

# SYLLABUS FOR PHYSIOTHERAPIST in MCD

## Human Anatomy

### General Anatomy

- Regions of Body, cavities and Systems outline.
- Surface anatomy – nerve, muscle, skeleton, major blood vessels and cardiopulmonary
- Cell Structure and function of cell organelles (Brief outline only).
- Connective tissue & its modification, tendons, membranes, cartilage.
- Bone structure, blood supply, growth, ossification, and classification.
- Muscle classification, structure and functional aspect.
- Nerve – structure, classification, microscopy with examples.
- Neurons, classification with examples. Simple reflex arc.
- Parts of a typical spinal curve/Dermatome
- Skin and skin appendages
- Joints – classification, structures of joints, movements, range, limiting factors, stability, blood supply, nerve supply, dislocations and applied anatomy.
- Circulatory system – major arteries and veins of the body, structure of blood vessels
- Lymphoid system – circulation, function, lymphoid organs- and their structure & functions.

### Upper extremity

- Osteology (Clavicle, scapula, humerus, radius, ulna, carpals, metacarpals, phalanges)
- Joints – structure, range of movement
- Soft Parts- Breast, Pectoral Region, Axilla, Front of the arm, back of the arm, cubital fossa, front fore arm, back of fore arm, palm and dorsum of hand.
- Muscles – origin, insertion, actions, nerve supply of all muscles.
- Major nerves – course, branches and implications of nerve injuries
- Major vessels – course and implications of pathological event
- Development of limb bones, muscles and anomalies
- Arches of the Hand, skin of palm, and dorsum of the hand
- Radiographic identification of bone and joints

### Lower Extremity

- Osteology ( Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges)
- Joints – structure, range of movement
- Soft parts- Gluteal region, front & back of the thigh (femoral triangle, femoral canal, and inguinal canal), medial side of the thigh (adductor canal), lateral side of the thigh, popliteal fossa, anterior & posterior compartment of the leg, sole of the foot
- Muscles – origin, insertion, actions, nerve supply
- Major nerves – course, branches and implications of nerve injuries
- Major vessels – course and implications of pathological event
- Development of limb bones, muscles and anomalies
- Arches of foot, skin of the foot
- Radiographic identification of bone and joints

### Spine

- Back muscles - Superficial layer, Deep muscles of back, their origin, insertion, action and nerve supply.
- Vertebral column – Structure & Development, Structure & Joints of vertebra
- Radiographic identification of bone and joints

### Thorax

- Thoracic cage, Pleural cavities & pleura
- Lungs and respiratory tree
- Heart and great vessels–
- Diaphragm

### Neural anatomy

- Mandible and bones of the skull.
- Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck
- Central nervous system – disposition, parts and functions of Cerebrum, Cerebellum, Midbrain & brain stem
- Blood supply & anatomy of strokes (Circle of Willis)
- Spinal cord- anatomy, blood supply, nerve pathways Pyramidal, extra pyramidal system

- Development of nervous system & defects (Brief Description)
- Cranial nerves – special emphasis on V, VII, X, XI, XII (course, distribution and palsies)
- Peripheral nerves
- Sympathetic nervous system, its parts and components
- Parasympathetic nervous system.

#### Miscellaneous

- Embryology in brief covering neuromuscular developmental aspect, Foetal & placental circulations
- Endocrine - system – Pituitary, Thyroid, parathyroid (Brief Description)
- Special senses (Brief Description): Nerve receptors, Eye, Ear, Labyrinth, Nose, Tongue
- Abdomen and pelvis (Brief descriptions only)
- Abdominal cavity – divisions
- Muscles of abdominal wall, pelvic floor, innervations
- Bony Pelvis
- Digestive system (Liver & pancreas, Alimentary canal)
- Urinary system – Kidney, Ureter, bladder, urethra
- Genital system – male and female

### Human Physiology

#### Organization of Human Body

- General Physiology: Introduction to Human Body
- Cell: Morphology. Organelles: their structure and functions, Transport Mechanisms across the cell membrane
- Tissue level of organization
- Body fluids: Distribution, composition.
- Homeostasis

#### Principles of Support & Movement

- Function of Bone & Skeletal System
- Structure of a bone and bone tissue
- Formation, function, Blood and nerve supply of a bone tissue
- Ossification of a bone
- Classification of Joints: fibrous, cartilaginous and fibrous
- Structure of synovial joint and ranges of different synovial joints
- Muscle tissue & its types, morphology, mechanism of muscle contraction, EC coupling
- Muscle properties and functions
- Electrical & Mechanical responses & their basis
- Concept of isometric & isotonic muscle contraction and relaxation of skeletal muscle fibres, muscle metabolism and production of ATP in muscle fibres
- Control of muscle tension: motor units and their recruitment
- Types of skeletal muscle fibres
- Neuromuscular junction, structure & events occurring during excitation-contraction coupling
- Myasthenia gravis, rigor mortis,

#### Nervous tissue

- Nerve cell – structure
- Genesis of membrane potential, Action potential & propagation
- Ionic basis of nerve conduction
- Classification & types of nerve fiber
- Mixed nerves & compound action potential
- Concept of nerve injury, degeneration and regeneration
- Synaptic & Junction Transmission
- Basic synaptic anatomy
- Synaptic activity, Chemical transmission
- Inhibition & facilitation
- Principal neurotransmitter system
- Regeneration and repair of nervous tissue

#### Blood

- Introduction: Composition and functions of blood.

- Formation of blood cells
- Plasma: Composition, formation, functions. Plasma proteins, Starling Forces & formation of oedema
- W.B.C., R.B.C., Platelets formation & functions
- Haemoglobin –structure, function and derivatives anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.
- Blood Groups, Erythroblastosis foetalis, Haemostasis, Immunity

#### **Cardiovascular System**

- Introduction: Physiological anatomy and blood and nerve supply of the heart
- Organization of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential.
- Properties.
- Anatomical, biophysical consideration of arterial, capillary, venous and Lymphatic circulation
- Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance.
- Regulation of BP.
- Basic idea of Electrocardiogram
- Mechanical events of Cardiac cycle, Cardiac output, its regulation
- Local & systemic regulatory mechanisms of CVS, humeral & neural
- Lymph: Composition, formation, circulation and functions
- Specific resistance: Immunity
- Cerebral, coronary, splanchnic, skin, Hepatic circulation

#### **Higher functions of nervous system**

- Learning & memory, neocortex, limbic functions, sexual behaviors, fear & rage, motivation– brief idea.
- Special senses,
- Vision: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Visual Pathway and the effects of lesions. Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism, Visual Reflexes, Visual acuity and Visual field.
- Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing.
- Taste: Taste buds. Primary tastes. Gustatory pathway.
- Smell: Olfactory membrane. Olfactory pathway.
- Vestibular Apparatus: Crista ampullaris and macula. Functions, Disorders Arousal mechanisms & sleep

#### **Male & female reproductive system**

- Anatomy of male reproductive organs, Sex determination, functions of testes. Pubertal changes in males. Spermatogenesis, Testosterone: action, Regulation of secretion.
- Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females, Oogenesis. oestrogen and progesterone-action, regulation of secretion. Menstrual Cycle

#### **Respiratory System**

- Physiological anatomy of lungs, mechanics of respiration
- Pulmonary circulation, Gas exchange in lungs, Oxygen & Carbon dioxide transport Other function of respiratory system
- Neural & chemical control of breathing
- Regulation of respiratory activity, non-chemical influences on respiratory activity. Cardio respiratory adjustments in health & disease:
- Exercise, high altitude, deep sea diving
- Hypoxia, hypercapnia, hypocapnia, oxygen treatment Asthma, emphysema, artificial respiration

#### **Renal System**

- Renal circulation
- Glomerular filtration rate, clearance, Tubular function
- Water excretion, concentration of urine-regulation of Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup> excretion Diuretics
- Physiology of urinary bladder
- Difference of tonicity, volume & pH of body fluids

#### **Digestive System & Endocrinology**

- Digestion & absorption of lipids, carbohydrates, proteins, nucleic acids, water, electrolytes, vitamins & minerals
- Gastrointestinal secretions & their regulation Liver & Exocrine Pancreas

## **Sociology**

- Definition and scope of Sociology
- Its relation with Anthropology, Psychology, Social Psychology and ethics
- Methods of Sociology-case study, Social Survey, Questionnaire, interview and opinion poll methods
- Importance of its study with special reference to health care professionals
- Social Factors in Health and Disease
- Socialization - Meaning and nature, Primary, Secondary, and Anticipatory Socialization and Agencies of Socialization
- Social Groups – Concept, influence of formal and informal groups on health and sickness and role of groups in the hospital and rehabilitation settings
- Family - Meaning and definition, Functions, family Patterns, influence of family on the individual health, family, and nutrition, effects of sickness on family and psychosomatic disease and their importance to Physiotherapy
- Community – (Rural community & Urban community – Meaning and features and health hazards)
- Culture and Health – Concept, cultures and behavior, cultural meaning of sickness and culture and health disorders
- Social change - Meaning & Factors of social change
- Human adaptation and social change, Social change and stress, deviance, and health Program,
- The role of social planning in the improvement of health and in rehabilitation
- Social problems of disabled - Consequences of the social problems in relation to sickness and disability, remedies to prevent these problems
- Population explosion, Poverty and unemployment, Beggary, Juvenile delinquency, Prostitution, Alcoholism,
- Problems of women in employment
- Social Stratification- caste, class, gender
- Social security - Social security and social legislation in relation to the disabled
- Social worker - Meaning of social work; the role of a medical social worker

## **Fundamentals of Physiotherapy**

- Mechanics - Definition of mechanics and Biomechanics
- Force - Definition, diagrammatic representation, classification of forces, concurrent, coplanar and co-linear forces, composition and resolution of forces, angle of pulls of muscle
- Momentum - principles, and practical application
- Friction
- Gravity - Definition, line of gravity, Centre of gravity
- Equilibrium - Supporting base, types, and equilibrium in static and dynamic state Levers - Definition, function, classification and application of levers in physiotherapy & order of levers with example of lever in human body
- Pulleys - system of pulleys, types and application
- Elasticity - Definition, stress, strain, HOOKE'S Law
- Springs - properties of springs, springs in series and parallel, elastic materials in use
- Normal Posture - definition & description, static and dynamic, alignments of various joints, centre of gravity, planes & muscular moments, and Analysis of posture Movements - Anatomical definition and description, Movements and exercise as therapeutic modality and their effects, Physiological reaction of exercise
- Starting positions - Description and muscle work, Importance of fundamental and derived types, Effects and uses of individual positions
- Massage- History, definition, types and their rationale, general
- effects, local effects on individual (physiological effects) and uses,
- contra-indications and techniques of application
- DC Currents -Modern concept of electricity: fundamental electric charges (proton and electron), bound and free electrons, free electrons and current, static electric charge, charging of an object potential and capacitance, potential difference and EMF

- A.C. currents: Sinusoidal wave from, frequency, wavelength, Amplitude and phase of a sine wave, Average & RMS value of a sine wave
- Quantity of electricity, magnitude of current, conductors and insulators, resistance of conductor and Ohm's law, resistances in series and parallel
- Capacitors: Electric field around a capacitor, charging and discharging a capacitor, types of capacitor with application of each in Physiotherapy department
- Rheostat: series and shunt Rheostat with application of each in the Physiotherapy department
- Effects of electric Current: Thermal effect, chemical effect (ionization) and magnetic effect. Electric shock, Earth shock, causes and its prevention

## **Yogic Sciences**

### **Introduction of Yoga**

- Etymology of Yoga, Concept of Chitta and Chitta Bhumis, General introduction to four paths of Yoga and Importance of Nadi & Chakra in Yoga

### **Ashtanga Yoga: Purpose, Significance and Effects**

- Eight limbs of Yoga as per Yogasutra of Patanjali – Discipline/self restraint (Yama), Observance (Niyama), Posture (Asana), Restraint of breath/exercises of life force (Pranayama), Abstraction of senses/Introversion-of attention (Pratyahara), Concentration (Dharna), Meditation(Dhyana) and Super conscious state/illumination (Samadhi).

### **Asana and Pranayama**

- Introduction of Asanas and Benefits and Contra-indication of Asanas
- Define and understand the concept of Prana & Pranayama, Benefits and Contra-indication of Pranayama and Physiological effect of Pranayama

### **Shatkarma, Mudra and Bandh**

- Introduction of Mudra and Benefits and Contra-indication of Mudra
- Introduction of Bandh and Benefits and Contra-indication of Bandh
- Introduction of Shatkarma and Benefits and Contra-indications of Shatkarma
- Yoga Nidra (The Conscious Dynamic Sleep),
- Meditation Technique
- Cause of Pain (Dukha) according to Yog Sutra of Patanjali
- Yogic lifestyle (Ahara, Vihar, Achar, Vichar),
- Yogic attitudes (Maitri, Karuna, Mudita and Upeksha) and practices for Mental Wellbeing.

### **Hydrostatics and Hydrodynamics:**

- History, Properties of water, Specific gravity,
- Hydrostatic pressure
- Archimedes principle, Buoyancy-law of floatation
- Effect of buoyancy on movements performed in water
- Equilibrium of a floating body, Bernoulli's theorem
- Physiological effects of exercise in water

### **Hydrotherapy:**

- Indication, contraindication, benefits, dangers and precautions
- Hydrotherapy regimes of exercises,
- Hydrotherapy exercise for all age groups
- Types of pools and baths

### **Suspension Therapy:**

- Principles of suspension & types
- Components
- Effects and uses & therapeutic application

### **Normal Gait –**

- Definition & description, alignments, centre of gravity during gait cycle, planes & muscle acting mechanisms, pattern, characteristics Normal gait cycle, temporal & spatial variables, & determinants of Gait

Aims and scope of various biomechanical modalities – shoulder wheel, shoulder ladder, shoulder pulleys, pronator-supinator instrument, static cycle, rowing machine, ankle exerciser, balancing board, springs, weights

### **Magnetism:**

- Magnetic - non-magnetic substances and their properties, properties of magnet, molecular theory, poles of magnet and its properties, magnetic lines of force and their properties, Electromagnetism,

- magnetic effects of electric current, Electromagnetic induction, Lenz's law, Inductor and Inductance types of inductor, reactance and impedance.
- Thermionic Valves: Thermionic emission, Diode and Triode valves and their characteristics, Construction and application of Cathode Ray Oscilloscope
- Semiconductor Devices: Intrinsic and extrinsic semiconductors, advantages of diode and transistors devices. Basing of Diode and their characteristics, Light Emitting Diodes, integrated circuits
- Electronic Circuits: Rectifiers & smoothing circuits, Oscillators - Sinusoidal and non- sinusoidal types
- A.C. & D.C. meters: Functions and applications of Ammeter and volt meters, Ohmmeters, Wheat stone bridge
- Introduction to Therapeutic Energies – Thermal, Mechanical, Electrical, Electromagnetic and magnetic - Definition, description, physiological effects, pathological effects and dangers

## COMPUTER APPLICATIONS

- Introduction to computer: Introduction, characteristics of computer, block diagram of computer, computer languages.
- Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).
- Processor and memory: The central Processing Unit CPU, Main memory.
- Introduction of Operating System: introduction, operating system concepts, types of operating system. History of Windows, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows opening, closing, moving, resizing, minimizing and maximizing etc. and install different software.
- Introduction to excel: Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs, macron, tables, basic formulas/ Functions ( Sum, count, average, logical operators), forting and filteration, Gridlines, Merge, basic short cut keys for MS- Excel.
- Introduction to Power Point: Introduction, creating and manipulating presentation, views, formatting and enhancing text slide with graphs.
- Internet and its applications: Definition, brief history, basic services email, File transfer protocol, telnet, the World Wide Web (WWW), www browsers, use of the internet.Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

## Psychology

### Introduction to Psychology

- Definition and nature of Psychology, Fields & subfields of psychology.
- Schools of thoughts – Structuralism, functionalism, Behaviorism, Gestalt, Psycho- analytic Theory
- Developmental Psychology : Definition & its Theories - Physiological and psychological changes during Infancy, Early & Late childhood, adolescent stage, Puberty, adulthood & old age
- Learning – Definition and theories, conditioning, Role of learning in human life
- Memory- theories of memory and forgetting, thinking & methods to improve memory
- Attention & perception- Nature of attention, Nature of perception, Principle of grouping
- Thinking – process, problem solving, decision making and creative thinking
- Motivation - theories and types of Motivation
- Emotions - theories of Emotions and stress
- Attitudes – theories, attitudes and behavior, factors in attitude change
- Intelligence - theories of intelligence
- Personality, theories of personality, factors influencing personality
- Development and growth of behavior in infancy and childhood, adolescence, adulthood and old age
- Behavior - normal and abnormal
- Counseling - Definition, Aims and principles
- Psychotherapy – brief introduction to paradigms in psychopathology and therapy
- Psychological need of children and geriatric patients
- Communication – effective and faulty
- Psychological disorders
- Anxiety Disorders
- Eating disorders

- Somatoform and Dissociate Disorders
- Personality Disorder
- Stress and health
- Severe psychological disorders – Mood disorders, psychosis
- Mental deficiency - Mental retardation, Learning disabilities & Autistic behavior

## Biochemistry

a) **Cell Biology** - Brief description of cell structure and its various components

**Chemistry**-Definition, Classification With Examples & Functions of Carbohydrates.

Reducing Properties Of Sugars Of Clinical & Diagnostic Importance (Eg. Benedict's Test, Barfoed's Test Etc)

**Metabolism**-Digestion & Absorption of Carbohydrates, glycolysis, Aerobic, Anaerobic, Energetics & Regulation

Kreb's Cycle-Its Energetics & Regulation- Role of T.C.A. Cycle, Glycogenesis, Glycogenolysis & Their Regulation, Glyconeogenesis-Significance Of H.M.P. Shunt Hormonal Regulation of Blood Sugar Levels- Important Metabolic Disorders of Glycogen, Lactose Intolerance, Diabetes Mellitus.

**Proteins** – Chemistry-Definition-Function-Classification of Amino Acids-Protein Structure-Effect of Temperature on Proteins-Denaturation-Coagulation Isoelectric Ph & Its Importance.

**Lipids** - Chemistry-Definition-Classification-[Including Fatty Acids with Examples]- Function.

**Nucleic Acids** - D.N.A., R.N.A.-Definition-structure & function-types-Genetic Code- Catabolism of purine – Gout

b) **Enzymes** - Definition- Enzymes, Co-Enzymes, Isozymes -Classification-Factors Affecting the activity. General Mechanism of Enzymes, Inhibition & Types Of Inhibitors, Iso-Enzymes, Clinical & Therapeutic Use Of Enzymes

c) **Vitamins**- Water & Fat Soluble-Definition-Classification, -Sources of Individual Vitamins , Co-Enzyme Forms & Function, Reaction Related To Metabolism, RDA- Deficiency & Toxicity

d) **Minerals** : Phosphate, Calcium, & Iron [In Details]; Magnesium, Fluoride, Zinc, Copper, selenium molybdenum, Iodine-sources, RDA. Functions & disorders of minerals

e) **Acid- Base Balance, Water & Electrolyte** : Body Water, Ph-osmolarity extra & intra cellular fluid, Buffers-Ph, buffer system In blood, Role of kidneys & lungs in acid-base balance, Water- electrolyte balance imbalance-dehydration

f) **Nutrition : Importance of Nutrition**-Calorimetry-Energy Value-Calorimeter-Respiratory Quotient & Its Significance, Nitrogen Balance & Its Significance-Protein Energy Malnutrition- Kwashiorkor & Marasmus.

## Communication Skills

- **Communication Skills**: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
- **Barriers to communication**: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
- **Perspectives in Communication**: Introduction, Visual Perception, Language, Other
- **Elements of Communication**: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication
- **Communication Styles**: Introduction, The Communication Styles Matrix with example for each - Direct Communication Style; Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.
- **Basic Listening Skills**: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations
- **Effective Written Communication**: Introduction, When and When Not to Use Written Communication Complexity of Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
- **Writing Effectively**: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message
- **Interview Skills**: Purpose of an interview, Do's and Don't's of an interview • Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion

## **Pathology & Microbiology**

### **Cell injuries**

- Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury-Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoid changes. Irreversible cell injury-Types of Necrosis & Gangrene, Autolysis. Pathologic calcification- Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin. Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.

### **Inflammation and Repair**

- Acute inflammation: features, causes, vascular and cellular events. Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples. Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.

### **Immunopathology**

- Immune system, Hypersensitivity: type and examples, antibody and cell mediated tissue injury, Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification.

### **Infectious diseases**

- Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.
- Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.
- Viral diseases: Poliomyelitis, Rabies, Measles, HIV infection.
- Fungal disease and opportunistic infections.
- Parasitic diseases: Malaria, Filariasis, Amoebiasis, Kala-azar.

### **Cardio-respiratory system & Circulatory Diseases**

- Atherosclerosis -Ischemic heart diseases- myocardial infarction – Pathogenesis / Pathology Hypertension, Congestive Cardiac Failure, Pericarditis, Cardiomyopathy, Rheumatic Heart Disease, Infective endocarditis, Peripheral vascular diseases.
- Respiratory system : COPD, Pneumonia (lobar, broncho, viral), T.B. Primary, secondary – morphologic types, complications, Lung collapse – atelectasis Hyperemia/Ischemia and Haemorrhage,

### **Musculoskeletal System**

- Osteomyelitis, tuberculosis, mycetoma, Metabolic diseases: rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease,
- Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis: Suppurative, Rheumatoid, Osteoarthritis, Gout
- Neuropathology
- TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess, CNS Tumors, Neuroblastoma, Meningioma, Medulloblastoma, Multiple Sclerosis, stroke,
- Neuropathies (Carotid Marie Tooth's disease, Compression and entrapments, diabetic, G.B syndrome), Myasthenia Gravis

## **Microbiology**

### **General Microbiology**

- Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate. Normal flora of the human body.
- Routes of infection and spread- endogenous and exogenous infections; source at reservoir of infections. Essentials of bacterial growth requirements.
- ~~Sterilization, disinfection and universal precautions in relation to patient care and disease prevention.~~ Definition of asepsis, sterilization, disinfection.
- Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

### **Immunology**

- Basic principles of immunity immunobiology: lymphoid organs and tissues. Antigen, antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis. Humoral immunity and its role in immunity, Cell mediated immunity, Immunology of hypersensitivity, Measuring immune functions.

### **Bacteriology & Virulogy**

- Morphology, pathogenicity & lab diagnosis of Staphylococci, Streptococci & Neisseria. Morphology, pathogenicity & lab diagnosis of Corynebacterium diphtheriae, Clostridium tetani,
- E. coli, Klebsiella, Pseudomonas, Shigella, Salmonella, V. Cholera. M. tuberculosis, M. leprae, Spirochaetes.
- Classification, cultivation of Viruses & methods for diagnosis of viral infections, Morphology transmission clinical syndromes, Laboratory diagnosis & Prevention of HIV, Hepatitis, polio, measles.

#### **Mycology & Parasitology**

- Morphological classification & general lab Diagnosis, Definition, causative Agents & lab Diagnosis of mycetozoa, Aspergillosis & Candidiasis. List of parasites affecting CNS, on short about lab diagnosis of malaria, Filariasis.

### **Pharmacology**

#### **General Pharmacology**

- Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects

#### **Autonomic Nervous system**

- General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System
- Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.
- Cardiovascular Pharmacology
- Drugs used in the treatment of heart failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors
- Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators
- Antiarrhythmic Drugs
- Drugs used in the treatment of vascular disease and tissue ischemia : Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers, Cerebral Ischemia Peripheral Vascular Disease.

#### **Neuropharmacology**

- Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
- Anxiolytic Drugs: Benzodiazepines, Other Anxiolytics
- Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants
- Antipsychotic drugs

#### **Disorders of Movement**

- Drugs used in Treatment of Parkinson's disease
- Antiepileptic Drugs
- Spasticity and Skeletal Muscle Relaxants

#### **Inflammatory/Immune Diseases**

- Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs
- Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids
- Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout
- Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematosus, Scleroderma, Demyelinating Disease.
- Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis

#### **Digestion and Metabolism**

- Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemic

### **Kinesiology & Biomechanics**

#### **Basic Concepts in Biomechanics:**

- Kinematics and Kinetics

- Motion- Types of Motion, Location of Motion, Direction of Motion, Magnitude of Motion, Objects in Motion
- Force- Definition of Forces, Force of Gravity, Reaction forces Concurrent force systems, Parallel force system, Force components
- Equilibrium- Types of Equilibrium, factors affecting equilibrium
- Force of friction
- Work
- Moment arm of force
- Axis Planes
- Levers

#### **Joint structure and Function**

- Basic principles of joint design and Materials used in human joints.
- General properties of connective tissues
- Human joint design
- Joint function
- Joint motion
- General effects of disease, injury and immobilization.

#### **Muscle structure and function**

- Mobility and stability functions of muscles
- Elements of muscle structure
- Muscle function
- Types of muscle contraction and muscles work. Classification of muscles and their functions.
- Group action of muscles, co-ordinated movement.

#### **Biomechanics of the Shoulder Complex –**

- Describe the structural components of the shoulder complex including the articulating surfaces, capsular attachments and ligaments and movements of the following joints:
- Sternoclavicular
- Acromioclavicular
- Scapulothoracic
- Glenohumeral

#### **Biomechanics of the Elbow Joint**

- The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex.

#### **Biomechanics of the wrist and hand complex**

- The wrist and hand complex: Structural components and functions

#### **Ergonomic**

- Ergonomics in home activity
- Ergonomic modification and rehabilitation of work related issues. Office Ergonomics

#### **Biomechanics of the Thorax and Chest wall -**

- General structure and function
- Rib cage and the muscles associated with the rib cage
- Ventilatory motions: its coordination and integration

#### **Biomechanics of the Hip Complex**

- Describe the general features of the hip joint including the articulating surfaces on the pelvis and the femur, angulations, angle of inclination, angle of torsion, internal architecture of femur and pelvis, joint capsule, ligaments and muscles (Flexors, Extensors-One joint extensors, two extensors, Adductors, medial rotators and lateral rotators).

#### **Biomechanics of the Knee complex**

- Describe the structure of the Knee complex biomechanics, articulating surfaces on femur and tibia, the menisci, joint capsule and bursa, ligaments and other supporting structures, anterior-posterior and ligaments and mediolateral stability, muscle structure, knee flexors and extensors, axes of knee complex: Mechanical axes, anatomic axis and axis of motion.

#### **Biomechanics of the Ankle and foot complex**

- Describe the structure, ligaments, axis and function of the following :ankle joint, tibiofibular joints, subtalar joints, talocalcaneonavicular joints, transversetarsal joint, tarsometatarsal joint, plantar arches, metatarsophalangeal joints, interphalangeal joints.

- Define the terminology unique to the ankle foot complex, including inversion-eversion, pronation-supination, dorsi flexion, plantar flexion and adduction and abduction.

#### **The Vertebral Column**

- Articulations, ligaments & muscles, typical & atypical vertebrae & intervertebral disc
- Regional structure & curves of vertebral column & function of cervical, dorsal, lumbar & sacral vertebrae.
- Describe the muscles of the vertebral column. Flexors & extensors, rotators & lateral flexors
- Mechanics of intervertebral disc
- Motions of vertebral column.
- Lumbar- pelvic rhythm

#### **Posture**

- Posture: Definition, factors responsible for posture.
- Static and dynamic posture.
- Postural control
- Kinetics and kinematics of posture

#### **Gait**

- Description of normal gait, determinants of gait, spatio temporal features, and analysis.
- Gait deviation: Types, causative factors and analysis
- Evaluation and assessment technique
- Dosimetry

#### **Environmental Sciences**

- The Multi disciplinary nature of environmental studies Natural Resources
- Renewable and non-renewable resources:
- Natural resources and associated problems
- a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

#### **Ecosystems:**

- Concept of an ecosystem, Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

#### **Environmental Pollution:**

- Air pollution; Water pollution; Soil pollution

#### **First Aid & Basic Nursing**

- Instrumentation used in First Aid (First Aid kit) & Examination of Vital Signs, First aid of Emergencies (Snake & animal bites, Poisoning, Electric shock, Hypovolemic Shock, Traumatic accidents, Cardiac arrest, Burns, spinal cord injuries & fractures)
- Indications, assessment and Technique of Cardio-pulmonary resuscitation
- Artificial ventilation & Basic life support
- Introduction and nursing principles of Nursing, Bandaging extremities: triangular bandages & their application Environment safety
- Bed Rest & Mobility - Bed making ( Prone, lateral dorsal, dorsal recumbent, fowler's position , Comfort measures, Aid to rest & sleeps, Transfers, Basic turns , Lifting patients up in the bed : transferring from bed to wheelchair, Transferring from bed to stretcher )
- Observation & Nourishment - Providing for patients elimination , Giving & taking bed pan, urinal: observation of stools, urine
- Observation of sputum - Understand use & care of catheters
- Methods of giving nourishment - Feeding tube, feeding drips, transfusions
- Care of rubber goods , Observation, reporting & recording temperature, respiration & pulse simple aseptic techniques, sterilisation & disinfection, Surgical dressing, Parental administer of medicine

#### **Medicine**

##### **Infection**

- Effects of Infection on the body, Pathology, source and spread of Infection, vaccinations, generalized infections, rashes and Infection, food poisoning and gastroenteritis, sexually transmitted diseases, HIV infections and Aids.

- Poisoning: Clinical features, general management, common agents in poisoning, pharmaceutical agents, drugs of misuse, chemical pesticides, Envenomation.

#### Food and Nutrition

- Assessment of Nutritional and Energy requirements; clinical features and treatment of Deficiency diseases, Protein Energy Malnutrition, Obesity and its related disorders: Causes, Complications, benefits of weight loss, management of Obesity, diet, exercise and medications.

#### Endocrine diseases

- Etiology and pathogenesis, Common presenting symptoms, Diagnosis and management of the disease; Diabetes Mellitus, hypo and hyperthyroid, hypo-parathyroid

#### Diseases of the blood

- Etiology and pathogenesis, Common presenting symptoms, Diagnosis and management of the disease anemia, Hemophilia, Leukaemia, complications due to repeated hemorrhages, complications due to therapy.

#### Diseases of the digestive system

- Etiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract
- Etiology, clinical features, diagnosis, complications and treatment of the following conditions: Viral Hepatitis, Wilson's Disease, Alpha-1-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholecystitis.

#### Diseases of the Skin

- Causes, clinical features and management of the following skin conditions: Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections.

#### Pediatrics

- Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood,
- Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ;
- Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child.

#### General Surgery

- Definition, Causes, Classifications, clinical evaluation, complications & management( in brief) in Wounds, Gangrene , Scars, Ulcers, Boils and Carbuncles
- Reasons for Surgery; Types of anaesthesia and its effects on the patient ; Types of Incisions; Clips Ligatures and Sutures ; General Thoracic Procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery. Blood Transfusion
- Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pneumothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions.
- Thoracic surgeries – Thoracotomy – Definition, Types of Incisions with emphasis to the site of incision, muscles cut and complications. Lung surgeries : Pneumonectomy, Lobectomy, segmentectomy; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung.
- Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations, Closed Heart surgery ,Open Heart surgery. Transplant Surgery – Heart, Lung
- ~~Diseases of the Arteries and Veins~~ : Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases : Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins.
- Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Nephrectomy, Prostatectomy.
- Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer.

- Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.
- Plastic Surgery : Principles of plastic surgery Post-operative management, and Complications.
- ENT: Common problems of ear, otitis media, Otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.

## **Exercise Therapy**

### **Passive movements**

- Definition
- Relaxed, forced and stretching type.
- Indications, contraindications, advantages and Techniques of passive movements of different joints.

### **Active movements**

- Free, assisted and resisted Movements
- Indication, contraindications, advantages and techniques of active exercises of different joints.
- Special emphasis on: Shoulder flexion, extension, abduction & adduction, elbow flexion, extension, wrist dorsiflexion, planter flexion, radial deviation, ulnar deviation, hip flexion, extension, abduction, adduction, knee flexion, knee extension, ankle planter flexion, dorsi flexion.
- Clinical methods of strengthening of various muscle groups.

### **Goniometry**

- Measurement of joints range of motion in normal and disease condition of all upper extremity and lower extremity.
- Different techniques of goniometry.
- Limb length measurements

### **Manual Muscle Testing**

- Concept, introduction, significance and limitations.
- Grade systems
- Techniques of Muscle testing.
- Emphasis on skills to grade individual muscles of upper extremity, lower extremity, neck and trunk muscles including trick movements.

### **Muscle Stretching**

- Stretching – definition, effects and uses of stretching, indications, contra indications, general techniques & group stretching techniques
- Special emphasis on stretching of: Sternocleidomastoid, trapezius, Pectoral major, biceps brachii, triceps brachii, long flexors of fingers, extensors of finger, ilio-psoas, quadriceps, hamstrings, ilio-tibial band, hip abductors ,hip adductors ,gastrocnemius-soleus, evertors.

### **Electrotherapy**

#### **Low frequency currents:**

- Nerve Muscle Physiology: brief outline Faradic current:
- Indications, contraindications, Techniques, parameters, Group muscle stimulation. Faradic footbath, Faradism under pressure and muscle re-education.
- Dosimetry

#### **Galvanic current:**

- ~~Indications, contraindications, precautions and therapeutic effects of stimulation.~~
- Techniques, parameters, Dosimetry

#### **Electro-Diagnosis:**

- S. D. Curve, Reaction of degeneration, Chronaxie & Rheobase
- Outline of EMG & Nerve conduction velocity

#### **Iontophoresis:**

- Definition and principles & factors
- Indications, effects, techniques, contraindications, precautions and Potential harmful effects.

#### **TENS therapy:**

- Principle of therapy, Parameters and therapeutic uses.

- Theories of pain and pain control.
- Indications and contra-indications, Dosimetry

#### Medium frequency currents:

Definitions, effects, indications, techniques of application, contraindications Interferential therapy:

- Physiological, therapeutic effects & dangers, Indications & contra indications
- Technique and method of applications, Dosimetry

#### Infrared Therapy:

- Therapeutic effects and uses, Techniques of application.
- Indications, contraindications precautions and Potential harmful effects.

#### Heating Modalities:

- Therapeutic effects and uses, Techniques and applications
- Indications, contraindications, precautions and Potential harmful effects of various heat modalities:
- Paraffin wax bath therapy, Hydro collar packs, Whirlpool and moist heat Heating pads, Hot air chambers.

#### Cold-therapy:

- Indications, contraindications and therapeutic effects.
- Technique, precautions and Potential harmful effects of treatment, Dosimetry

#### Traction instruments:

- Rationale, technique, indications, contraindications, precautions of electric traction equipment.

#### Relaxation:

- Description of fatigue and spasm & factors.
- General causes, signs and symptoms of fatigue
- Techniques of Relaxation- local and General with indication
- Rationale of relaxation Techniques.

#### Joint Mobility:

- Joint range, stiffness, range and limitations
- Accessory movements- glides, traction and approximation
- Mobilization of peripheral joint, techniques and grading in detail.

#### Re-education of muscles:

- Concept, technique, spatial and temporal summation.
- Various reduction techniques and facilitating methods.
- Progressive strengthening of various muscle groups in Grade-I-Grade IV.
- Muscle strengthening techniques
- PNF - Principles of PNF, indications, contra indications, techniques, limb patterns

#### Co-ordination:

- Balance – static and Dynamic
- Discoordination: LMNL & UMNL, cerebellar lesion, loss of kinesthetic sense (Tabes dorsalis, leprosy, syringomyelia)
- Re -education of balance and coordination: PNF and Frenkel's exercises.

#### Crutch Walking:

- Description of crutch - components, classification
- Good crutch, measurements
- Crutch use- Preparation, Training, counseling.
- Crutch gaits- types, & significance.
- Crutch complications- Palsy, dependency etc.
- Etiology and pathogenesis, Common presenting symptoms, Diagnosis and management of the disease; Diabetes Mellitus, hypo and hyperthyroid, hypo-parathyroid

#### -Diseases of the blood

- Etiology and pathogenesis, Common presenting symptoms, Diagnosis and management of the disease anemia, Hemophilia, Leukaemia, complications due to repeated hemorrhages, complications due to therapy.

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- Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and
- behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child.

#### **Obstetrics & Gynaecology**

- History taking, Basic principles of clinical examination, investigation, diagnosis, prognosis of female reproductive system disorders, Birth control, Reproduction, Menstruation and its disorders
- Physiological changes during pregnancy, Complications in pregnancy, Labour and its stages & delivery, Prenatal and post-natal care, Antenatal care, Antenatal assessment of foetal well - being , Abortion and birth control
- Pelvic inflammatory diseases and management, Prolapse uterus, urinary incontinence, causes & management, Surgical considerations in obstetrics and gynecology, Special considerations (previous history of C- section,
- Rh – , elderly primigravida , Grand multipara) , Bad obstetric history
- Term ( newborn infant, low birth weight baby) , Diseases of the fetus and newborn , Musculo-skeletal problems in an obstetric patient and its management, Genital malignancies
- Aids to diagnosis in obstetrics.

#### **Electrotherapy**

##### **High frequency currents:**

- Short wave Diathermy: Continuous & Pulsed
- Indications, contraindications and therapeutic effects.
- Methods of application-capacitor and induction electrode, precautions and Potential harmful effects of treatment, Dosimetry.

##### **Microwave Diathermy:**

- Characteristics and therapeutic effects.
- Application techniques, indications, contraindications, precautions and potential harmful effects, Dosimetry.

##### **Ultrasonic therapy:**

- Physiological and therapeutic effects & potential harmful effects.
- Indications, contraindications, methods of application and precautions, Dosimetry

##### **Actinotherapy**

##### **Laser:**

- ~~Introduction, effects and potential harmful effects.~~
- Indication, contraindications, precautions, method of application, dosimetry

##### **Ultraviolet therapy:**

- Physiological and therapeutic effects- photosensitization
- Indications and contraindications and Potential harmful effects.
- Methods of application, Sensitizes, Filters, Dosage, wavelength, penetration, tolerance, treatment / Application condition wise
- Comparison between UVR & IR Therapy

##### **Advanced electrotherapy:**

- Computerization of modalities

- Programming of parameter.
- Selection and combination of parameters.
- Combined therapy-U.S.+TENS-Principles, uses, indications etc.
- Principles of Bio-feed back, indications & uses.

## **Clinical Orthopaedics**

### **Introduction to orthopaedics**

Introduction, Clinical examination, Common investigative procedures, Radiological and Imaging techniques, Inflammation and repair, Soft tissue healing.

### **Traumatology**

- Fracture: definition, types, signs and symptoms, Fracture healing, Complications of fractures, Conservative and surgical approaches, Principles of management
- Subluxation/dislocations – definition, signs and symptoms, management (conservative and operative).

### **Fractures of Upper Limb**

- Causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:
- Fractures of clavicle and scapula, Fractures of greater tuberosity and neck of humerus, Fracture shaft of humerus, Supracondylar fracture of humerus, radial head, olecranon, and epicondyles, Side swipe injury of elbow. Fracture of forearm – Monteggia, Galeazzi fracture, Colle's fracture, Smith's fracture, Scaphoid fracture, Fracture of the metacarpals, Bennett's fracture, Fracture of the phalanges,
- Dislocations of Upper Limb – Mechanism of injury, clinical feature, complications, conservative management, surgical management of dislocation of shoulders and elbow.

### **Regional Conditions**

Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries:

- Shoulder joint: Impingement Syndrome, rotator cuff injury, Bicipital tendinitis, Supraspinatus tendinitis, Adhesive Capsulitis, scapular dyskinesia, Subacromial bursitis
- Elbow Joint: collateral ligament injury, tennis elbow, golfers elbow, olecranon bursitis
- Wrist joint: wrist sprains, flexor tendon injuries, extensor tendon injuries, trigger finger, VIC, DeQuervain's disease, Dupuytren's contracture

### **Amputations**

- Definition, levels of amputation of lower and upper limbs, indications, complications.

### **Deformities**

- Clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.
- Congenital Deformities of upper limb – Hand anomalies- syndactyly, polydactyly and ectrodactyly. Arthrogryposis multiplex congenita, Limb deficiencies- Amelia and Phocomelia. Klippel Feil syndrome. Osteogenesis imperfecta (fragile ossium),
- Acquired Deformities of upper limb

**Disease of Bones and Joints:** Causes, Clinical features, Complications, Management- medical and surgical of the following conditions:

- Infective conditions: Osteomyelitis (Acute / chronic). TB of spine and major joints like shoulder, hip, knee, ankle, elbow etc.
- Bone Tumors: classification, clinical features, management - medical and surgical of the following tumors: Osteoma. Osteosarcoma, Osteochondroma. Enchondroma, Ewing's sarcoma. Giant cell tumor. Multiple myeloma. Metastatic, tumors.
- Metabolic Bone Diseases: Rickets- Osteomalacia, Osteopenia, Osteoporosis

**Inflammatory and Degenerative Conditions:** causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions:

- Osteoarthritis. Rheumatoid arthritis, Ankylosing spondylitis, Gouty arthritis, Psoriatic arthritis, Hemophilic arthritis, Charcot's joints.
- Connective Tissue Disorders- Systemic Lupus Erythematosus, Scleroderma, Dermatomyositis, Polymyositis, Mixed connective tissue Disease (MCTD)

### **Physiotherapy in Orthopaedics**

- PT assessment and management of upper limb fractures and dislocations.

- Fractures of clavicle and scapula, Fractures of greater tuberosity and neck of humerus, Fracture shaft of humerus, Supracondylar fracture of humerus, radial head. Fracture of forearm – Monteggia, Galeazzi fracture, Colles' fracture, Smith's fracture, Scaphoid fracture, Fracture of the metacarpals, Fracture of the phalanges,
- PT assessment, aims, and management and home program of the following conditions
- Shoulder joint: Impingement Syndrome, rotator cuff injury, Bicipital tendinitis, Supraspinatus tendinitis, Adhesive Capsulitis, scapular dyskinesia
- Elbow Joint: collateral ligament injury, tennis elbow, golfers elbow, olecranon bursitis
- Wrist joint: wrist sprains, flexor tendon injuries, extensor tendon injuries, trigger finger, VIC, DeQuervain's disease, Dupuytren's contracture

#### **Amputation:**

- Level of amputation of upper limb and lower limb, stump care, stump bandaging, Pre and postoperative physiotherapy management, pre and post prosthetic management including check out of prosthesis, training.

#### **Deficiency disease**

- Physiotherapy Management of the following conditions
- Rickets, Osteomalacia, Osteoporosis and other deficiency disorders
- PT assessment, aims, and management and home program of the following conditions Rheumatoid arthritis, Ankylosing spondylitis, Gouty arthritis

### **Clinical Orthopedics-II**

#### **Fractures of Lower Limb**

- Causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures: Fractures of Femoral Neck, trochanters, Fracture shaft femur, Supracondylar fracture of femur, Fractures of the condyles of femur, Fracture patella, Fractures of tibial condyles, Both bones fracture of tibia and fibula, Pott's fracture Bimalleolar fracture, Trimalleolar fracture, Fracture calcaneum, Fracture of talus, Fracture of metatarsals, stress fractures, Fracture of phalanges.
- Dislocations of Lower Limb
- Mechanism of injury, clinical features, complications and management of the following dislocations of hip, patella and Knee.

#### **Fracture of Spine**

- Mechanism of injury, clinical feature, complications, Management of fracture of Cervical, thoracic & lumbar Spine, Fracture of Pelvis

#### **Regional conditions**

Mechanism of injury of each, clinical features, managements- conservative and surgical of the following injuries:

1. Hip Joint: IT band syndrome, Piriformis Syndrome, trochanteric Bursitis, Hamstring Strain
2. Knee Joint: Meniscal injuries, Cruciate injuries, Medial and lateral collateral injuries, chondromalacia patellae
3. Ankle Joint: spur, achilles tendinitis, metatarsalgia
4. Spine: LBP, PIVD, Spondylosis, Spondylolisthesis, Lumbosacral strain, Lumbarization & sacralization, Coccydynia

#### **Deformities**

- Clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.
- Congenital Deformities of lower limb – CTEV, CDH, Flat foot,
- Deformities of spine : Cervical rib, Torticollis, Scoliosis, Kyphosis, Lordosis
- Acquired Deformities- Acquired, Genu varum, Genu valgum, Genu recurvatum, Coxa vara, Pes cavus, Hallux rigidus, Hallux valgus, Hammer toe, Metatarsalgia.

#### **Neuromuscular Disorders**

- Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions:
- Cerebral palsy, Poliomyelitis, Leprosy.

#### **Orthopedic Surgeries**

- Indications, Classification, Types, Principles of management of the following Surgeries: Arthrodesis, Arthroplasty, Osteotomy, External fixators, Spinal stabilization surgeries.

## **Physiotherapy in Orthopaedics**

- PT assessment and management of lower limb fractures and dislocations.
- Fractures of Femoral Neck, trochanters, Fracture shaft femur, Supracondylar fracture of femur, Fractures of the condyles of femur, Fracture patella, Pott's fracture Bimalleolar fracture, Trimalleolar fracture, Fracture calcaneum, Fracture of talus, Fracture of metatarsals, Fracture of phalanges.
- PT assessment and management of cervical spine, thoracic spine, lumbar spine
- PT assessment, aims, and management and home program of the following conditions Hip Joint: IT band syndrome, Piriformis Syndrome, Hamstring Strain
- Knee Joint; Meniscal injuries, Cruciate injuries, Medial and lateral collateral injuries, chondromalacia patellae, Patellar Tendinitis
- Ankle Joint: Ankle sprain, planter fasciitis, calcaneal spur, achillis tendinitis, metatarsalgia Spine: Neck pain, LBP, PIVD, Spondylosis, Spondylolisthesis, Lumbosacral strain, Coccydynia

## **Physiotherapy Management of Deformities of Lower limb**

- Congenital Deformities of lower limb – CTEV, CDH, Flat foot,
- Acquired Deformities- Acquired, Genu varum, Genu valgum, Genu recurvatum, Coxa vara, Pes cavus, Hallux rigidus, Hallux valgus, Hammer toe, Metatarsalgia.
- Deformities of spine : Cervical rib, Torticollis, Scoliosis, Kyphosis, Lordosis
- PT assessment, aims, and management and home program of the following conditions Cerebral palsy, Poliomyelitis, Leprosy
- PT assessment, aims, and management and home program of the following Orthopedic Surgeries: Arthrodesis, Arthroplasty, Osteotomy, Spinal stabilization surgeries.

## **Physiotherapy in General Medicine & General Surgical conditions**

### **Physiotherapy in Oncology**

- Principles of Onco-rehabilitation
- Management of complication of Chemotherapy and Radiotherapy
- Physiotherapy Lymphedema management

### **Physiotherapy in Obstetrics and Gynaecology**

- Principles of Physical Therapy Management with:
- Pelvic Floor Care
- Incontinence and prolapse uterus
- Pelvic inflammatory disease
- Musculo-skeletal and other problems associated with pregnancy, labour and caesarean section
- Physiotherapy in Ante-natal and post-natal care

### **Physiotherapy in Dermatology**

- Dermatological conditions: Psoriasis, Vitiligo, Acne vulgaris
- Leprosy (including Neuro-muscular complications)

### **Physiotherapy in ENT**

- Sinusitis, non-suppurative and chronic suppurative otitis media, labyrinthitis, mastoidectomy, chronic rhinitis, laryngectomy, pharyngeal – laryngectomy, facial palsy.

## **Physiotherapy in General Medicine & General Surgical conditions**

### **Management of wound ulcers**

- Wound- Stages of wound Healing
- Ulcer Boils, carbuncles
- Scar assessment and management

### **Abdominal Incision**

- Types of abdominal Incision; Vertical, Transverse and Thoraco-abdominal
- Complication of Bed rest/ Immobilisation

### **Physiotherapy in pre and post-operative stages**

- Appendicectomy,
- cholecystectomy,
- hernia Surgery
- Splenectomy,
- Nephrectomy
- Mastectomy

### **Physiotherapy in Burn**

- Post-operative P.T. assessment and management of Burns and their complications.

- Skin grafting and flaps
- Physiotherapy in Plastics and Reconstructive Surgery
- Introduction to gerontology
- Physiological changes with ageing
- Physiotherapy evaluation and assessment of elderly patient
- Fall prevention and management

#### **Introduction to Research methodology**

- Meaning of research
- Objective of research
- Types of research & research approaches
- Phases of Research
- Research Ethics.

#### **Research Problem and Research Question**

- Statement of research problem.
- Criteria for evaluating research problem
- Define Research Question
- Developing Answerable research Question
- Formulation of Hypothesis.
- Research Proposal

#### **Experimental Design**

- Group Design
- Single system design

### **Biostatistics**

#### **Introduction to Biostatistics**

- Definition of Statistics
- Characteristics of statistics
- Importance of the study of statistics
- Limitation of Statistics
- Descriptive and inferential statistics,

#### **Tabulation of Data:**

- Basic principles of graphical representation
- Data Representation- Frequency distribution tables
- Types of diagrams
- Normal probability curve.
- Skewness and kurtosis.

#### **Measures of central tendency**

- Need for measures of central Tendency
- Definition and calculation of mean – ungrouped and grouped
- Meaning, interpretation and calculation of median ungrouped and grouped
- Meaning and calculation of mode

#### **Sampling & Assignment**

- Methods of sampling
- Methods of Assignment

### **Clinical Cardiothoracic Conditions**

#### **Anatomy and Physiology**

- Respiratory system : Upper respiratory tract, Lower respiratory tract – Trachea, Bronchial tree, Bronchopulmonary segments, Respiratory unit, hilum of lung, Muscles of respiration, Pleura, intra pleural space, intra pleural pressure, surfactant, Mechanics of respiration – Chest wall movements, lung & chest wall compliance, V/Q relationship, airway resistance, Respiratory centre, Neural & chemical regulation of respiration, Lung volumes and lung capacities, Spiro meter, lung function test, Pulmonary circulation, Lung sounds, cough reflex