.
- Routine Monitoring of Patients on ART.
- ART in pregnant Women, PPTCT and Previous Exposure to NVP.
- Considerations for Co-infection with HIV.
- Antiretroviral Drug Toxicity.
- ART Treatment Failure and When to Switch.
- Choice of ARV Regimens in the Event of Failure of First-line Regimens.
- Nutritional Aspects of HIV.
- Palliative Care in HIV.
- NACO Standardized Reporting and Recording System.

Management of Occupational Exposure including Post-exposure Prophylaxis.
Cutaneous Manifestation and Lab-diagonasis of HIV.
Prevention aspect of STD's (Condoms, Vaccines etc).
Prevention, counseling and education of different STD.s including HIV
National control programmes of STDs and HIV infection

Medicolegal, social aspects of STD.s including psychological and behavioural abnormalities in STD patients

LEPROSY

Approach to the patient with leprosy
Epidemiological aspects
Structure, biochemistry, microbiology of Mycobacterium leprae
Animal models
Pathogenesis
Classification
Immunology and molecular biological aspects
Histopathology and diagnosis including laboratory aids
Clinical features
Reactions
Systemic involvement (ocular, bone, mucosa, testes and endocrine etc.)
Pregnancy and leprosy
HIV infection and leprosy
Therapeutic aspects including newer drugs
Immunotherapy,
Disabilities, deformities and rehabilitation
Prevention, education and counseling
National leprosy control and elimination programme

DIPLOMA IN VENEREOLOGY AND DERMATOLOGY PRACTICAL/ CLINICAL EXAMINATION :-

Sr. No.	Heads	Marks
1	One Long Case	80
2	Two Short Cases	30×2=60
3	Viva	80
4	Spotters Ten	5×10=50
5	Histopath Slides	3×10=30
Total Marks	**300 Marks**	

Subheads to be added to Draft Syllabus for MD and DDVL

Basics of Dermoscopy and Trichoscopy

Cosmetic Dermatology
Chemical Peels,
Lasers,
Botox and fillers,
Facial rejuvenation

Continuing Medical Education:

1) University should sponsor CMEs to be held by rotation in each of the medical colleges affiliated to the university on the subjects of (or related subjects)
    a. Dermatopathology
    b. Dermoscopy
    c. Skin in internal medicine
    d. Genodermatoses
    e. Autoimmune diseases
    f. Contact Dermatitis
    g. Ultraviolet therapy
    h. Vitiligo
    i. Pigmentary diseases
    j. Leprosy

2) Faculty development:

    a. Faculty training: Each of the medical college departments may be identified as a training centre for one or two subspecialties mentioned above. Faculty from other medical colleges interested in getting trained in that department for that subject should be given the opportunity to attend the training for one to two weeks on deputation from their department under a university program. Faculty may also be encouraged to acquire experience in related fields by attending part time at an allied department in the same hospital.

    b. Foreign Conferences - leave and support: Each senior faculty (Professor and Associate Professor), should be given 5 days leave once a year to attend a conference or training abroad. Financial assistance for such travel may be given if the faculty is invited to present a paper at the conference.

3) Books and journals: Currently students and teachers are unaware of the availability of digital resources provided by MUHS. Awareness drive should be held to improve visibility of this vital resource. Students should be given a handout of the facilities at the time of registration.

    a. The number of books and journals provided in the MUHS digital library should be increased. I recommend the following additional journals:
        Indian Journal of Dermatology
        International Journal of Dermatology
        Indian Journal of Sexually Transmitted Infections and AIDS
        Journal of American Academy of Dermatology
        Journal of European Academy of Dermatology and Venereology

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

OBJECTIVES OF CURRICULUM PLANNING

FOR PG DEGREE

OBJECTIVES

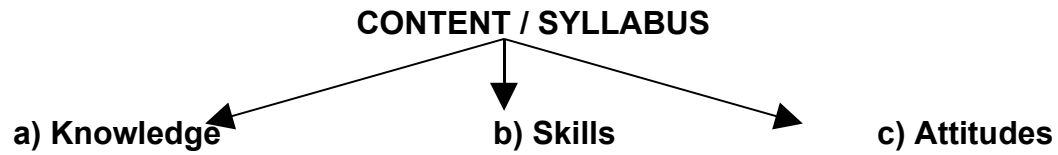
1) Therapeutic :
   a) To examine, diagnose and treat psychiatric disorders.
   b) Consultation – Liason psychiatry in general hospital.

2) Preventive and Promotive
   a) Prevention of relapses and complication of psychiatric disorders and addictive behaviour.
   b) Rehabitation of mentally ill patients.
   c) Promotion of mental health in the population in terms of improving mental well being & Quality of life.

3) To inculcate an empathic attitude that allows an integration of humanistic and Ethical approach in medicine.

4) To Apply Research Methodology in the field of psychiatry

5) To be aware of Knowledge of recent advance in psychiatry.



a) <u>KNOWLEDGE:</u>

1. BASIC SCIENCES AS APPLIED TO PSYCHIATRY

- NEUROANATOMY
  - Developmental
  - Central peripheral autonomic
  - Principles of Brain imaging

- NEUROPHYSIOLOGY
    - Normal sleep
    - Basic cell
    - Of thought ,cognition mood and Motor function
- NEUROCHEMISTRY
    - Neurotransmitters
    - In emotion, memory,behaviour
- Applied Neurophysiology., Neurochemistry., Neuroanatomy in relation to physical factors affecting psychiatric disorders.

PSYCHOLOGY

- Basic principles e.g. Learning, memory, motivation, emotion and stress etc.
- Applied psychology – behaviour science
- Sensory processes and perception
- Thinking and language
- Social perception, Influences and relationships
- Attitudes and beliefs
- Developmental psychology child development
- Personality structure
- Psychological assessment and testing (IQ and cognition)
- EEG
- Genetics

2. PSYCHIATRY, NEUROLOGY, NEUROPSYCHIATRY AND BEHAVIOURAL MEDICINE

PSYCHIATRY

- Introduction to mental health and psychiatric disorders
- History taking and clinical examination in psychiatry
- Classificatory systems.
- History of Psychiatry
- Schizophrenia and other psychotic disorders.
- Mood Disorders
- Anxiety and Somatoform and dissociative disorders
- Substance related disorders
- Sexual disorders
- Sleep disorders
- Eating disorders
- Psychiatric disorders due to General Medical Consumption including HIV
- Disaster and Psychiatry
- Special population in psychiatry
- Personality disorders
- Impulse control disorders
- Adjustment disorders
- Relational problems
- Psychiatric emergencies
- Deliberate self harm / Suicide

- Transcultural psychiatry
- Child and adolescent psychiatry
- Family psychiatry
- Geriatric psychiatry
- Community psychiatry in relation to India (NMHP)
- Forensic psychiatry (Mental Health Act)
- Ethics
- Human rights
- Rehabilitation.
- Psychosomatic disorders including stress
- Therapies
    a) Biological - ECT and Psychopharmacology
    b) Psychosocial interventions
    c) Psychotherapy
    d) Behaviour therapy
    e) Therapies based on Indian philosophy

NEUROLOGY, NEUROPSYCHIATRY

- Clinical history and CNS examination
- Head injuries
- Alcohol and substance
- Toxic & metabolic & endocrine Disorders
- Nutritional
- Dementias
- Delirium
- SOL

- Infections and inflammatory diseases including HIV
- Movement disorders
- Epilepsy
- CVA
- Investigations

MEDICINE AS RELATED TO PSYCHIATRY

Consultation liason psychiatry

Medicine and allied

Surgery and allied

Gynecology and Obstetrics and allied

b. **SKILLS**

- Communication skills
- History taking and interview
- Mental status evaluation & Physical Examination with neurological examination
- Diagnostic formulation and comprehensive plan of management
- Appraisal of Psychometry ie Intelligence , personality
- Handling emergencies and liaison services
- Psycho-education skills
- Ethical discharge of duties
- Tackling medico legal issues
- Psychotherapy and counseling
- Behavior Therapy
- Interpretation of EEG, C T, MRI
- Biological therapies including ECT & Psychopharmacology

c. ATTITUDES AND VALUES

- For professional and ethical conduct
- Humanistic and empathic relationship with patients, relatives and colleagues.

d. TEACHING LEARNING METHODS

Cognitive:

- Lectures
- Tutorials
- Seminars
- Symposium
- Didactic Small group teaching
- Workshop
- Self study
- Inter disciplinary conference
- Research forum

Skills:

- Demonstrations
- Case conference
- Research project
- Workshops
- Bedside clinics
- Journal review
- Psychotherapy and Behavior Therapy session

Attitude:

- Roll play
- Audio-visual
- Workshops
- Demonstration

EVALUTION: (*As per Direction No. 01/2008 dtd. 26/05/2008 & practical scheme is as per revised practical marksheet.)*

Dissertation /Thesis

- **Time spent should be one year**
- **Supervision**
- **Evaluation mandatory**

Log book of all the academic activities of students

- **Attitude:**
    - Structured evaluation and Scales
    - Group Discussion
    - Log Book
    - Clinical - patient relationship

RECOMMENDED BOOKS AND JOURNALS:

- Psychology - Morgan King
- Anatomy - Snelles
- Physiology – Guyton
- Symptoms in the mind – Sims
- Comprehensive Textbook of psychiatry – Kaplan
- Postgraduate psychiatry – Niraj Ahuja(Indian text book)
- Oxford Text book of Psychiatry
- Organic psychiatry – Lishmann
- Indian Journal of Psychiatry

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The Curriculum

Goals

The goals of postgraduate training course in Surgery would be to train a MBBS doctor who will Practice surgery efficiently and effectively backed by scientific knowledge and skill .
No syllabus can be comprehensive but the following topics are not intended to be prescriptive but it is a guide to the topics which need to be covered during training.
At the end of the training and evaluation,

• He will develop right attitudinal skills which will ensure effective and correct communication with patients, relatives, colleagues and superiors
• Continue to develop keen interest in continuing surgical education irrespective of whether he is in a teaching institution or is in Private practice
• Be a motivated 'teacher' - defined as a surgeon keen to share his knowledge and skills with a colleague or a junior or any learner.

Objectives of the Course

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the subheadings

1. **Knowledge (Cognitive domain):** Knowledge and information about the subject, Recall of and Analysis of available information to be used for the treatment of patients.
2. **Skills (Psycho motor domain)**: The correct skills to be developed by working in a dry lab as well as surgeries on animals (Minimal access Surgery). He/She should develop surgical skills by assisting seniors as well as being assisted by seniors
3. **Human values**: Ethics involved in Surgical practice

At the end of the training, the candidate must be able to:

Knowledge:

• Describe etiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.
• The candidate should be conversant with Homeostatic mechanism and Fluid Electrolyte balance and replacement therapy including blood transfusion, plasma expanders and treatment of various types of shock.

• Nutrition : Assessment, Management of parenteral and enteral nutrition

•Disorders of coagulation pertaining to surgeries, DVT , Thrombophilia

• Describe common malignancies in the country and their management

• Recognize conditions that may be outside the area of his specialty / competence and appropriate referral to specialist

• Advise regarding the operative or non-operative management of the case and to carry out this management effectively.

• Update himself by self-study and by attending courses, conferences and seminars relevant to surgery.

• Teach and guide his team, colleagues and other students.

• Undertake audit, use information technology tools and carry out research, both basic and clinical, with the aim of publishing his work and presenting his work at various scientific forums.

Skills

• Take a proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them to come to a reasonable diagnosis about the surgical condition.

• Perform *minor* operative procedures and common general surgical operations independently and the *major* procedures with help from a senior surgeon.

• provide basic and advanced life saving support services (BLS & ALS) in emergency situations

• manage acute abdominal emergencies and poly trauma.

• Undertake thorough wound management, including burn wounds.

• Undertake complete patient monitoring including the preoperative and post operative care of the patient.

•Use of antibiotics in Surgery, Surgical infections' & use of Prophylactic antibiotics

Human values, Ethical practice and Communication abilities

• Adopt ethical principles in all aspects of his surgical practice. Professional honesty and integrity are to be fostered. Surgical care is to be delivered irrespective of the social status, caste, creed or religion of the patient.

• Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.

• Provide leadership and get the best out of his team in a congenial working.atmosphere.

• Apply high moral and ethical standards while carrying out human or animal research.

• Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.

• Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

Course Contents

Essential Knowledge

A list of objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course is given. The course contents have been identified and categorized as essential knowledge as under. This is to enable the student to achieve the objectives of the course. It is recognized that General surgery today mainly covers Gastrointestinal & Hepatobiliary disorders, basic urological problems, abdominal wall herniae, Breast & thyroid disorders, knowledge of some common problems in allied specialities. Further he should be familiar with complications, current controversies and recent advances in these topics.

The topics are considered under:

- Basic sciences,
- General Surgery topics and
- Specialty topics.

There will be an overlap between the General surgery and specialty categories.

Basic sciences include anatomy, physiology, biochemistry, microbiology and pathology and Radiology, as found in current text books. These standard topics are recommended to be studied as much as they are applicable to the practice of surgery.

General Surgery Topics include the following:

History of surgery

Clinical History and examination - detailed systematic history taking, clinical examination of various systems, coming to a provisional working diagnosis.

Rationale of diagnostic tests - Ordering diagnostic tests with prioritizing the needs,based on the clinical, hospital and the patient's socioeconomic condition

Informed consent / Medico legal issues - Understanding the implications of acts of omission and commission in practice. Issues regarding Consumer Protection Act. - Implications in a medico-legal case like accidents, assaults etc.

Concept of Essential Drugs and Rational use of drugs

Pharmacoeconomics

Surgical audit - Understanding the audit of process and outcome. Methods adopted for the same.

Basic statistics

Evidence based medicine - Understanding journal based literature study;
the value of text book, reference book articles; value of review articles; original articles and their critical assessment. Understanding the value of retrospective, prospective, randomized controlled and blinded studies. - Understanding the principles and meanings various biostatistical tests applied in these studies.

Use of computers in surgery: Retrieval of important information, Record keeping, Powerpoint presentations for teaching, Statistical methods

Preoperative evaluation of patients with Co-morbid conditions

Principles of operative surgery like asepsis, antisepsis, sterilization. Basic surgical techniques; properties of suture materials; appropriate use of sutures, drains, prosthetic grafts. Postoperative care - concept of recovery room care; airway management; assessment of wakefulness; management of cardiovascular instability in this period. Post operative pain management as well as care of terminally ill patients especially cancer patient. Basic surgical instrumentation - Principles of surgical instrumentation; their maintenance and troubleshooting. Familiarize with minimal access surgery instruments, Diathermy & lasers.

Wound management: wound healing; factors influencing healing;
Assessment of trauma; Assessment of head, chest and abdominal trauma and triage - Assessment of a trauma victim; resuscitation; care at the site; triage; care in the accident department; criteria for immediate surgery; immediate workup and logical referral criteria. Multiple injured patient, closed abdominal and chest injuries, penetrating injuries; fractures pelvis; urological injuries; vascular injuries; trauma scores.

Surgical infections - asepsis and antisepsis; microbiological principles; rational use of antibiotics; special infections like synergistic gangrene and diabetic foot infections. Hepatitis and AIDS

Surgical nutrition - nutritional assessment; metabolic response to stress; need for nutritional support; enteral nutrition; routes of access to GI tract; parenteral nutrition; access to central veins for nutritional support.

Acute abdomen - Appendicitis / Peritonitis / Perforated viscus / Intestinal obstruction

Hernias - simple and complicated - various types of hernias; their repair; prosthetic materials

Critical care - Cardiorespiratory failure - management of shock; including monitoring; sepsis scores; pharmacological support.

Fluid and electrolyte balance / Acid - Base metabolism - The body fluid Compartments; metabolism of water and electrolytes; factors maintaining homeostasis; causes for and treatment of acidosis and alkalosis.

Pain control - acute and chronic pain; cancer and non-cancer pain; patient controlled analgesia.

Principles of oncology - cell kinetics; causation of tumours; principles of oncologic surgery, radiotherapy and chemotherapy; paraneoplastic syndromes; cancer pain management; palliative care

Principles of burn management - types of thermal injury; assessment of extent; immediate management; late management; skin cover; rehabilitation

Principles of fracture management - fracture healing; principles of immobilization; complications; principles of internal fixation.

Airway obstruction / management - anatomy of the airway; principles of keeping the airway patent; mouth to mouth resuscitation; oropharyngeal airway; endotracheal intubation; crico-thyroidetomy; tracheostomy.

Breast disease - benign and malignant disease; diagnosis; investigation; screening for cancer; genetics of breast cancer

Thyroid disease - solitary nodule; investigations; multinodular goiter; Hashimoto's disease; cancer

Specialty Topics Include

GI endoscopy and Laparoscopy:

Principles of GI endoscopy

Diagnostic and therapeutic GI endoscopy including upper GI, lower GI and pancreato-biliary systems.

Physiology of pneumoperitoneum. Diagnostic laparoscopy & Laparoscopic therapeutic procedures

Neurosurgery :

Head and neck trauma; acute management and rehabilitation

Concept of brain death / medico-legal implications

Peripheral nerve injuries

Neoplasms of the brain and meninges

Acute and chronic infections of the brain and meninges

Hydrocephalus

Spinal injuries

Monitoring intracranial tension

Urology:

Urological injuries

Urothelial tumours / Chemotherapy

Prostatic hypertrophy

Hypospadias

Pyelonephritis / perinephric abscess

GU tuberculosis

Scrotal disease

Endourology

Peritoneal dialysis / CAPD / haemodialysis

Transplantation / harvesting kidney

Urinary diversion

Infertility / Vasectomy

Pyeloplasty / hydronephrosis

Oncology:

Breast, thyroid and GI malignancies

Chemotherapy / Adjuvant therapy

Head and neck tumours

Imaging CT/ MRI CT guided FNAB/C

Post excision reconstruction

Radiotherapy

Plastic Surgery

Burns management

Cleft lip and palate

Congenital defects of hand

Details of skin flap

Facial injuries

Hand injuries / tendon injury

Hypospadias

Nerve repair

Pressure sores .

Principles of microsurgery

Principles of tissue transfer

Vascular repair

Cardio-thoracic surgery

Flail chest / thoracic trauma Bronchogenic carcinoma Lobectomies

Pneumonectomy

Endocarditis prophylaxis

Pulmonary function tests

Control of major haemorrhage

Operations on the diaphragm

Coronary artery disease

Valvular heart disease

Lobectomies and pneumonectomies

Oesophageal disease

Operations on thoracic aorta

Mediastinal tumours

Basics of congenital heart disease

Vascular Surgery

Vascular imaging

A V malformations

Exposure of major arteries and veins / vascular anastamosis

Varicose veins

Chronic venous insufficiency.

Vascular emergencies - trauma, embolism

Peripheral vascular disease - Atherosclerosis, arteritis

Details of vascular prosthesis

Paediatric Surgery

Fluid and electrolyte management

Preparation for surgery / post op care

Hernias

Spinal fusion defects Ventral defects

Operative Skills:

Emergency Room Procedures

Application of Splints for Fractures
Arterial and Venous Lines
Assessment and initial management of Poly trauma
Cardiopulmonary Resuscitation
Management of Airway Obstruction
Management of Shock and Cardiac Respiratory failure

Pre-operative Workup

Ability for adequate pre-operative preparation in special situations like Diabetes, renal failure, cardiac and Respiratory failure etc. and risk Stratification
Communication skills with special reference to obtaining Informed Consent
Proper pre-operative assessment and preparation of patients including DVT prophylaxis, Blood transfusion and Antibiotics

Post-operative Care

Airway management
Basic Physiotherapy
Management of epidural analgesia
Management of Fistulae
Management of postoperative hypo and hypertension
Postoperative pain control
Skills for Nutritional rehabilitation of patients
Skills for proper Fluid & Antibiotic management
Stoma care

Minor O. T. procedures

Circumcision under Local Anesthesia
Drainage of Abscesses
FNAC
Major dressings
Minor Anorectal Procedures (Haemorrhoids -Banding, Cryotherapy, suturing etc.
Anal dilatation and Fissures), Fistulectomy
Minor Biopsies - Lymph node, ulcer, swellings etc.,
Reduction and plaster application of simple fractures and dislocations
Removal of simple subcutaneous swellings
Sigmoidoscopy and Upper OJ. endoscopy
Suturing Techniques
Vasectomy
Wound debridement

Major Operating room techniques

Instrument anangement and trolley layout
Skills in Sterilization techniques, O.T.Layout and Asepsis
Skin preparation - painting and draping
Technique of scrubbing and gowning

General Surgical Operative Procedures

Appendicectomy

Cholecystectomy

Closure of Colostomy

Closure of peptic ulcer / under-running bleeding ulcer / vagotomy drainage

Colostomy

Cysts and sinuses of the neck

Diagnostic laparoscopy

Drainage of breast abscess / Excision of breast lump

Groin Hernia repair

Gynaecomastia

Haemorrhoidectomy / Fissurectomy / simple fistulectomy

Hemicolectomy

Herniotomy / Orchidopexy in children

Laparotomy for abdominal trauma / splenectomy

Laparotomy for intestinal obstruction / bowel resections / bowel anastamosis Management of complex wounds

Mastectomy

Opening and closing the abdomen

Opening and closing the chest

Parotidectomy

Release of bands and simple adhesive obstruction

Thyroid lobectomy

UGI endoscopy / Flexible sigmoidoscopy

Ventilation

Wide excision of breast tumours / mastectomy / microdochectomy

Gastrostomy / Feeding jejunostomy

Speciality Procedures

There will be repetition of the procedures listed under this category and those listed under General surgical procedures.

Laparoscopy And GI Endoscopy

Diagnostic and therapeutic Upper and Lower GI endoscopy

Diagnostic laparoscopy

Diagnostic Upper GI endoscopy

Laparoscopic Cholecystectomy

Neurosurgery

Craniotomy
Management of paraplegia
Peripheral nerve repair
Treatment of nerve injury specific operations
Suturing complex scalp wounds
Trephining

Urology

Carcinoma penis
Diagnostic cystoscopy
Inguinal Block Dissection
Meatotomy
Nephrectomy - partial & total
Nephrolithotomy
Orchidectomy
Orchidopexy
Retroperitoneal lymph node dissection
Supra pubic cystostomy
Total amputation of penis
TURP / Open prostatectomy
Ureterolithotomy
Urethral J Urogenital injuries
Urethral dilatation
Varicocele
Vasectomy

Oncology

All radical operations - Breast, Thyroid, GI and Facio-maxillary malignancies
Breast lumpectomy
Functional neck node dissection
Gastrectomy / Bowel resection
Metastatic workup

Plastic Surgery

Burn resuscitation

Lip surgery

Local blocks in anaesthesia

Minor hand injuries

Nerve repair

Post excision reconstruction

Reimplantation of digits

Skin flap surgery

Stitch craft

Tendon repair PA

Wound debridement

Paediatric Surgery

Anorectal anomalies

Circumcision I meatoplasty

Herniotomy

Intercostal aspiration

Laparotomy for peritonitis

Lymph node biopsy

Non operative treatment of volvulus

Orchidopexy

Ostomies

Paediatric emergencies

pyloromyotomy

Cardiothoracic Surgery (Not essential)

Canulation of artery and vein

Chest injuries PA

Empyema drainage / decortication

Endotracheal intubation

Intercostal drainage

Lobectomies and pneumonectomies

Oesophageal surgery

Opening and closing the chest

Operations on the root of the neck

Pericardiectomy

Removal of FBs

Remove pulse generator (pacing)

Rib resection PA

Tracheos tom y

Undertake sternotomies

Vein and arterial harvesting

Ventilator management

Vascular Surgery

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full time student.He should be included in Residency program No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not remain absent himself / herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below. Depending on the facilities available, any or all of these methods may be employed.

1.**Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a)Didactic Lectures: Recommended for selected common topics for post graduate students of all specialities. Few topics are suggested as examples:

1)Bio-statistics

2)Use of library

3)Research Methods

4)Medical code of Conduct and Medical Ethics

5)National Health and Disease Control Programmes

6) Communication Skills etc.

These topics may preferably taken up in the first few weeks of the 1st year.

b)Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, eg Jaundice, Diabetes mellitus, Thyroid Topics to bs taken by Basic sciences specialist etc.

2.**Journal Club:** Recommended to be held once a fortnight All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must make a presentation from the allotted journal(s) of selected articles at least two times a year and a total of 6 presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table with names of the student and the moderator should be announced at the beginning of every year.

3.Subject Seminar: Recommended to be held once a month All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must present on selected topics ai least" four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry

weightage for internal assessment (See Checklist II of Internal Assessment). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.

4.Student Symposium: Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.

5.Ward Rounds: Ward rounds may be service or teaching rounds.

a)Service Rounds: Postgraduate students and Interns should do ward rounds every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.

b)Teaching Rounds: Every unit should have 'grand rounds' for teaching purpose. A diary should be maintained for day to day activities by the students.

Entries of (a) and (b) should be made in the Log book.

6.Clinico-Pathological Conference: Recommended once a month for all post graduate students. Presentation be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

7.Inter Departmental Meetings: Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of Surgery department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advance immuno-histochemical techniques, the burgeoning markers other recent developments can be discussed.

Radio-diagnosis: Interesting cases and the imaging modalities should be discussed.

8.Teaching Skills:: Post graduate students must teach under graduate students (Eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc.

Assessment is made using a checklist by surgery faculty as well students. Record of their participation be kept in Log book. Training of post graduate students in Educational Science and Technology is recommended.

9.**Continuing Medical Education Programmes** (CME) : At least 2 state level CME programmes should be attended by each student in 3years.

10.**Conferences:** Attending conferences is optional. However it should be encouraged.

11.**Dissertation** Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

Rotation and posting in other departments

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic subjects, allied departments and speciality departments are given below.

In the first year, during the morning session, student should work in the parent department. It is recommended that 2 years and 4 months be spent in General Surgery and 8 months in allied and specialty departments. Depending on the time and opportunities available, some of the procedures listed for second year activity can be shifted either to the first or the third year. Students must be 'on call' on a regular basis. The total duration of postings in core and other specialities will be eight months.

Basic Sciences

Basic science should be an essential part of training. It should be done as concurrent studies during the 1 st year of training. At least two hours daily may be in the first six months of the course.

In the afternoons basic science teaching relevant to surgery can be done in the respective departments.

Topics for study to include Anatomy, Physiology, Pathology, Microbiology, Pharmacology, Anaesthesia and Radiology

Pathology - Concurent study - Recommend daily Grossing sessions, weekly Surgical pathology sessions and monthly Clinico Pathological Conferences. Radiology - Concurrent study - adequate exposure to modern imaging modalities like ultrasound sonography, CT scan, MRI and angiography.

Allied Specialty Subjects

Students should to be posted to core allied speciality subjects Viz. Anaesthesia and ICU for one month and Orthopaedics including trauma (accident and emergency) for 2 months during the second year of training. Posting to the Department of Obstetrics and Gynaecology for one month is optional. This posting may be in lieu of one of the other specialties (except the core specialties) depending on the choice of the candidate.

Other Surgical Speciality Subjects

Postings to other speciality departments will be during the second year. The departments and duration of postings are as under:

Department	Duration
• Paediatric surgery	4wks
• Plastic surgery	4wks
• Urology	4 wks
• Oncology	4 wks
• Cardiothoracic surgery	2 wks
• Neurosurgery	2 wks

Dissertation

1.The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

2.Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation worK within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

3.Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

4.The dissertation should be written under the following headings:

1.. Introduction
11. Aims or Objectives of study
111. Review of Literature
IV. Material and Methods
V. Results
VI. Discussion
V11. Conclusion
V11l. Summary
IX. References
X. Tables
Xl. Annexure

5.The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other Checklists. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" X 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

6.Four copies of dissertation thus prepared shall be submitted to the University, six months before final examination on or before the dates notified by the University.

7.The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the Universityexamination.

8.**Guide:** The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work be as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognised as post
graduate teachers. A **Co-guide** may be included provided the work requires substantial contribution from a sister department or from another medical institution recognised for teaching/ training by the University /Medical Council of India. The co-guide shall be a
recognised post graduate teacher

9.**Change of guide:** In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

Practical Examination:

(As per Direction No. 01/2008 dtd. 26/05/2008)

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

SYLLABUS OF M.S. ORTHOPAEDICS

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK - 422 005.

Syllabus for M.S. (Orth.)

Syllabus :

1) Basic Sciences Related to Locomotor system.
   1) Development, histology of bone, cartilage, collagen, muscles and nerve.
   2) Physiology of bone, carliage, muscle & nerve.

2) Surgical pathology related to bones, cartilage, muscle, collagen & nerve in various congenital affections, infections, Tumours and timorous conditions and metabolic affections.

3) Orthopaedic diseases
   - Metabolic bone disease
   - Bone infections – Acute and Chronic
   - Congenital deformities and development conditions of upper extremity, lower extremity, spine general defects.
   - Diseases of joints
   - Tumours of Bones
   - Orthopaedic Neurology including spine bifida, Poliomyelitis and cerebral palsy.
   - Diseases of muscle, fibrous tissue and vessels
   - Regional orthopaedic conditions related to neck, shoulder, elbow, wrist, hand, hip, knee, ankle , foot, back and pelvis.
   - Special subject – Orthopaedic Radiology Amputation and disarticulation physiotherapy and rehabilitation

   Recent advances in orthopaedic diseases.

4) General principles of Surgery and Traumatology.
   - Wound healing
   - Fracture healing
   - Rehabilitation after bone and joint injuries
   - Systematic response to injury
   - Acute trauma care and early management of injured
   - Injury to head, face, chest, abdomen, vessels & nerves.
   - Polytrauma
   - Fracture & dislocations in all bones and joints including diagnosis, classifications, various modalities of investigation and operative non-operative treatment including complications.
   - Fractures in children
   - Pathological fractures
   - Recent Advance in various fractures and complications management.

5) Exposure to surgical techniques & surgical approaches to various regions to manage common infection, tumor, joint diseases, different type of trauma, congenital, neurological and miscellaneous conditions.

6) Principles of Arthroscopy microsurgery & Arthroplasty.

7) Orthotics & Prosthetics, disability calculation, Bio-mechanics of gait, splints.

8) Thesis – Aim is to train the PG student in research work. Topics should be in experimental, clinical, retrospective analysis or combination such that students is encouraged to do exhaustive reference work. Topics should be relevant to subject and region of work. Topics should allotted within first three months of training. The candidate should complete review of literature by end of the first year and submit his completed thesis six months before the final examination. Subject of thesis should be approved by University within first six months.

9) Under Graduate teaching in clinical methods.

10) Seminar presentation on common topics.

11) Journal reading and discussion.

12) Case presentation, ward record maintenance.

13) Adequate experience in closed reducation of various fractures, as isting major operation, independent operative management of common orthopaedic condition.

14) Preparation of paper for presentation in conference.

15) Preparation of article for publication.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

NASHIK - 422 005.

Scheme of Theory Exam. in Orthopaedics for M.S. (Ortho.) Exam.

(As per Direction No. 01/2008 dtd. 26/05/2008

Provisional Syllabus for Diploma in Orthopaedics

1) Basic Sciences related to Locornotor System
   i) Histology of bone, cartilage, muscles, collagen, Nerves
   ii) Physiology of bone, cartilage, muscles, collagen and Nerves
2) Surgical Pathology related to Bones, cartilage, Muscle, collagen and Nerves in various.
   Congenital affection, infections, Tuirnours and turnours conditions a metabolic affection.
3) General principles of surgery and Traurratology
   i) Wound healing
   ii) Fracture healing
   iii) Rehabilitation after bone and joint injury
   iv) Systemic response to injury
   v) Fracture and dislocation in all bones its management including complications.
   vi) Injury to chest, abdomen and head
   vii) Ploytrauma
   viii) Fractures in children
4) Orthopaedics diseases
   i) Metabolic Bone Disease
   ii) Bone infections – Acute and chronic
   iii) Congenital and development Deformities
      - upper extremity
      - Lower extremity
      - Spine
      - General defects
   iv) Disease of joints
   v) Tumours of Bones
   vi) Orthopaedics Neurology – Spina bifida, Polio, Cerebral Palsy
   vii) Disease of muscles, nerves , vessels and fibrous tissues
   viii) Regional Orthopaedics related to spine, shoulder
   ix) Elbow, wrist, hip, knee, ankle and foot.
   x) Special Subjects
      - Orthopaedics Radiology
      - Amputation
      - Physiotherapy
      - ALTS
      - First Aid

Examination Scheme for D. (Ortho)
(As per Direction No. 01/2008 dtd. 26/05/2008

Theory Exam. Total three papers, each of three hours duration and carrying 80 marks each. Total = 240 Marks.

Paper I	-	Anatomy, Physiology and Pathology as applicable to Orthopaedics.
Paper II	-	Traumatology and general Surgery,
Paper III	-	General Orthopaedics

Each paper will have four questions of 25 marks each.

Practical Exam.

Total Marks	=	300
Long Case 1	=	100
Short Case 2	50 X 2 =	100

Tables : 100

1) Instruments	=	20
2) X-rays	=	20
3) Specimen & Bones and splints	=	20
4) Ward round	=	20
5) Operation	=	20

Internal Exam.

Total Marks	=	100
Theory	=	50
Practical	=	50

For further examination the internal assessment marks should be calculated based on periodical tests in theory and practical at every term i.e. 4 tests for D. (Ortho)

Passing will be 50% of the marks in each head separately i.e. Theory, Practical and internal examination. Total marks should be 50% of the total marks for passing

SYLLABUS FOR DIPLOMA AND M.S. DEGREE IN ENT-HNS (OTOLARYNGOLOGY AND HEAD NECK SURGERY)

BASIC SCIENCES: -

1. Anatomy, Ultrastructure of Human Ear.
2. Physiology of Hearing.
3. Physiology of Equilibrium.
4. Anatomy of the Nose & Paranasal sinuses.
5. Physiology of Nose & Paranasal sinuses.
6. Pathophysiology of Ear & Paranasal sinuses in Flight and Diving.
7. Mouth & Related Facio-Maxillary Structure.
8. Anatomy & Physiology of Salivary Glands.
9. Anatomy of Pharynx & Esophagus
10. Physiology of Deglutition.
11. Anatomy of Tracheobronchial tree.
12. Physiology of Respiration.
13. Anatomy of Thyroid & Parathyroid Glands.
14. Physiology of Thyroid & Parathyroid Glands.
15. Physiology & Reception of Speech.
16. Surgical Anatomy of Skull Base.
17. Clinical Neuro-Anatomy.
18. Imaging & Radiology.
19. Basic Immunology.
20. Microbiology related to ENT & HEAD, NECK Diseases.
21. Cell Biology.
22. Principles of Radiotherapy in Head & Neck Cancer.
23. Principles of Chemotherapy in Head & Neck Cancer.
24. Principles & Use of Nuclear Medicine.

25. Wound Healing.
26. Principles of Laser Surgery.
27. Intensive & High Dependency Care.
28. Anaesthesia in ENT & HEAD, NECK Surgery.
29. Biomaterials.
30. Medical Negligence in Otorhinolaryngology.

OTOLOGY: -

1. Examination of Ear.
2. Aetiopathology of Inflammatory Conditions of External & Middle Ear
3. Pathology of Cochlea.
4. Pathology of Vestibular System.
5. Diseases of External Ear.
6. Ear Trauma.
7. Plastic Surgery of the Ear.
8. Acute Suppurative Otitis Media.
9. Management of Acute Suppurative Otitis Media
10. Chronic Suppurative Otitis Media.
11. Management of Chronic Suppurative Otitis Media.
12. Reconstruction of the Ear.
13. Complication of Suppurative Otitis Media.
14. Otalgia.
15. Otosclerosis.
16. Diseases of Temporal Bone.
17. Sensorineural Hearing Loss.
18. Sudden & Fluctuant Sensorineural Hearing Loss.
19. Vertigo.
20. Meniere's Disease.
21. Ototoxicity.
22. Vestibular Schwannoma.
23. Epithelial Tumours of External Auditory Meatus.
24. Glomus & Other Tumours of the Ear.
25. Disorders of Facial Nerve.

26. Surgery of the Vestibular System.

27. Cochlear Implants.

28. Presbycusis.

29. Implantable Hearing Devices.

RHINOLOGY: -

1. Examination of Nose.
2. Conditions of the External Nose.
3. Congenital Anomalies of the Nose.
4. Evaluation of the Nasal Airway & Nasal Challenge.
5. Abnormalities of Smell.
6. Mechanism & Treatment of Allergic Rhinitis.
7. Food Allergy & Intolerance.
8. Infective Rhinitis & Sinusitis.
9. Intrinsic Rhinitis.
10. Nasal Polyps.
11. The Nasal Septum.
12. Surgical Management of Sinusitis.
13. Complications of Sinusitis.
14. Cerebrospinal Fluid Rhinorrhoea.
15. The Upper Airways & their relation to the respiratory System.
16. Fracture of Facial Skeleton.
17. Rhinoplasty.
18. Epistaxis.
19. Snoring & Sleep Apnoea.
20. Non-Healing Granulomas.
21. Facial pain & Headache.
22. Aspects of Dental Surgery for Otorhinolaryngology.
23. Trans-Sphenoidal Hypophysectomy.
24. The Orbit.
25. Neoplasms of Nose & Paranasal sinuses.

LARYNGOLOGY & HEAD, NECK

1. Examination & Endoscopy of the Upper Aerodigestive Tract.
2. Oral Cavity.
3. Acute & Chronic Infections of Pharynx & Tonsils.
4. Acute & Chronic Laryngitis.
5. Disorders of Voice.
6. Management of Obstructed Airway & Tracheostomy.
7. Trauma & Stenosis of Larynx.
8. Neurological Affections of Larynx & Pharynx.
9. Pharyngeal Pouches.
10. Tumours of the Larynx.
11. Angiofibroma.
12. Nasopharynx (the postnasal space).
13. Tumours of Oropharynx & Lymphomas of the head & Neck
14. Benign Diseases of Neck.
15. Malignant neck Diseases;
16. The Thyroid & Parathyroid Gland.
17. Non-neoplastic Salivary Gland Diseases.
18. Benign Salivary Gland Tumours.
19. Malignant Salivary Gland Tumours.
20. Tumours of Infratemporal fossa & Parapharyngeal space.
21. Cysts, Granulomas & Tumours of the Jaw, Nose & Sinuses.
22. The Esophagus in Otolaryngology.
23. Facial Plastic Surgery.
24. Plastic & Reconstructive Surgery of the head & neck.
25. Terminal Care of Patients with head & neck Cancer.

AUDIOLOGY: -

1. Acoustics.
2. Computers in Audiology.
3. Epidemiology.
4. Otological Symptoms & Emotional Disturbances.
5. Clinical tests of Hearing & Balance.
6. Pharmacological Treatment of Hearing & Balance Disorders.
7. Legal & Ethical Matters.
8. Prevention of Hearing & Balance Disorders.
9. Hearing Overview.
10. Causes of Hearing Disorders.
11. Noise & the Ear.
12. Diagnostic Audiometry.
13. Audiological Rehabilitation.
14. Hearing Aids.
15. Cochlear Implants.
16. Tactile Aids.
17. Central Auditory Dysfunction.
18. Tinnitus.
19. Overview of Balance.
20. Causes of Balance Disorders.
21. Diagnostic Testing of Vestibular System.
22. Rehabilitation of Balance Disorders.

PAEDIATRIC OTOLARYNGOLOGY: -

1. Improving Paediatric Otolaryngological Consultation.
2. Genetic Factors & Deafness.
3. The Causes of Deafness.
4. Testing Hearing in Children.
5. Screening & Surveillance for Hearing Impairment in Preschool Children.
6. Otitis Media with Effusion.
7. Acute Suppurative Otitis Media in Children.
8. Chronic Suppurative Otitis Media in Children.
9. Surgery of Congenital Abnormalities of the External & Middle Ear.
10. Management of Hearing Impaired Child.
11. Cochlear Implantation in Children.
12. Vestibular Disorders in Children.
13. Speech & Language.
14. Foreign Bodies in the Ear & Nose.
15. Congenital Anomalies of the Nose.
16. Craniofacial Anomalies.
17. Nasal Obstruction & Rhinorrhoea in Infants & Children.
18. Tonsils & Adenoids.
19. Dental development, Orthodontics, Cleft lip& Cleft palate.
20. Sleep Apnoea.
21. Stertor & Stridor.
22. Congenital Disorders of Larynx, Trachea & Bronchi.
23. Stenosis of Larynx.
24. Acute Laryngeal Infections.
25. Foreign Bodies in Larynx & Trachea.

26. Tracheostomy & Decannulation.

27. Home care of Tracheostomised Child.

28. Neonatal Pulmonary Disorders.

29. Diseases of the Esophagus in Children.

30. Branchial cleft Anomalies, Thyroglossal cysts & Fistulae.

31. Tumours of the Head & Neck in Children.

32. Salivary Glands Disorders in Children.

33. The Drooling Child.

34. Recurrent Respiratory Papillomatosis.

35. Paediatric Anesthesia.

DISSERTATION

1. The dissertation is compulsory for the candidates registered for M.S. (ENT-HNS) and should include candidates own work under a supervisor qualified for the purpose and recognized as a postgraduate teacher by the university.
2. The subject of thesis along with a synopsis (about 200 words in the prescribed proforma) should be countersigned by the postgraduate teacher, head of the department and head of the institution. It should be submitted to the university within four months of registration as postgraduate student. No change in the dissertation topic or guide shall be made without prior approval of university.
3. The dissertation should be submitted under the following headings:

I. Introduction

II. Aims and objectives of the study

III. Review of literature

IV. Materials & methods

V. Observations

VI. Results

VII. Discussion

VIII. Conclusion

IX. Summary

X. Master chart

XI. References

4. If a work required for the thesis entails collaboration with other department or specialties, the collaborative portion of work will be supervised by a co-guides designated by the head of the institution .A co-guide should normally be a post graduate teacher in his own specialty, however, workers who have specialized in a particular field may be designated as co-guides by the Head of the institution. In cases where there is guide and co-guide for a thesis, the certificate required for submission of the thesis should be signed both guide and co-guide.

5. The subject of the thesis should as far as possible reflect the research priorities of the postgraduate department where the work is being done. The department should provide all facilities to the candidate and the candidate should not be asked to spend money on chemicals instruments etc. The Dean, Commandant/Principal of the college while submitting the topic of the thesis to the university for approval should make sure that the institution provides all facilities for the research work The candidate should submit to the university six monthly progress report of thesis and his other postgraduate work through his Post-Graduate teacher, Head of the post graduate department and Head of institution.

6. If the progress of the candidate's work including thesis work is not satisfactory, the university on recommendation of the Head of the department, head of the institution and Dean of the faculty of medicine may not grant the particular term and the period of training will be extended by the number of terms not granted.

7. If there is a minor change in the topic of dissertation the same be allowed at any time However if there is major change the student may allowed to change without keeping additional terms provided there is an interval of three clear terms between the date of application and date of examination

8. Lectures, Seminars, Journal club etc: The Post-graduate departments will organize lectures, seminars, symposia, tutorials, journal clubs, grand rounds and clinical meetings to keep the student abreast with the latest developments in the subject and ensure active participation by all PG students. 80% attendance is mandatory in these activities for grant of terms.

9. Log Book: Each PG student shall maintain a logbook of all academic activities, surgeries assisted and performed independently on a monthly basis. This logbook shall be signed by the Guide and Head of the department with their remarks on the progress of the student. This Logbook shall be produced at the time of Final Practical Examination as a record of academic and surgical work performed by the student over his training period.

SCHEME OF EXAMINATION

(As per Direction No. 01/2008 dtd. 26/05/2008)

RECOMMENDED BOOKS: -

1. Scott-Browns Otolaryngology.
2. Paparella Otolaryngology.
3. Shambaugh/Glasscock - Surgery of Ear.
4. Logan & Turner Diseases of ENT.
5. Ballenger Snow Otolaryngology.
6. Diseases of the Head & Neck by Cummins
7. Surgery of the Head & Neck – Stell & Maran
8. Rob & Smith Operative ENT Surgery.
9. Lore — Operative ENT Surgery.

RECOMMENDED JOURNALS: -

1. Indian Journal of Otolaryngology and Head neck Surgery.
2. Otology & Neurotology
3. Journal of Laryngology & Otology
4. Laryngoscope.
5. Annals of Otorhinolaryngology.
6. Archives of Otorhinolaryngology.
7. Otolaryngology Clinics of North America.

Passed by Academic Council (Resolution No. 355/2006) dtd. 30/05/2006, subject to Uniformity in the Examination pattern.

SYLLABUS FOR POST GRADUATE COURSES IN OPHTHALMOLOGY

1. Every candidate for the post graduate courses in ophthalmology must have obtained the Bachelor of Medicine and Bachelor of Surgery Degree of this University.
2. He or She should complete two years and three years academic terms for Post-graduate Diploma and Degree course in Ophthalmology as per MCI norms.
3. Every candidate presenting himself for these courses must send to the registrar with his application for admission of registration the following certificates –

1. Certificate of having MBBS degree.
2. Maharashtra Medical Council Certificate.
3. Eligibility Certificate.
4. Simultaneous registration for degree and diploma courses shall not be permitted.
5. Holder of diploma in any subject are not been give any concession of duration for completing post – graduate degree.
6. The subject for study shall be

A) Anatomy and Embryology of Eye including the contents of the orbital bones in relation thereof and the central nervous system as far as it refers to eye.(this includes anatomy of each structure of the eyeball for e.g. – Cornea, Iris, Choroid, Retina, Lens, Vitreous, Lids, etc)

B) Physiology of the Eye – Which includes physiology of vision, optics, binocular vision, Aqueous secretions, tear secretion, metabolism of various structures of the ye like cornea, lens, etc.

C) Various errors of refraction and their principles and optics.

D) Ophthalmic Medicine and Surgery (All Diseases related to various structures of the eye for eg – Lid, Adnexa, Conjunctiva, Cornea, Uvea, Lens, Vitreous, Retina,optic Nerve, Extraocular muscles, Tumors .)

E) Pathology and Bacteriology of the Eye.

F) Relation of ophthalmology to general medicine.

G) Eye Banking and its aspects.

H) National Program for Control of Blindness and its applications in Community Ophthalmology.

I) Various new innovations in Ophthalmology for example like Lasers in Ophthalmology, New Drugs in Ophthalmology, New techniques in operative skills, various transplant surgeries like – Keratoplasty, Stem cells transplant, amniotic membrane transplant.

J) Therapeutics in Ophthalmology

K) Radio therapy in Ophthalmology.

EXAMINATION PATTERN – For M.S. Ophthalmology –
(As per Direction No. 01/2008 dtd. 26/05/2008)

SYLLABUS FOR POST GRADUATE DEGREE IN OBST. & GYNAECOLOGY (M.D.)

OBSTETRICS :

1. Basic sciences

A) Applied Anatomy in females of genito urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall and breast.

B) Anatomy of fetus

C) Fundamentals of reproduction

Gametogensis fertilization, implantation & early development of human embryo.

Placenta - development, structure, functions

Amniotic fluid - formation and function

Fetal growth & development, fetal physiology

Birth defects,Genetics & teratology & counselling.

Physiological changes during pregnancy, labour and puerperium

Endocrinology of pregnancy.

Lactation

Immunology of pregnancy

Molecular biology

2. Normal pregnancy, labour & puerperium.

Breast feeding - baby friendly initiative

3. Early recognition and prompt management of pregnancy complications, - Hyperemesis gravidarum, abortions, ectopic pregnancy, hydatidiform mole,

Pre-eclampsia, eclampsia, Pathophysiology of PIH,

Antepartum hemorrhage, multiple pregnancy, polyhydramnios, Oligohydramnios &Prolonged pregnancy.

4. Management of pregnancies complicated by medical,surgical or gynaecological diseases, in consultation with the concerned specialities by team approach.

* Anemia,Heart disease,diabetes mellitus, liver disorders,Respiratory diseases, Renal diseases**,** CNS disorder, Skin, Psychiatry

Hypertensive disorders .

* Acute abdomen, Acute Appendicitis, Intestinal obstruction, perforations.

- Fibroids, Ovarian tumors, Carcinoma cervix, genital prolapse.
- Recent advances in medical and surgical management.

5. Infections in pregnancy.

Malaria, Toxoplasmosis, viral infections (Rubella, CMV, Hepatitis B, Herpes) syphilis and Other sexually transmitted infections including HIV, Leptospirosis.

Parents to child transmission of HIV infection. (PPTCT)

6. Evaluation of the fetal and maternal health in complicated pregnancy by making use of available diagnostic modalities and plan for safe delivery of the fetus while safeguarding the maternal health. Identification of fetus at risk and management.

High risk pregnancy - Post caesarean pregnancy, prolonged gestation, preterm labour, fetal growth restriction, premature rupture of membranes, blood group incompatibility, recurrent pregnancy wastages. Imaging techniques, CTG

7. Prenatal diagnosis of fetal abnormalities and appropriate care. Fetal therapy. PNDT Act and its implications.
8. Partographic monitoring of labour progress, early recognition of dysfunctional labour and appropriate interventions during labour including active management of labour.
9. Obstetrical analgesia and anesthesia.
10. Induction and augmentation of labour.
11. Management of abnormal labour : Abnormal pelvis, soft tissue abnormalities in birth passage, Malpresentation and malpositions of fetus, abnormal uterine action, obstructed labour and cervical dystocia. Third stage complications - PPH including surgical management, retained placenta, uterine inversion, post partum collapse, amniotic fluid embolism.
12. Abnormal puerperium, Puerperal sepsis
Thrombophlebitis, Mastitis, Puerperal venous sinus thrombosis,Psychosis.
13. National Health Programmes to improve the maternal and child health, social obstetrics and vital statistics. (Maternal and Perinatal mortality)
14. Drugs used in obstetric practice including prostaglandins.FDA Classification
15.Coagulation disorders in obstetrics, Blood and component therapy.

16.Operative obstetrics - decision making, technique, recognition and management of complications - C.S. instrumental delivery, obstetrics hysterectomy, role of destructive surgery.Manipulations-version,MRP etc.
Forceps,Vaccum, Internal iliac artery ligation

17. Intensive care in obstetrics for critically ill patient. Fluid and electrolyte balance, volume status maintenance, protecting vital organ function.
18. Provision of safe abortion services - selection of case, techniques, and management of complications. Septic abortion, Criminal abortion, MTP Act Adoption laws.

NEW BORN

1. Care of newborn
care of preterm, S.G.A.neonates, infants of diabetec mother
2.Asphyxia & Neonatal resuscitation (Respiratory distress syndrome and Meconium aspiration syndrome)
3. Neonatal sepsis - prevention, Early detection & management.
4. Neonatal hyperbilirubinemia, investigation and management.
5. Birth trauma - prevention, early detection & management.
6.Detection of congenital malformations in new born and make timely referrals for surgical corrections.
7. Management of the common problems in neonatal period.

GYNAECOLOGY :

Basic sciences

Development of genital tract and associated malformations. Basics of breast diseases related to ob/gy

Applied anatomy of female genital tract, abdominal wall and urinary tract.

Physiology of menstruation and ovulation

Physiology of spermatogenesis

Endocrinology - hypothalamus pituitary, thyroid and adrenal glands Neurotransmitters

Common menstrual disorders and their management

3. Diagnosis and surgical management of clinical conditions related to congenital malformations of genital tract. Reconstructive surgery in gynaecology

4. Chromosomal abnormalities and intersex. Ambiguous sex at birth

5. Reproductive Endocrinology : Evaluation of primary and secondary amenorrhoea, management of hyperprolactinemia, Hirsutism, chronic anovulation and PCOD,. Thyroid dysfunction.

6. Endometriosis and adenomyosis - medical and surgical management.

7. Infertility evaluation and management. Use of ovulation induction methods and Tubal microsurgery, Assisted reproduction techniques , management of immunological factors in infertility. Adoption law, medico-legal and ethical issues.

8. Reproductive Tract Infections, Sexually Transmitted Infections, HIV/AIDS : Prevention, Diagnosis and management.Genital Tuberculosis.

9 Screening for genital malignancies - cytology, colposcopy and biochemistry. Management of premalignant lesions

10. Benign and malignant tumors of genital tract - Early diagnosis and management.
11. Principles and practice of oncology in gynaecology - chemotherapy, radiotherapy, palliative treatment.
12. Supports of pelvic organs , genital prolapse,surgical management of genital prolapse.
13. Common urological problems in gynaecology - SUI, voiding difficulties, VVF, urodynamics, surgical repair of genital fistulae, ureteric and bladder injuries**.**
14. Management of menopouse, prevention of complications, HRT, cancer screening - genital, breast.
15. Recent advances.
16. Newer diagnostic aids - USG, interventional sonography, other imaging techniques, endoscopy.
17. Hysteroscopy, laporoscopy - diagnostic, simple surgical procedures, including laparoscopic tubal occlusion , endometrial ablative techniques, colposcopy**.**
18. Medicolegal aspects, ethics, communications and counselling.(SEXUAL / ASSAULTS)
19. Operative gynaecology - Selection of case, technique and management of complications of minor and major gynaecology procedures.

- Abdominal and vaginal hysterectomy
- Surgical procedures for genital prolapse
- Surgical management of benign and malignant genital neoplasms.
- Repair of genital fistulae, SUI
- Operative endoscopy – Laparosocpic, Hysteroscopic

20. Recent advances in gynaecology - diagnostic and therapeutic
21. Special groups - Pediatric and adolescent gynaecology, geriatric gynaecology
22. Evidence based management

FAMILY PLANNING :

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1. Demography and population Dynamics.
2. Contraception - Temporary methods. Permanent methods (vasectomy and female sterilization) Legal issues.
3. MTP Act and procedures of MTP in first & second trimester.(Recent Amendments, Legal/ethical issues)
4. Emergency contraception.
5. Recent advances, New development, Future research work in contraceptive technology.

OBSTETRICS AND GYNAECOLOGY - M.D. EXAMINATION

(As per Direction No. 01/2008 dtd. 26/05/2008)

Recommended Books

OBSTETRICS

SN	Must Read	Desirable to Read	Good to read
1	C.S.Dawn's Text book of Obstetrics and Neonatology	Medical Disorders in Pregnancy by DeSwiet	High Risk pregnancy by James
2	Ian Donald Practical Obstetrics problems	Obstetrics by Ian Donald	Williams Obstetrics
3		Arias, High Risk Pregnancy	
4	Munro-Kerr's Operative Obstetrics	Progress in OBGY, Studd	Operative Obstetrics by Douglas
5			Recent Advances in Obst/Gyn
6			All on net
7			FOGSI Books

GYNECOLOGY

SN	Must Read	Desirable to Read	Good to read
1	Novacs Gynecology	Reproductive Endocrinology by Speroff	Gynecology Devherst
2	TeLindes Operative Gynecology	Infertility by Insler	All on net
3	C.S.Down's Textbook of gynecology and contraception	Endocrinology by Rajan	FOGSI Books
4	Bereks gynecological Oncology	Gynacology by Gold	
5	Gynecology by P.K.Devi		Shaws textbook of gynecology
6	Jeffcoat's Principles of Gynaecolgy	Bonney's Operative Gynecology	
7	Standard Operating Procedures in Obstetrics and Gynecology by Dr. shrinivas Gadappa	---	---

FAMILY PLANNING

SN	Must Read	Desirable to Read	Good to read
1	Family Planning Practices by S.K .Chaudhary	Reproductive endocrinology by Speroff	Population reports
2	C.S.Dawn’s book on Contraception		

Journals/ Periodicals;

SN	Must Read	Desirable to Read	Good to read
1	Clinic in Obst. & gynecology	Year books	Am J Obst Gynec
2	North Americal clinic in ObGy	Annuals	Br. J Obst Gync.
3	J. Obst. Gyn India		Obstet Gynec Survey
			Fertility & Sterility

M.D. ANAESTHESIA - SYLLABUS

May - 2006

At the end of three years of training as residents in anaesthesia, the candidates should be fully conversant with theory and practical aspects of:

A. **Human Anatomy and Physiology of** various organ systems and cellular components in relation to Anaesthesia including muscles, neuromuscular junction, nerve plexuses, cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and temperature homeostasis, theories of mechanism of production of anaesthesia, changes during pregnancy, various tests/investigations to evaluate the functional status of organ systems as applied to Anaesthesia Management, Intensive Care Practice and Pain Relief

B. **Pharmacology** as applied to Anaesthesia, Intensive Care Practice and Pain Relief including General Pharmacological Principles, Pharmacokinetics and Pharmacodynamics of Anaesthetic Drugs (including Uptake and Distribution of Inhaled Anaesthesia agents and All the Adjuncts used in Anaesthesia, Drugs used for treatment of various Diseases and Drug Interaction

C. **Pathophysiology of various diseases** including disorders of cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and immune systems, various tests/investigations to grade/measure the disease process of various organ systems as applied to anaesthesia management, intensive care practice and pain relief

D. **Medicine** as applied to the practice of Anaesthesia including diagnosis and management of Diabetes, Hypertension, Bronchial Asthma, Chronic Obstructive Pulmonary Diseases, Respiratory Failure, ARDS, Myocardial Ischemia / Infarction, Arrhythmia, Shock, Congestive Heart Failure, Acute / Chronic Renal Failure, Head Injury, Unconscious patients, Status Epilepticus / Asthmaticus, Endocrine Disorders, Diseases related to Dysfunction of Hepatobiliary, Muscular, Connective Tissues and Immune system, Management of Perioperative Infection, Neuromuscular Disorders, Poisoning etc. and interpretation of ECG / Blood Gases / Other Biochemical Values and Function Tests

E. **Physics** as applied to Anaesthetic gases, vapours, anaesthesia machine, breathing systems, monitors, ventilators, therapeutic devises & other relevant equipment including physical principles involved in their construction and functioning

F. **Perioperative Anaesthesia management** including pre-operative evaluation, intra-operative management as well as post-operative care, monitoring (invasive as well as non-invasive) as applied to various surgical specialities and age groups.

G. **Theory and practice of various techniques / aspects of Routine & Emergency cases** of **General Anaesthesia** (e.g., Intravenous / Inhalational, Endotracheal / Mask / LMA / COPA, Spontaneous/Controlled mode of ventilation, induced hypotension / hypothermia etc.), **Regional Blocks** (Spinal, Epidural & Peripheral Nerve block) and **Local Anaesthesia,** including **various postures** required for anaesthetic/surgical procedures, their effects **and Recent Advances** for most minor to supra major surgeries in the field of:

- **General surgery:** e.g. minor cases like haemorrhoidectomy to supra major cases like Liver transplant
- **Gynaecology and Obstetrics**
- **ENT and Head & Neck**
- **Orthopaedics**
- **Ophthalmology**
- **Pediatric & Neonate**: Differences between adult and pediatric Anatomy, Physiology, Pharmacology, Anaesthesia principles, pediatric/neonatal emergencies, postoperative care, fluid & ventilator management etc

- **Cardiac, Vascular & Thoracic:** Conduct of closed heart as well as open heart surgeries (Valvular, Ischemic, Congenital -Cyanotic & Acyanotic), CABG (including off pump), Pulmonary Cases (Insertion of Double Lumen Tube, one lung anaesthesia), Thymus and Vascular surgeries etc. Ability to go on Cardiopulmonary bypass and disconnect from bypass, Ability to take, manage and interpret Arterial, Central Venous and P.A. Lines, postoperative care, management of re-explorations etc.
- **Neurosurgery**: Ability to monitor ICP, Management of head injuries, bleeds, tumours, etc with raised ICT. Ability to safely manage cases in sitting, prone, lateral, jack-knife positions and Anaesthetic management for neuro-radiology procedures
- **Urology**: Management of endoscopic surgeries like TURP/TURBT etc, Problems related to TURP, extracorporeal shock wave lithotripsy, percutaneous placement of nephrostomy etc., anaesthetic management of patients with acute and chronic renal failure, anaesthetic management of renal transplant cases of donor as well as recipient.
- **Plastic**: Management of burns contractures, congenital faciomaxillary abnormalities like cleft lip and palate, faciomaxillary injuries like fracture mandible, maxilla, zygoma, panfacial fractures, difficult intubations, microvascular surgeries, reconstructive surgeries, aesthetic surgeries etc
- **Dental**: Monitored Anaesthesia Care, Anaesthetic management of pedodontia patients, maxillo-facial surgeries including TMJ Ankylosis, Awake, Retrograde & Fibreoptic intubations
- **Endoscopies / laparoscopies**: Anaesthetic management, specific requirement and complications of various endoscopies like cystoscopy, ureteroscopy, PCNL, hysteroscopy, thoracoscopy, mediastinoscopy etc. and Lap. assisted/laparoscopic surgery like hysterectomy, tube ligation, appendicectomy, cholecystectomy etc.
- Anaesthesia for various **diagnostic, therapeutic and Specialized** procedures
- Anaesthesia for **Geriatric patients**
- Anaesthesia for surgery using **LASER**
- **Anaesthesia / Sedation techniques out side operating room:** Electroconvulsive shock therapy (ECT), Electrophysiologic tests, Radiofrequency ablation, Cardioversion, Cardiac catheterization, Special anaesthetic considerations in radiology and interventional radiology related to Dye allergies, Embolization, Monitoring / Equipment options in the MRI suite

H. History of **Anaesthesia**

I. Airway Management: Assessment of difficult airway, Awake, Retrograde, Use of intubating LMA's, Intubating Stylets, Various laryngoscopes designated for difficult airway, Insertion of Combitube, Ability to perform Cricothyrotomy and use of Venturi, Minitrach & Fibreoptic intubations etc

J. Basic & Advanced Cardiopulmonary & Cerebral Resuscitation (CPCR) for all age group of patients under different situations e.g., neonates, pregnant females, poisoning cases, trauma victims etc.

K. Acid base & Fluid management including use of Crystalloids, Colloids, blood & blood products

L. Arterial, Central Venous and P.A. Lines: Establishment, management and interpretation

M. Anaesthetic drugs used in **perioperative care**

N. Equipments (Minor to advanced monitoring) – their use, maintenance, sterilisation and care

O. Medical gases: Knowledge of Manufacturing, Storage and Central pipeline Systems

P. Day Care / Outpatient Anaesthesia.

Q. Remote Location Anaesthesia: Anaesthetic practice during **disasters** and for large turnover surgeries in **camps / mass casualties**.

R. **Emergency** Anaesthesia
S. **Monitored Anaesthesia** Care
T. **Labour Analgesia**
U. **Pain relief –** Acute & Chronic
V. **Critical care practice** including oxygen therapy, respiratory therapy, ventilatory support, haemodynamic monitoring, prevention and management of multi organ failure, and care of patients with brain damage or brain dead patients For organ Transplant
W. **Advanced Trauma Life Support** (**ATLS**)
X. **Occupational Hazards**
Y. **Safety** in Anaesthesia
Z. **Complications of Anaesthetic procedures, its prevention, detection and management**
AA. **Record keeping** in Anaesthesia
BB. **Medical Audit**
CC. **Quality Assurance**
DD. **Anaesthesia standards:** e.g., Minimum monitoring standard
EE. **Medicolegal** aspects in Anaesthesia
FF. **Ethics** in Anaesthesia
GG. **Principles of Evidence Based Medicine**
HH. **Basic Research Methodology and Clinical Trials**
II. **Bio-statistics**
JJ. **Computers:** Utility, computer assisted learning and data storage, Computerised anaesthesia records
KK. **Skills:** for planning of operation theater, pain clinic, recovery room, intensive care etc. including selection and purchase of equipments

TRAINING PROGRAMME

A. ADMINISTRATION OF ANAESTHESIA & PERIOPERATIVE PATIENT CARE

I Year Residents:–

Assisting during minor & major anaesthesia procedures and managing patients in recovery or intensive care areas (all Under Supervision)

The first month of the first year will be spent in orientation in the operating rooms and attending lectures covering the basics of the discipline. After that the first year of training will be spent in learning the fundamentals of anesthesiology with emphasis on checking of anaesthesia equipment including anaesthesia machine, airway equipment and appropriate monitors, preparation of appropriate dosages of various drugs required at specific point of time, mastering clinical skills regarding selection and implementation of an appropriate anesthesia plan, placement of lines, induction of anaesthesia, intubation, maintenance of anaesthesia, and the successful reversal of anesthetic agents. Emphasis will also be placed on learning regional anaesthesia and Cardiopulmonary resuscitation. Also the candidates will be assigned guides for thesis so as to help them prepare protocols.

To start with the first year residents will observe and then slowly become independent in giving general anaesthesia and Regional anaesthesia to patients belonging to ASA grade I & II for minor and major surgery, under graded supervision. They will be posted in rotation to the following specialties during the first year**:** Preoperative assessment area, General Surgery, Gynecology, Obstetrics, Orthopedic, ENT, and Recovery Room. They will be assigned to cases in the Operating Room at the hospitals attached to medical teaching institutes affiliated to the University under which they have registered and will gain experience under the direction and supervision of respective academic faculty.

II Year Residents:–

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting minor procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift)

The second year of training will be devoted to the subspecialties/superspecialities of anesthesia at the hospitals affiliated to medical teaching institute and the university under the supervision of a faculty member with an aim to concentrate on mastering the knowledge and technical skills associated with providing anesthesia to subspecialty/superspeciality patients. Residents will be rotated in Pediatric anesthesia, Neuroanesthesia, Cardiovascular and Thoracic anesthesia, Ambulatory anesthesia, Obstetrics, Dental Surgery, Ophthalmology, Pain Clinic / Pain Management, Peripheral Theatres, Anaesthesia Outside Operating Rooms, Trauma care, Transplant Surgeries etc. They will be taught to give general anaesthesia and regional anesthesia (Extradural Block - EDB, Spinal Block, and Peripheral Nerve Blocks) to ASA grade I, II, III & IV patients under supervision for superspeciality theaters. They should be able to give GA/RA to other ASA grade I & II patients independently. Rotations in critical care areas e.g., Trauma Ward, Post Anesthesia Care Unit / ICU / Emergency Medical Service will also be part of the second year training curriculum. They should learn pediatric and trauma life support and maintain skills for basic and advanced cardiac life support. The student should be able to analyze and present scientific data and write a thesis.

III Year Residents:–

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting both minor and major procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift)

The third (final) year of training will be devoted to management of most complex cases available at the institute under the supervision of a faculty member. The residents will be trained to exercise independent judgment, to take responsibility while caring for such patients, and to take part in research projects under the supervision of a faculty member. The student should be able to plan and administer anaesthesia to all patients under graded supervision including patients for Cardiac, Neurosurgery, Pediatric surgery and for all major surgery of subspeciality branches. The aim at the end is to be competent and independent soon after the third year of residency in providing anaesthesia to elective and emergency cases belonging to all specialities. The resident should be able to manage critically ill patients and treat intractable pain. They should also know how to organize mass casualty.

B. THESIS -

- The aim of thesis should be to make the student able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
- Thesis protocol should be submitted at the end of six months after admission in the course to the Research Committee of the Institute. The protocol must be presented in the department of Anaesthesiology before being forwarded. The research committee appointed by the Dean/Principal to scrutinize in references to its feasibility, statistical validity, ethical aspects, etc would approve the Protocol.
- Protocol in essence should consist of:
  - **a)** Introduction and objectives of the research project.
  - **b)** Brief review of literature.
  - **c)** Suggested materials and methods, and (scheme of work)

d) Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.

e) Bibliography

- Chief guide for thesis will be from the department of Anaesthesiology and co-guide(s), if needed, will be from the department of Anaesthesiology or from other disciplines related to the thesis.
- The thesis shall relate to the candidate's own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
- The thesis shall be written in English, printed or typed on white A4 size bond paper bearing the matter on one side of paper only and bound with cloth/rexine, with the title, author's name and the name of the College printed on the front cover.
- The thesis shall contain: Introduction, review of literature, material and methods, observations, discussions, conclusion and summary and reference as per index medicus.
- Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Departments, not later than six months prior to the date of commencement of theory examination in the subject

C. ACTIVITIES – Participation by way of attendance / presentation in Didactic lectures, Symposia, Seminars, Group discussions, Workshops, Morbidity & Mortality meet, Panel Discussion etc. **Each Student should have actively participated in at least 6 academic sessions per year** during the total training period of three years (total 18).

D. LOG BOOK MAINTENANCE of all the clinical and academic work done by the student in his/her tenure of three years.

Minimum Procedures/Cases required to be done and entered in the log book

Regional Block	
Spinal	= 30 to do
Epidural	= 30 to do
Combined Spinal Epidural	= 20 to do
Caudal	= 10 to do
Bier Block (IVRA)	= 5 to do
Sciatic/Femoral	= 5 + 5 (to observe or do)
Ankle Block	= 5 (to observe or do)
Stellate Ganglion Block	= 3 (to observe or do)
Brachial Plexus	= 5 to observe & 10 to do
Sympathetic Block	= 3 (to observe or do)
Trigger Point injection	= 3 (observe)
Other peripheral N. Block	= 3 to do
Ophthalmic Blocks	= 5 (to observe)
Field Block	= 3 (to observe or to do)
Anaesthesia for:	
General Surgery	= 50 (to do)
Gynecology	= 50 (to do)
Obstetrics	= 20 (to do)
ENT	= 20 (to do)
Orthopedics	= 20 (to do)
Ophthalmology	= 5 (to do)
Plastic Surgery	= 5 (to do)
Endoscopy / Laparoscopy	= 5 (to do)
Urology	= 5 (to do)

Open Heart	= 5 (to observe)
Closed Heart	= 5 (to observe)
Pediatric Surgery	= 5 (to observe)
Craniotomy	= 5 (to observe)
Spinal Surgery	= 5 (to observe)
Joint Replacement	= 5 (to observe)
Anesthesia for organ transplant	= 5 (to observe - desirable)
ECT	= 10 (to do)
Radiology / CT Scan	= 5 (to do) Anaesthesia/sedation
Procedures	
Internal Jugular Cannulation	= 5 + 5 (to observe or do)
External Jugular Cannulation	= 5 to do
Subclavian Vein Cannulation	= 5 + 5 (to observe or do)
Peripheral Central Line	= 15 to do
Arterial Line Cannulation	= 10 to do
Endotracheal Intubation	= 250 to do
LMA insertion	= 30 to do
Difficult Airway Management	= 5 to do
Conduct of Cases	
ASA I	= 300 to do
ASA II	= 200 to do
ASA III	= 50 (to observe)
ASA IV	= 30 (to observe)
Labour Analgesia	= 5 (to observe or do)

ASSESSMENT (*As per Direction No. 01/2008 dtd. 26/05/2008)*

Recommended Reading

I. Books

S.No	Name	Authors / Editors	Year of publication	Last Edition	Publication House
1	Lee's Synopsis of Anaesthesia	G.B.Cashman, N.J.H Davies	2006	13th	Butterworth-Heinemenn
2	Wylie & Churchill Davidson's – A practice of Anaesthesia	Thomas E. Healy Paul R. Knight	2003	7th	Arnold
3	Anaesthesia	Miller Ronald D.	2005	6th	Elsevier Churchill Livingstone
4	Yao and Artusio's Anesthesiology	Fun-Sun F.Yao	2003	5th	Lippincott Williams & Wilkins
5	Anesthesia and Co-existing Disease	R. K. Stoelting S.F. Dierdorf	2002	4th	Churchil Livingstone
6	Anesthesia and Uncommon Disease	Fleisher	2005	5th	Saunders Elsevier
7	Clinical Anaesthesiology	G.E.Morgan M.S.Mikhail	2005	4th	McGraw-Hill
8	Understanding Anaesthesia Equipment	Jerry A. Dorsch Susan E. Dorsch	1998	4th	Williams & Witkins

9	Wards Anaesthesia Equipments	Davey	2005	5th	Baillirro Tindall
10	Anatomy for Anaesthetists	Harold Ellis Stanley Fieldman	2005	8th	Blackwell Science
11	Pharmac. & Physiology in Anaesthetic Practice	R. K Stoelting S.C.Hillier	2006	4th	Lippincott-Raven
12	Shnider and Levinson's Anesthesia for Obstetrics	Hughes Levinsons Rosen	2002	4th	Lippincott Williams & Wilkins
13	Paediatric Anaesthesia	Gregory	2005	4th	Churchil Livingstone
14	Cardiac Anesthesia	Kaplan	2005	4th	W. B. Saunders & Co.
15	Thoracic Anesthesia	Kaplan	2003	3rd	Churchil Livingstone
16	Clinical Application of Mechanical Ventilation	David W. Chang	2001	2nd	Delmar-Thomas Learning

II. "Recent Advances in Anaesthesia and Analgesia" Last two Editions: Mosby Publications

III <u>Journals</u>

1. Indian Journal of Anaesthesia	5. Anaesthesia
2. Journal of Anaesthesiology and Clinical Pharmacology	6. British Journal of Anaesthesia
3. Indian Journal of Critical Care Medicine	7. Anesthesia & Analgesia
4. Anesthesiology Clinics of North America	8. Anesthesiology

SYLLABUS FOR M.D. (RADIO-DIAGNOSIS & IMAGING SCIENCES).

GOAL:- The broad goal of the teaching & training of Post-graduate student in Radio-Diagnosis is to
make them understand & implement the knowledge regarding the role of various imaging modalities,
helpful in the management of different clinical conditions. At the end of his/her training, he/she should be
capable to take up a career in teaching institution or in diagnostic center or in research..

OBJECTIVES :-

a) Knowledge:- At the end of the course the student shall be able to:
1) Explain the interaction of tile X-rays with mater to produce an image.
2) Fromiliarize with the principles of various imaging modalities (e.g. .US/CT/MRI) & their applications
in medicine.
3) Explain the biological hazards of ionizing radiation & protective measures.
4) Explain the normal Anatomy, Physiology of various organs and their deviation from normal) & its
consequences.
5} Summarize the fundamental aspects of embryology & alteration in development with reference to
congenital anomalies.
6) Select appropriate imaging modality for- study of specific condition.
7) Explain .the role of imaging, pre-operative, intra-operative & post-operative Conditions.
8) Evaluate role of imaging modalities in various therapeutic applications (lnterventional Radiology)
9) Update information about recent advances in imaging sciences.
10) Effectively organize & supervise the diagnostic proceduces to ensure quality control/assurances

b) Skills:-

At the end of the course the student shall be able to :
1) Make use of conventional & other imaging sciences to achieve definitive diagnosis.
2) Analyse & interpret imaging data.
3) Demonstrate the skills of solving Scientific & clinical problems & decision making.
4) Develop skills as a self:-directed learner recognize cointinuing educational needs, select & use
appropriate learning resources.
5) Demonstrate Comperence in basic concepts of research methodology & be able to critically aualyse
relevant literature.

c) Integration-

Knowledge acquired in Radio diagnosis shall help the students to integrate imaging techniques
with structure & function of the human body in health & disease.

M.D. (RADIODIAGNOSIS)

PAPER –I

Radiation Physics. Protective measures & Radiological procedures,
TOPICS

1) Radiations and production of X-rays
2) X-ray generators
3] Basic interactions between X-Rays and matter
4] Attenuation.
5] Filters and grids.
6] Luminescent screens.
7] Physical and Photographic characteristics of X-ray film & film processing
8] Computed tomography.
9] Ultrasound.
10] Radiation's hazards and protection.
11] Digital Radiography.
12] Nuclear magnetic resonance.
13] Magnetic resonance imaging.
14] Wet processing of films -Chemistry of Developer, fixer etc,
15] Dry processing – chemistry of films & its processing.
16] Radiological procedures(IVU, barium procedures, antegrade pyelography , fistulography, sialography, DCG)

PAPER- II

Radiological Imaging in congenital & systemic diseases- I

a. Respiratory system: Congenital anomalies, Pediatric chest, Chest wall, pleura, diaphragm, Mediastinum, Pulmonary infections, Airway obstruction, Pulmonary neoplasms, Diffuse pulmonary diseases.
b. Cardio-vascular system: Congenital heart Disease's, left-to-right shunts Cyanotic heart diseases,Acquired valvular heart diseases, Ischemic heart disease, Pulmonary circulation, cardiomyopathy, cardiac tumors, Pericardium, thoracic aorta.
c. Gastro Intestinal Tract: Oesophagus, Stomach, Duodenum, Small intestine large bowel, mesentry & omentum, Pediatric abdomen.
d. Hepato-biliary: Liver, Biliary tract, Pancreas.

PAPER-III

Radiological Imaging in congenital & systemic diseases-II

a. Skeletal system: Skeletal trauma benign lesions, malignant lesions, Myeloproliferative & similar disorders, metabolic and endocrine diseases, skeletal dysplasias and malformation syndromes,joint disease, bone and joint infection, radiology of soft tissues, musculo-skeletal system inchildren.
b. Genito-urinary system: Renal parenchymal diseases, Renal masses. Calculus disease and urinaryobstruction, urinary bladder and prostate, Reno-vascular

disorders, injuries, Renal failure andtransplantation, pediatric uroradiology Imaging in obstretics and gynecology, imaging of breast.

c. CNS: Skull, Intra-cranial tumors, Intra-cranial infections, Cerebro-vascular disease, cranial and intracranial malformatins trauma, CSF disturbances, degenerative diseases of spine infections of spine, spinal tumours.

PAPE R – IV

Miscellaneous, Interventional Radiology & Recent advances and Newer imaging.

a) Orbit , ENT, dental
b) Reticuloendothelial system
c) Interventional radiology:
    I. HSG & FTR
    II. 4 vessel angiography
    III. Biliary intervention(PTBD,PTC)
    IV. PCN
    V. Laser ablation of varicose veins
    VI. RFA/ chemoembolisation of hepatic tumour and malformations.
    VII. Vertebroplasty.
    VIII. Hemangioma and AVM management.

Syllabus for MD

A. RADIOLOGICAL PHYSICS & X-RAY TECHNOLOGY:

1. Radiation
2. Production of X -Rays
3. X- Ray Generators :
4. Basic Interaction between X- Rays and Matter
5. Attenuation
6. Filters
7. X- Ray beam restrictors
8. Physical characteristics of x- Ray films & film Processing
9. Photographic characteristics of X- Ray films
10. Fluroscopic imaging and image intensifier
11. Viewing & recording of the Fluroscopic Image
12. The Radiographic Image
13. Geometry of the Radiographic Image
14. Computed Tomography
15. Ultrasound
16. Digital Radiography
17. Nuclear Magnetic Resonance
18. Magnetic Resonance Imaging
19. Radiation hazards & Protection
20 Electric & Protection
21. Cine Angiography:
22. Atomic structure, Radioactive Isotopes & Gamma Camera
23. Positron Emission Tomography
24. Digital Subtraction Angiography
25. Catheters, guides wires, dilators, balloons & stents
26. Pictorial Achieving & Communicating System (PACS)
27. DICOM

B. DARK ROOM TECHNIQUES:

1. Intensifying screens /construction, types and advantages :
2. Rare earth intensifying screens :
3. Intensification factor :
4. Cassette: .construction & care
5. Factors affecting image details :
6. Factors affecting image contrast & density :
7. Grids : construction & types
8. Cones & collimeter :
9. X Ray films -construction, types & storage :

C. BASIC RADIOLOGY

I. IMAGING TECHNIQUIES AND MODALITIES

a) Department Organization**:** Digital Imaging and PACS**:**
   i. Digital imaging and PACS**:** Picture Reliving and Communication System
   ii. Digital Imaging and PACS**:** what should a radiologist expect from PACS
   iii. Digital Imaging and PACS**:** Image processing in Computed Radiography

b. Intravascular Contrast Media
c. Whole body Computed Tomography: Recent Advances
d. Magnetic Resonance Imaging Basic Principles
e. Ultrasound : general Principles
f. Radionuclide imaging
   i. Radionuclide imaging**:** General Principles
   ii. Radionuclide imaging**:** Pediatric Nuclear Medicine
g. Dual Energy X-ray Absorptiometry
h. Functional and Physiological Imaging
i. Medicolegal issues in Diagnostic Radiology
j. Radiation Protection and patient doses in diagnostic radiology

II. RESPIRATORY SYSTEM :

1.1 Techniques of Investigations

1.11 Standard Techniques
1.1.2 Tomography: a) Conventional film Tomography
b) Computed Tomography
1.1.3 Digital Radiography
1.1.4 Magnetic Resonance Imaging
1.1.5 Radionuclide Imaging a) Ventilation
b) Other thoracic scanning techniques
1.1.6 Ultrasound
1.1.7 Angiography
1.1.8 Lung Biopsy & Other Interventional Techniques.

1.2 Normal Chest:

1.2.1 The Lungs (Radiological Anatomy} & CT Terminology)
1.2.2 The Central Airways
1.2.3 The Lungs beyond Hila
1.2.4 The Hila
1.2.5 The Mediastinum :
a) CT & MRI
b) Plain film appearances
   i. The junctional lines :
   ii. The right Mediastinum above azygous vein
   iii. The left Mediastinum above Aortic arch
   iv. vi) The supra aortic Mediastinum on lateral view
   v. v) The right Middle Mediastinum border below azygous arch.
   vi. vi) The left cardiac border below aortic arch
   vii. vii) The para spinal lines
   viii. viii) The retrosternal line
1.2.6 The Diaphragm

1.3 The Chest Wall, Pleura & Diphragm

1.3.1 Chest Wall :

i) Soft tissue /Breasts

ii) Ribs /Sternum/Clavicle, Spine

1.3.2 The Pleura :

i) Normal Pleura

ii) Pleural Pathologies

1.3.3 The Diaphragm :

i) Height/ Eventration/Movements/Paralysis

ii) Hernias/Trauma/Neoplasm

1.4 The Mediastinum :

1.4.1 Techniques. .

1.4.2 Mediastinal Masses: i) Thyroid/ Para Thyroid Messes/Thymic tumors/Tymic hyperplasia/Teratoma/ Cermcell Tumor.

ii) Mediastinal lymphadenopthy

iii) Neurogenic Tumors

iv) Extra medullar heamatopes/Mesenchymal Iumors/ Hernarationof / Mediastinal lipomatosis/ Aneusyrum

1.4.3 Differential Diagnosis:

1.4.4 Other Mediastinal Lesions: i) Acute/ fibrosing Medlastinitis

1.5 Pulmonary Infections in Adults .

1.5.1 Pneumonia

1.5.2 Associated features and complications of pneumonia

1.5.3 Pulmonary tuberculosis

1.5.4 HIV & AIDS

1.6 Large Airway Obstruction :

1.6.1 Collapse: General features /Collapse of individual lobes / entire lung/ segmental collapse/

Rounded /obstructive collapse

1.6.2 Obstructive Pneumonities/ Bronchoscope/Broncheietasis

1.7 Pulmonary lobar Collapse essential considerations :

1.8 Chronic inflow Obstruction :

1.8.1 Asthama:

1.8.2 Choronic Bronchitis and Emphysema

1.8.3 Bronchiolitis

1.9 Pulmonary Neoplasms :

1 Bronchial Carcinomas

2 Benign Pulmonary Tumors

3 Malignant Lymphoma

4 Metastases

5 The solitary Pulmonary Nodule

2.0 Diffuse Pulmonary. Disease / Industrial Lung Disease / HRCT :

1 Pulmonary Oedema :

2 Diffuse pulmonary Haemorrhage

3 Inhalation of particulate matter

4 Diffuse pulmonary Fibrosis

5 Sarcoidosis / Collagen Vascular Disease *I* Systemic Vasculitidis *I* Lymphoid Disorders of Lungs / Pulmonary Eosinophilia *I* Drug induced Lung Disease

2.1 Chest Trauma :

2.2 Pulmonary Thromboembolism :

Imaging Chest Radiograph/ Radionuclide Study *I* Pulmonary Arteriography/ CT / MRI

2.3 .Post Operative & Critically ill Patients :

1 Cardiopulmonary Disease
2 Post Thoracotomy Radiograph
3 Support and Monitoring apparatus
4 Radiation Therapy

2.4 Chest Radiography after Lung Transplantation :

2.5 Congenital Pulmonary Anamolies :

1 Abnormal Development of Lung Bud
2 Abnormalities of separation of the lung had from the foregut
3 Abnormalities of Pulmonary Vasculature
4 Ectopic of Hamartomatous Development

2.6 The Infant and Young Child :

1 Pathologies of Diaphragm
2 Pleural Abnormalities
3 Inflammation
4 Airway Obstruction
5 Diffuse Lung Disease .
6 Respiratory Distress in Newborn Baby

2.7 Interventional Techniques in Thoracs:

1 Biopsy Procedures
2 Thoracic Drainage Procedure
3 Thoracic Sympathectomy
4 Therapeutic Embolisation
5 Dilatation & Stenting Techniques
6 Extraction Techniques.

III. THE HEART AND GREAT VESSELS

3.1 Cardiac Anatomy and Enlargement- :

3.1.1 Plain Radiography
3.1.2 Enlargement of various chambers on Plain Radiography

3.2 Magnetic Resonance of Heart and Circulation .

3.3 Congenital Heart Disease :

1 General Principles
2 Left to right shunts .
3 Central Sinuses
4 Other Congenital Heart Disease

3.4 Aquired Heart Disease: i) Non Rheumatic/ Rheumatic Mitral VD
ii) Tricuspid VD
iii) Aortic VD

3.5 Ischaemic Heart Disese : i) Coronary Atreriography
ii) Left Ventriculography
iii) Angina Pectoris
iv) Myocardial Infarction
v) Mechanical Complication of MI

3.6 Pumlonary Circulation : i) Anatomy and Physiology
ii) Pulmonary Vascularity in Heart Disease
iii) Pulmonary Arterial hypertension/ Its Imaging
iv) MR in Pulmonary Vascular Abnormalities .

3.7 Cadiomyopathy, Cardio Tumors, Trauma
3.8 The Imaging of Prosthetic Cardiac .Valves
3.9 The pericardium
3.10 Thoracic Aorta

IV .THE GASTROINTESTINAL TRACT:

The Esophagus
1 Anatomy .and Functions
2 Methods of Examination
3 Pathologies of Esophagus
4 Motility Disorders
5 Extrinsic lesions/ miscellaneous conditions

The stomach
1 Radiological anatomy and methods of examination
2 Inflammatory Diseases
3 Neoplastic Conditions
4 Radionuclide Studies in Stomach

The Duodenum
1 Anatomy and Normal Appearances
2 Methods of Radiological Examination
3 Peptic ulceration
4 Gastro heterotopia /diverticula
5 Neoplasms benign and malignant

The Small Intestine
1 Anatomy and normal appearances
2 Methods of radiological examination
3 Crohns disease/Coeliac Disease/Neoplasms/various conditions

The Large Bowel
1 Anatomy and Normal Appearances
2 Methods of Radiological Examination
3 Tumors
4 Diverticular Disease
5 Colitis
6 Aids
7 Miscellaneous Conditions

Peritoneum, Mesentery and Omentum
1 Peritoneal spaces and reflections
2 Abnormalities of Peritoneum
3 Abnormalities of Mesentry
4 Abnormalities of greater Omentum

Gastrointestinal Angiography.
1 General Consideration
2 Gastro intestinal bleeding

Interventional Radiology in Gastrointestinal tract

1 Introduction
2 Esophagus
.3 Stomach and Duodenum
4 Small Intestine
5 Colon and Rectum

Pediatric Gastrointestinal Radiology

1 The Neonate
2 The Infant and Older Child

V. Liver, Biliary tract, Pancreas, Endocrine System and Lymphoma

Liver

1 Normal and variant Anatomy
2 Liver Imaging Techniques
3 Diffuse Disease
4 Focal Disease
5 Intervention

The Biliary Tract

1 Anatomic Consideration
2 Methods of investigation
3 Biliary Disorders

Interventional Techniques Hepatobiliary System

1 Liver Biopsy
2 Biliary Obstruction
3 Malignant Biliary Obstruction
4 Percutaneous Cholangiography and Biliary Drainage Procedures
5 Vascular Interventional Techniques in Hepatobiliry System

The Pancreas

1 Embryology and Anatomy
2 Congenital Anomalies
3 Multisystem Diseases with Pancreatic involvement
4 Pancreatitis
5 Pancreatic Neoplasms
6 Trauma
7 Interventional Radiology in Pancreas

Imaging of the Endocrine System :

1 Hypothalamic-Pituitary Axis
2 Pineal Gland
3 Thyroid Gland
4 Parathyroid Gland
5 Pancreatic & Gastrointestinal Endocrine Disorders
6 Carcinoid Tumors
7 Adrenal Glands
8 Female Reproductive System .
9 Male Reproductive System

Reticuloendothelial Disorders : Lymphoma

1 Epidermilogy
2 Histopathological Classification
3 Staging Investigation and Management
4 Extranodal Manifestation of Lymphoma
5 Monitoring response to therapy

Reticuloendothenial Disorders: The Spleen

1 Imaging Techniques
2 Normal Anatomy
3 Splenomegaly
4 Benign Mass Lesions
5 Malignant Mass Lesions
6 Splenic Trauma

VI Genito Urinary Tract :

6.1 Methods of Investigation :

6.2 Radionuclide Imaging in Genito Urinary Tract :

6.3 Urodynamics

6.4 Reno Vascular Disease:

6.4.1 Renal Arteriography
6.4.2 Vascular Abnormalities
6.4.3 Radiological Management of Reno Vascular Disease

6.5 Renal Parenchymal Disease

6.5.1 Normal Appearance
6.5.2 Renal Parenchymal Disease
6.5.3 Parasitic Infections

6.6 Renal Masses :

6.6.1 Methods of Analysis
6.6.2 Pathological Renal Masses
6.3 Neoplastic Renal Masses

6.7 Calculus Disease & Urothelial Lesions

6.7.1 Calculus Disease
6.7.2 Nephrocalcinosis
6.7.3 Urothelial Tumors

6.8 Urinary Obstruction:

6.8.1 Pathophysiology
6.8.2 Causes of Obstruction

6.9 Radiological Evaluation of Urinary Bladder, Prostrate & Urethra :

6.10 Injuries to the Genito Urinary Tract :

6.11 Renal Failure and Transplantation :

6.12 Interventional Uroradiology :

6.13 Imaging of the Kidneys & Urinary Tract in Children

6.13.1 Embryology
6.13.2 Techniques .
6.13.3 Interventional Procedure "

6.14 Imaging of Paediatric Pelvis :

6.14.1 Imaging Techniques ;
6.14.2 Normal Anatomy
6.14.3 Congenital Anomalies
6.14.4 Pelvis Masses
6.14.5 Scrotal Disease

VII Skeletal System :
7.1 Skeletal Trauma
7.2 Bone Tumors : Generals Characteristic & Benign Lesions
7.3 Bone Tumors : Malignant Lesions
7.4 Myelproliferative and Similar Disorders
7.4.1 Generalised/Localised Decreased in Bone Density
7.4.2 Generalised/Localised Increased in Bone Density
7.4.3 Delayed Skeletal Matuarity
7.5 Metabolic and Endocrine Disease of the Skeletal
7.6 Skeletal Dysplasias and Malformation Syndrome
7.7 Joints Diseases :
7.7.1 Rhumatiod Arthritis
7.7.2 Other Connective Tissue Disease
7.7.3 Crystal Deposition Arthropathy
7.7.4 Degenerative Joint Disorders/Degenerative spine
7.7.5 Arthrography/ HPOA/ Pachy Dermoperiostritis
7.8 Bone and Soft tissue Infection :
7.9 Imaging of Soft tissue :
7.10 Bone Tumors in Children :
7.10.1 Imaging approach
7.10.2 Benign Bone Tumors
7.10.3 Malignant Bone Tumors
7.11 The Radiology of Non Accidental Injry in Children :
7.12 Paediatric Musculo -Skeletal Trauma
7.13 Radiology of Arthritides in Children
7.14 Radiology of Soft tissue in Children
7.15 Bone and Soft tissue infection in Children.

VIII. The Reproductive System :
8.1 Ultrasound in Obstetrics and Gynaecology
8.1.1 Indication
8.1.2 Instrumentation in US Techniques
8.1.3 Gynecological infertility
8.1.4 Assesing Tubal Patency
8.2 Imaging in Gynaecology
8.3 Hysterosalpingography
8.4 The Breast & its Imaging
8.5 Breast Cancer
8.6 Male Reproductive System

IX Central Nerve System :
9.1 Skull and Brain : Methods of Examination and Anatomy
9.2 Cranial and Intracranial Pathology : Tumors in Adults
Cerebro Vascular Disease and Non Traumatic
Intracranial Haemorrhage
Infections, AIDS, Demyelinating and Metabolic
Disease
9.3 Spine: Method of Investigation
9.4 Imaging of Spinal Pathology
9.5 Scoliosis in Children
9.6 Neonatal Head and Spine Sonography
9.7 Neurology in Children

X. The Orbit; ENT; Face; Teeth:

10.1. The Orbit

10.1.1 Anatomy / Techniques
10.1.2 Intraoccular Abnormalities
10.1.3 Lacrimal Gland Tumors
10.1.4 Muscular Tumors
10.1.5 Intra/Extra Canal Tumors

10.2 Ear, Nose and Throat Radiology

10.2.1 The Ear
10.2.2 Nose and Paranasal Sinuses
10.2.3 Phrynx

10.3. Maxillofacial Radiology

10.3.1 Fractures of Maxilla
10.3.2 TM Joint
10.3.3 Salivary Glands

10.4. Dental Radiology

10.5. Pediatrics, Eye & Orbit :

10.5.1 Imaging Techniques
10.5.2 Child with Proptosis or an Orbital mass
10.5.3 Child with Orbital Infection
10.5.4 .Child with White Eye
10.5.5 Child with Development Abnormalities

10.6. Paediatric ENT Imaging

XI) Interventional radiology:

1. HSG & FTR
2. 4 vessel angiography
3. Biliary intervention(PTBD,PTC)
4. PCN
5. Laser ablation of varicose veins
6. RFA/ chemoembolisation of hepatic tumour and malformations.
7. Vertebroplasty.
8. Hemangioma and AVM management.