

SCREENING TEST – PHYSIOTHERAPIST

Mode of Selection - Topper of Screening Test of Multiple Choice Questions (MCQs) Type Exam will be considered as selected. There will be one correct answer and three distractors.

Total Number of Questions to be asked – 100

Duration of Test – 90 Minutes

Proposed Scheme of Number of Questions from different Sections –

S. No.	Subject & Syllabus	Number of Questions
1.	As per Annexure I	80
2.	General Knowledge & Current Affairs	10
3.	Computer (Annexure II)	10
Total		100

ANATOMY THEORY

1. General Anatomy:

- Introduction to Anatomy, terms and terminology.
- Regions of Body, Cavities and systems.
- Surface anatomy – musculo-skeletal, vascular, cardiopulmonary system
- General Embryology.
- Applied anatomy.

2. Musculoskeletal system.

- Connective tissue & its modification, tendons, membranes, special connective tissue.
- Bone structure, blood supply, growth, ossification, and classification.
- Muscle classification, structure and functional aspect.
- Joints – classification, structures of joints, movements, range, limiting factors, stability, blood supply, nerve supply, dislocations and applied anatomy.

2(a). Upper extremity:

- Bony architecture
- Joints – structure, range of movement
- Muscles – origin, insertion, actions, nerve supply
- Major nerves – course, branches and implications of nerve injuries
- Development of limb bones, muscles and anomalies
- Radiographic identification of bone and joints
- Applied anatomy

2(b). Lower Extremity:

- Bony architecture
- Joints – structure, range of movement
- Muscles – origin, insertion, actions, nerve supply
- Major nerves – course, branches and implications of nerve injuries
- Development of limb bones, muscles and anomalies
- Radiographic identification of bone and joints
- Applied anatomy

2(c). Spine and thorax

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

2(d). Head and neck:

- Cranium
- Facial Muscles – origin, insertion, actions, nerve supply
- Temporomandibular Joints – structure, types of movement

3. Nervous system

- Classification of nervous system
- Nerve – structure, classification, microscopy with examples.
- Neurons, classification with examples. Simple reflex arc.

- Parts of a typical spinal nerve/Dermatome
 - Central nervous system – disposition, parts and functions
 - Cerebrum
 - Cerebellum
 - Midbrain & brain stem
 - Blood supply & anatomy of brain
 - Spinal cord- anatomy, blood supply, nerve pathways
 - Pyramidal, extra pyramidal system
 - Thalamus, hypothalamus
 - Structure and features of meninges
 - Ventricles of brain, CSF circulation
 - Development of nervous system & defects
 - Cranial nerves – (course, distribution, functions and palsy)
 - Sympathetic nervous system, its parts and components
 - Parasympathetic nervous system
 - Applied anatomy
4. Sensory system
- Structure and function of
 - Visual system
 - Auditory system
 - Gustatory system
 - Olfactory system
 - Somato sensory system
5. Cardiovascular system
- Circulatory system – major arteries and veins of the body, structure of blood vessels
 - Heart structure, positions, chambers, valves, internal & external features
 - Blood supply to heart
 - Conductive system of heart
6. Lymphatic system
- Circulation, structure & functions
 - Lymph nodes
7. Respiratory system
- Structure of upper and lower respiratory tract
- Thorax:
- Pleural cavities & pleura
 - Lungs and respiratory tree
 - Heart and great vessels
 - Diaphragm
8. Digestive system
- Parts of digestive system
 - Abdominal cavity – divisions
 - Muscles of abdominal wall
 - Liver
 - Pancreas
 - Spleen
 - Alimentary canal
 - Gall bladder
 - Intestine (small & large)
9. Urinary and Reproductive system
- Urinary system
 - Pelvic floor, innervations
 - Kidney, Ureter, bladder, urethra

- Genital system – male and female
 - Reproductive system of male
 - Reproductive system of female
10. Endocrine system
- Pituitary gland
 - Thyroid
 - Parathyroid

PRACTICAL

1. Identification and description of all anatomical structures.
2. The learning of Anatomy is by demonstration only through dissected parts, slides, models, charts, etc.
3. Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).
4. Demonstration of skeleton- articulated and disarticulated.
5. During the training more emphasis will be given on the study of bones, muscles, joints, nerve supply of the limbs and arteries of limbs.
6. Surface anatomy:
 - surface land mark-bony, muscular and ligamentous.
 - surface anatomy of major nerves, arteries of the limbs.
7. Points of palpation of nerves and arteries.

PHYSIOLOGY THEORY

1. General Physiology

- Cell: morphology, Structure and function of cell organelles
- Structure of cell membrane
- Transport across cell membrane
- Intercellular communication
- Homeostasis

2. Blood

- Introduction-composition & function of blood
- W.B.C., R.B.C., Platelets formation & functions, Immunity
- Plasma: composition, formation & functions, Plasma Proteins:-types & functions
- Blood Groups- types , significance, determination
- Hemoglobin
- Haemostasis
- Lymph- composition, formation, circulation & functions

3. Cardiovascular system

- Conducting system-components, impulse conduction
- Heart valves
- Cardiac cycle- definition, phases of cardiac cycle
- Cardiac output- definition, normal value, determinants. Stroke volume and its regulation
- Heart rate and its regulation
- Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure
- Shock-definition, classification, causes and features
- Basic idea of ECG
- Cardiovascular changes during exercise

4. Respiratory System

- Mechanics of respiration
- Lung volumes and capacities
- Pulmonary circulation, transport of respiratory gases
- Factors affecting respiration
- Regulation of respiration-neural regulation, voluntary control and chemical regulation
- Hypoxia, Hypercapnoea, Hypocapnoea
- Artificial respiration
- Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation, apnoea, tachypnoea
- Respiratory changes during exercise.

5. Nerve Muscle Physiology

- Muscles- classification, structure, properties, Excitation contraction coupling
- Motor unit, EMG, factors affecting muscle tension,
- Muscle tone, fatigue, exercise
- Nerve –structure and function of neurons, classification, properties
- Resting membrane potential & Action potential their ionic basis
- All or None phenomenon
- Neuromuscular transmission
- Ionic basis of nerve conduction
- Concept of nerve injury & Wallerian degeneration
- Synapses
- Electrical events in postsynaptic neurons
- Inhibition & facilitation at synapses
- Chemical transmission of synaptic activity
- Principal neurotransmitters.

6. Nervous system

- Introduction, central and peripheral nervous system, functions of nervous system
- Reflexes- monosynaptic, polysynaptic, superficial, deep & withdrawal reflex
- Sense organ, receptors, electrical & chemical events in receptors
- Sensory pathways for touch, temperature, pain, proprioception & others
- Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions
- Motor mechanism: motor cortex, motor pathway: the descending tracts- pyramidal & extra pyramidal tracts- origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis.
- Spinal cord lesions- complete transection & hemisection of the spinal cord
- Autonomic nervous system :features and actions of parasympathetic & sympathetic nervous system
- Hypothalamus
- Higher functions of nervous system
- Special senses- eye, ear, nose, mouth

7. Renal System

- Physiology of kidney and urine formation
- Glomerular filtration rate, clearance, Tubular function
- Water excretion, concentration of urine- regulation of Na^+ , Cl^- , K^+ excretion
- Physiology of urinary bladder

8. Digestive System

- Digestion & absorption of nutrients

- Gastrointestinal secretions & their regulation
- Functions of Liver & Stomach.

10. Endocrinology

- Physiology of the endocrine glands – Pituitary, Pineal Body, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications and functions.

11. Male & female reproductive system

- Male - Functions of testes, pubertal changes in males, testosterone - action & regulations of secretion.
- Female - Functions of ovaries and uterus, pubertal changes, menstrual cycle, estrogens and progesterone - action and regulation.

PRACTICAL

1. Examination of pulse, B.P., Respiratory rate.
2. Reflexes
3. Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on Spirometry.
4. Estimate of Haemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count.
5. Blood indices, Blood grouping, Bleeding & Clotting time.

CLINICAL BIOCHEMISTRY

1. Nutrition: RDA, BMR, SDA, caloric requirement and balanced diet.
2. Carbohydrates: Definition, classification and general functions. Carbohydrate Metabolism - Glycolysis, T.C.A cycle.
3. Lipids: Definition, classifications and general functions. Essential fatty acids and their importance, Cholesterol, Lipoproteins. Metabolism- β -Oxidation of fatty acids, fatty liver and ketosis.
4. Amino Acids : Definition, classification, essential and non essential aminoacids.
5. Proteins: Definition, classification, and Bio-medical Importance. Metabolism: Formation and fate of ammonia, Urea cycle and its significance.
6. Study of hemoglobin and myoglobin with their functions.
7. Enzymes: Definition, classification with examples, Factors affecting enzyme action, isoenzyme and co-enzyme, Clinical importance of enzymes.
8. Biochemistry of connective tissue - Introduction, various connective tissue proteins : collagen, elastin- structure and associated disorders.
9. Vitamins: Definition, classification and functions, dietary source, daily requirement and deficiency disorders.
10. Diabetes mellitus - definition, types & causes.

GENERAL PSYCHOLOGY

1. Introduction to Psychology, Fields of application of Psychology, influence of heredity and environment on the individual.
2. Learning – theories and principles of learning, Learning disabilities.
3. Memory – types, theories of memory and forgetting, methods to improve memory.
4. Thinking – process of thinking, problem solving, decision making and creative thinking.
5. Motivation - theories and types of Motivation.
6. Emotions - theories of emotions and stress, Emotional and behavioral disorders of childhood and adolescence, Disorders of under and over controlled behavior, Eating disorders.
7. Attitudes – theories, attitudes and behavior, factors in attitude change.
8. Intelligence - theories of intelligence, I.Q., general intelligence and special intelligence, intelligence tests and their uses.
9. Personality, theories of personality, factors influencing personality, Personality Disorders.
10. Conflict and frustration - Common defensive mechanism : Identification, regression, repression, projection, sublimation and rationalization.
11. Attention and Perception : Nature of attention, factors determining attention, nature of perception, principle of perceptual grouping; illusions and Hallucination.
12. Counseling - Aims and principles.
13. Development and growth of behavior in infancy and childhood, adolescence, adulthood and old age, normal and abnormal.
14. Psychotherapy – introduction to paradigms in psychopathology and therapy.
15. Mental deficiency -
 - a) Mental retardation,
 - b) Autistic behavior
 - c) Learning disabilities.

BASIC NURSING & FIRST AID

Basic Nursing:

1. What is Nursing ? Nursing principles. Inter-Personnel relationships, Bandaging : Basic turns, Bandaging extremities, Triangular Bandages and their application.
2. Nursing Position: Environment safety, Bed making, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, Aids & rest and sleep.
3. Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion.
4. Surgical Dressing: Observation of dressing procedures.
5. Lifting and transporting patients : Lifting patient up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.

First Aid

Syllabus as for Certificate of Red Cross Society of St. John's Ambulance Brigade.

ETHICS IN PHYSIOTHERAPY

ETHICS

1. History of physiotherapy, Ethical principles in health care, Ethical principles related to physiotherapy, Scope of practice, Enforcing standards in health profession-promoting quality care, Professional ethics in research, education and patient care delivery, Informed consent issues, Medical ethics and Economics in clinical decision-making.
2. Rules of professional conduct:
 - Physiotherapy as a profession
 - Relationship with patients
 - Relationship with health care institutions

 - Relationship with colleagues and peers
 - Relationship with medical and other professional.
3. Confidentiality and Responsibility, Malpractice and negligence, Provision of services and, advertising, Legal aspects: Consumer protection act, Legal responsibility of physiotherapist for their action in professional context and understanding liability and obligations in case of medico-legal action

BIOMECHANICS AND KINESIOLOGY

THEORY

1. Mechanics - Definition of mechanics and Biomechanics
2. Motion: definition, types of motion, plane and axis of motion, factor determining the kind and modification of motion.
3. Force - Definition, diagrammatic representation of force, point of application, classification of forces, concurrent, coplanar and co-linear forces, composition and resolution of forces, angle of pulls of muscle
4. Friction
5. Gravity - Definition, line of gravity, Centre of gravity
6. Equilibrium - Supporting base, types, and equilibrium in static and dynamic state
7. Levers - Definition, function, classification and application of levers in physiotherapy & order of levers with example of lever in human body
8. Pulleys - system of pulleys, types and application
9. Elasticity - Definition, stress, strain, HOOKE'S Law
10. Springs - properties of springs, springs in series and parallel, elastic materials in use
11. Muscular system
12. Definition, properties of muscle, muscular contraction, structural classification, action of muscle in moving bone, direction of pull, angle of pull, functional classification, coordination of muscular system.
13. Joint structures and functions:
 - i. Joint design, Structure of Connective Tissue, Properties of Connective Tissue, joint function, changes with disease, injury, immobilization, exercise, over use
 - ii. Structure and functions of upper extremity joints – shoulder complex, elbow complex, wrist and hand complex
 - iii. Structure and functions of lower extremity joints – hip joint, knee joint, ankle and foot complex
 - iv. Structure and functions of axial skeletal joints – vertebral column – craniocervical, thorax, lumbar, lumbo pelvic region
 - v. Structure and functions of temporomandibular joint
14. Posture – dynamic and static posture, kinetic and kinematics of posture, analysis of posture, effect of age, pregnancy, occupation on posture.
15. Gait – kinematics and kinetics of gait, gait in running and stair climbing.

PRACTICAL

1. Goniometry – measurement of joint ROM
2. Identify Muscle work of various movements in body at different angle.
3. Identify normal and abnormal posture.
4. Normal gait with its parameters and identify abnormal gait with the problems in it.

EXERCISE THERAPY - I

THEORY

1. Introduction to exercise therapy
2. Mechanical principle applied in human body – gravity, centre of gravity, line of gravity, base of support, equilibrium, axis and planes
3. Disability models – ICDH model of disability, Nagi model of disability, ICF model
4. Exercise physiology – effect of exercise in various systems – musculoskeletal, neuromuscular, cardiovascular, respiratory system
5. Movements
6. Passive movements – definition, classification, indications, contra indications, advantages, limitations, techniques - emphasize PROM to upper, lower, neck and trunk muscles
7. Active movements - definition, classification, indications, contra indications, advantages, limitations, techniques - emphasize active movements to upper, lower, and neck and trunk muscles
8. Starting positions – muscle work, effect and uses and derived positions
9. Relaxation – definition, types of relaxation, relaxation techniques
10. Suspension – definition, types, uses and therapeutic applications
11. Balance – static and dynamic balance, mechanism of balance control, balancing exercises
12. Neuromuscular coordination – causes of in coordination, exercises to improve coordination – Frenkle exercise
13. Joint range measurement – Goniometer, types and techniques of measuring joint ROM
14. Measurement of limb length, girth
15. Manual muscle testing – grading system, techniques- emphasize on skill to grade upper, lower, neck and trunk muscles.
16. Mobility aids – crutches, canes, walker
17. Soft tissue manipulation (massage) – history, types, techniques, physiological effects, therapeutic uses, contraindications

PRACTICAL

1. Starting positions and derived positions
2. Range of motion (PROM, AROM, AAROM) exercises to all joints
3. Measurement of joint range using goniometer
4. General and local Relaxation techniques
5. Suspension exercise to all major joints
6. Massage – upper limb, lower limb, back, face
7. Manual muscle testing of individual muscles
8. Coordination exercises, balancing exercises

ELECTRO THERAPY – I

THEORY

1. Basic components of electric current – electrons, protons, neutrons, ions, matter, molecules
2. Current electricity – static electricity, electric charge, conductors, conduction of electricity, resistance, factors effecting resistance with example in human body, insulation, unit of electric current – ampere, coulomb, volt, ohms law
3. Magnetism, theories of magnetism, properties of magnet.
4. Electromagnetic induction, electromagnetic radiation, laws governing radiations – Grouth's law, cosine law, inverse square law, law of reflection, refraction.
5. Electrical components – transformer, capacitor, diode, valves
6. Types of electric current, wave forms, current modulation – continuous, burst, beat, surge. Electric circuit in parallel and series.
7. Safety issues while using electrical equipments – for patients and therapist
8. Muscle and nerve response to electrical stimulation – polarization, depolarization and propagation of impulse.
9. Pain – types of pain, pain pathway, theories of pain, Gate control theory of pain, pain modulation at various levels.
10. Low frequency currents:
 - a. Neuromuscular electrical stimulation – physiological effects, therapeutic uses of electrical stimulation techniques – electrodes type, electrode size, electrode placement, stimulating points, methods of reducing skin electrode resistance, contraindications and precautions.
 - b. High voltage pulsed stimulation.
 - c. Russian stimulation.
 - d. Trans cutaneous Electrical Nerve stimulation (TENS) – therapeutic uses of TENS, types, electrode placement in TENS, contraindications and precautions
 - e. Iontophoresis – mechanism, biophysical effect, medication dosage, medicated ions used, techniques of application.
11. Electro diagnostic test – FG test, strength duration curve, chronaxie, reobase
12. Interferential therapy (IFT) – physiological effects, therapeutic indications, methods of application, sweep, base, contraindication and precautions.

PRACTICAL

1. Identify basic electrical components in electrotherapeutic equipments.
2. Reading of medical records, indentifying indications and contraindications for electrotherapy.
3. Stimulation of motor points, stimulation of individual muscle and group muscle
4. Faradic foot bath, Faradism under pressure.
5. Plotting SD graph, diagnosis using electro diagnostic test – FG test and SD curve.
6. Placement of electrodes in TENS & IFT with dosimeter for various indications.

MEDICAL MICROBIOLOGY THEORY

1. Introduction & History of Microbiology
2. Classification of microorganism : Bacterial Morphology, cells structure, difference between prokaryotes & eukaryotes, capsule, flagella, fimbriae, pilli, cell wall, plasma membrane, cytoplasm, ribosomes etc.
3. Bacteriology - Classification of Bacteria, Morphological characteristics of different bacteria.
4. Bacterial growth/Reproduction : Growth curve
5. Sterilization & disinfection :
 - a) Physical Methods
 - b) Chemical Methods
 - c) Mechanism of Sterilizations
 - d) Difference between sterilization and disinfection.
6. Modes of transmission of diseases
 - a) Various routes of spread of infection.
 - b) Hospital acquired infection.
 - c) Bacterias responsible for nosocomial infectious
7. Bacterial diseases (in brief):
 - Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.
 - Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.
8. Viral diseases (in brief) : Poliomyelitis, Herpes, Rabies, Measles, Ricktsia, Chlamydial infection, HIV infection.
9. Fungal diseases and opportunistic infections (in brief).
10. Food sanitation
 - a) Hygiene in restaurants & kitchens.
 - b) Health of food handlers & hygiene.
 - c) Disease caused by infected food & water.
11. Immunity
 - a) Active, passive
 - b) Natural, acquired
 - c) Antigen
 - d) Antibody, type of antibodies
 - e) Antigen antibody reactions.
 - f) Mechanism of immunity
 - g) Immunization.

12. AIDS - Aetiology, modes of transmission, diagnostic procedure.
13. Handling of infected material.

PRACTICAL

1. Preparation of smear.
2. Basic staining methods
3. Identification of bacteria on the basis of staining.
4. Basic knowledge of media and culture of bacteria.
5. Colony characteristics of common bacteria.

PATHOLOGY

THEORY

1. Introduction to Pathology

2. 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.

3. 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. Healing in specific site including bone healing.

4. Circulatory Disturbances

- Hyperemia/Ischemia and Haemorrhage
- Edema: Pathogenesis and types.
- Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology
- Thrombosis and Embolism: Formation, Fate and Effects.
- Infarction: Types, Common sites.
- Shock: Pathogenesis, types, morphologic changes.

5. Growth Disturbances and Neoplasia

- Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, dysplasia. Precancerous lesions.
- Neoplasia: Definition, classification, Biological behaviour: Benign and Malignant (brief idea), Carcinoma and Sarcoma.

6. Hematology

- Constituents of blood and bone marrow, Regulation of hematopoiesis.
- Anemia: Classification, clinical features & lab diagnosis (brief idea).
- Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis.
- Coagulopathies - (i) Inherited (ii) Acquired with lab diagnosis.
- Leukocytic disorders: Leukocytosis, Leukopenias, Leukemoid reaction.
- Leukemia: Classification, clinical manifestation, pathology and Diagnosis (brief idea).

7. Respiratory System

- Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases
8. Cardiovascular Pathology
 - Congenital Heart diseases: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus, Endocarditis, Rheumatic Heart disease.
 - Vascular diseases: Atherosclerosis, Monckeberg's medial calcification.
 - Ischemic heart Disease: Myocardial infarction.
 9. Hepato Biliary Pathology
 - Jaundice: Types, aetio-pathogenesis and diagnosis.
 10. Musculoskeletal System
 - Osteomyelitis: acute, chronic, tuberculous, mycetoma
 - Metabolic diseases: Rickets/ Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.
 - Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma.
 - Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous.
 11. Endocrine pathology
 - Non-neoplastic lesions of Thyroid: Thyrotoxicosis, myxedema,
 12. Neuropathology
 - Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess, Tuberculosis, Cysticercosis.
 13. Dermatopathology:
 - Skin tumors: Squamous cell carcinoma, Basal cell carcinoma, Melanoma (brief idea)
 14. Congenital Myopathy & myasthenia gravis

PRACTICAL

1. Collection of blood and anticoagulants used..
2. Discussion about parts of microscope and different types of microscopes used in pathology.
3. Staining of slide by Leishman method.
4. Study of peripheral blood smear.
5. Estimation of hemaglobin by Sahli's method and discussion of other methods used.
6. ESR
7. Identification of various instruments in pathology lab & their uses (eg. Neubauer chamber, RBC, WBC, pipette etc.).
8. Bleeding Time, Clotting Time.

PHARMACOLOGY

1. 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.
 - Elementary knowledge of drug toxicity, drug allergy, drug resistance, drug potency, efficacy & drug antagonism.
2. 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.
3. Cardiovascular Pharmacology (in brief) :
 - 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
 4. Neuropharmacology (in brief) :
 - Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
 - Antianxiety Drugs: Benzodiazepines, Other Anxiolytics
 - Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium
 - Antipsychotic drugs
 5. Disorders of Movement (in brief) :
 - Drugs used in Treatment of Parkinson's Disease
 - Antiepileptic Drugs
 - Spasticity and Skeletal Muscle Relaxants
 6. 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 Erythmatosus, Scleroderma, Demyelinating Disease
 7. Respiratory Pharmacology (in brief) : Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis
 8. Digestion and Metabolism (in brief):
 - Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea
 - Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics
 9. Geriatrics:
 - Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension, urinary incontinence.

EXERCISE THERAPY – II

THEORY

1. Joint mobilization:

- Definition – Mobilization, Manipulation, indications, limitations, contraindications and precautions, applications of Mobilization technique to various joints.
Principles of Maitland, Mulligan and Meckzi joint Manipulation techniques.
2. **Stretching:**
Definition, properties of soft tissue, mechanical and neurophysiological properties of connective tissue, mechanical properties of non contractile tissue. Determinants, type and effect of stretching, precautions, general applications of stretching technique.
 3. **Resisted exercise:**
Definition – strength, power, endurance. Guiding principle of resisted exercise, determinants, types Manual and Mechanical Resistance Exercise, Isometric Exercise, Dynamic Exercise - Concentric and Eccentric, Dynamic Exercise - Constant and Variable Resistance, Isokinetic Exercise, Open-Chain and Closed-Chain Exercise, precautions, contraindications
Progressive Resistance Exercise - de Lormes, Oxford, MacQueen, Circuit Weight Training, Plyometric Training—Stretch-Shortening Drills, Isokinetic Regimens
 4. **Proprioceptive Neuromuscular Facilitation – Principles, Diagonal patterns of movements, Basic procedures, Upper Extremity Diagonal patterns, Lower Extremity Diagonal Patterns. Technique in PNF – Rhythmic Initiation, Repeated Contractions, Reversal of Antagonists, Alternating Isometrics, Rhythmic Stabilization.**
 5. **Aerobic Exercises – Definitions, Physiological response to Aerobic Exercise, Evaluation of aerobic capacity – exercise testing, Determinant of Aerobic Exercise, Physiological Changes with Aerobic Training, Aerobic Exercise Program, Applications of Aerobic Program in patients with chronic illness.**
 6. **Hydrotherapy:**
Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Therapeutic Exercises in Hydrotherapy, Special equipments used.
 7. **Balance training:**
Definition and Key terms, Balance control, Components of balance, Balance Impairment, Examination of Impaired Balance, Balance training Exercises.
 8. **Posture:**
Normal Postural Control, Postural Alignment, Postural Stability, Postural Impairment and Mal-Alignment, Postural Training.
 9. **Breathing Exercises:**
Aims and Goals of Breathing Exercises, Procedures of Diaphragmatic Breathing, Segmental Breathing, Pursed-Lip Breathing, Preventing and Relieving Episodes of Dyspnea, Positive Expiratory Pressure Breathing, Respiratory Resistance Training, Glossopharyngeal Breathing.
Exercises to mobilize the chest, Postural Drainage, Manual Technique used in Postural Drainage, Postural Drainage Positions, Modified Postural Drainage.
 10. **Gait Training:**
Definition, Different methods of Gait Training, Gait Training in Parallel Bars, Walking Aids: Types: Crutches, Canes, Frames; Principles and training with walking aids.
 11. **Soft Tissue Injury:**
General Description of Inflammation and repair, Acute, Sub Acute, and Chronic stage, General Treatment Guidelines.
 12. **Yoga: History, Introduction, Classification, Various Asana**

PRACTICAL

1. **Joint Mobilisation to individual joint**
2. **Stretching of individual and group muscles**
3. **Resisted exercises to individual and group muscles, open and closed kinematic exercises**

4. PNF patterns to upper and lower limb.
5. Various types breathing exercises, chest mobilization exercises, postural drainage
6. Gait training with various walking aids

ELCTROTHERAPY - II

THEORY

1. Introduction to high frequency current, Electro Magnetic Spectrum
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus. Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters. Pulsed Electro Magnetic Energy
3. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.
4. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Nonthermal effects, Principles & Application of US: Direct contact.
Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, Commonly used drugs, Uses. Dosages of US.
5. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
6. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers Dosages for different therapeutic effects, Distance in UVR lamp.
7. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER Energy density & power density.
8. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
9. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.
10. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.
11. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications.
12. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, and Methods of application with dosage.
13. EMG and Nerve Conduction Velocity test, Biofeed back

PRACTICAL

The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.

1. Application of Ultrasound for different regions-various methods of application
2. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
3. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
4. Calculation of dosage and technique of application of LASER
5. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy

ORTHOPAEDICS

1. Introduction to Orthopaedics:
An Orthopaedic patient, history taking, clinical features, clinical examination, and investigation (X- ray, CT scans, MRI scan, Bone scan)
2. Injuries of muscle & tendons : etiology & management.
3. Bony & Soft tissue injuries :
Injury & repair, Clinical presentation, evaluation & general principles of rehabilitation management, Tenosynovitis, Bursitis etc.
4. Fractures -
 - a. Types, Healing, complications, general principles of treatment.
 - b. Fracture of Spine, pelvis, hip joint, femur, patella, knee joint, cartilage and ligaments, tibia, fibula, ankle, calcaneum, metatarsals, calcicle, scapula, ribs, humerus, elbow joint, radius, ulna, scaphoid, metacarpals & phalanges.
 - c. Fracture separation of epiphysis.
5. Inflammation of bones & joints (Clinical features, evaluation, conservative & surgical management) -
 - a) Bones - Osteomyelitis- osteomyelitis - pyogenic & tubercular, osteoarthritis.
 - b) Joints - Rheumatoid arthritis, Juvenile Arthritis, Reiter's disease, Polymyalgia rheumatica, Gout, Ankylosing spondylitis, Neuropathic- joints, haemophilic arthropathy, Avascular necrosis.
6. Nutritional & metabolic diseases of bones :
Rickets, Osteomalacia & Osteoporosis.
7. Spine deformities:
Clinical features, diagnosis, management of Scoliosis, Kyphosis, Lordosis, Spondylosis, prolapse of intervertebral disc, cord compression, sacralization and traumatic deformities (paraplegia & quadriplegia).
8. Infections of Musculoskeletal system -
 - a. Bacterial infections
 - b. Tubercular infections, Leprosy, Pott's paraplegia
9. Congenital malformations (in brief description with outline of treatment):
 - a. Congenital Hip Displasia, Congenital Talipes Equinovarus / Calcaneoalgus, Arthrogryposis Multiplex Congenita, Congenital Torticollis, Acromelia, phocomelia, Amelia,
 - b. Spina Bifida: all types, clinical presentation, sequel & management
10. Developmental diseases of skeleton:

Osteogenesis imperfecta, heterotopic ossification, Osteochondritis, Perthes' disease.

11. Neuromuscular diseases:
 - a) Volkmann's Ischaemic contracture, obstetrical paralysis, and peroneal muscular atrophy
 - b) Poliomyelitis – orthopaedic aspects and treatment of deformities.
12. Upper Limbs:

Clinical presentation, evaluation, conservative & surgical management of rotator cuff injuries, adhesive capsulitis, bursitis, biceps tendonitis, shoulder dislocation, snapping & winged scapula, tennis and golfer elbow, olecranon bursitis, soft tissue injuries, sprains and strains, Arthritic conditions, tenosynovitis, Carpal tunnel syndrome, wrist drop, claw hand, mallet finger, Dupuytren's contracture, reflex sympathetic dystrophy, common fractures and dislocations.
13. Lower Limb:

Clinical presentation, evaluation, conservative & surgical management of Arthritic conditions, soft tissue injuries, sprains and strains, achilles tendonitis, bursitis, plantar fasciitis, deformities, reflex sympathetic dystrophy, neuropathic Joints, common fractures and dislocations, pes cavus, pes valgus, hallus valgus footstrains, metatarsalgia, hallus rigidus, ingrowing toe nail.
14. Neuro-vascular Diseases :

Orthopaedic aspects and treatment of - Nerve injuries (major nerves), Plexus injuries
15. Amputations :

Justification, outline of surgical approaches, incisions, procedures, indications, contraindications, complications & management.
16. Bone tumors : benign & malignant (in brief)
17. Operations :

Reconstructive arthroplasty, arthodesis, bone grafting, osteotomy, tendon transplantation & transfer, nerve- neurolysis, suture, graft and decompression.
18. Orthopaedic splints and appliances.
19. Traction : Skin, skeleton (in brief).
20. Foot arches & their complications.
21. Rehabilitation of patients.

GENERAL MEDICINE INCLUDING PEDIATRICS & PSYCHIATRY

1. Introduction:
Brief outline of subject of medicine, a medical patient, common signs & symptoms of disease
2. Infectious Diseases:
Brief description of concept of infection, types, classification & common clinical manifestation of infection and general principle of management
3. Nutritional & Metabolic Diseases:
Brief description of following diseases along with outline of management: Diabetes Mellitus, Vitamins (A, B, C, D & K) and Minerals (iron, calcium phosphorus, iodine) deficiencies, and Obesity
4. Alimentary tract:
Brief description of manifestations of alimentary tract disease & general principle of diagnosis & outline of management of following diseases: Peptic ulcer disease, common infections of small & large intestine
5. Brief description of liver diseases along with outline of management:

Hepatitis, & Jaundice

6. Diseases of connective tissues:
Brief description of manifestations along with outline of management of - SLE, polymyositis
7. Diseases of skin:
Brief description of manifestations along with outline of management of common skin diseases - scabies, pediculosis, taeniasis, impetigo & psoriasis
8. Geriatrics-
Physiology of ageing, manifestations of diseases in old people and general principles of management. Implications of aging in physical therapy. lung disease, Pleurisy & Pulmonary embolism
9. First Aid in common Medical Emergencies
10. Cardio-vascular System:
Manifestations of heart & vascular disease & general principle of diagnosis. Brief description of following diseases along with outline of management: Cardiac failure, Ischaemic heart disease, hypertension, atherosclerosis, Deep vein thrombosis
11. Respiratory System:
Manifestations of respiratory disease & general principle of diagnosis. Brief description of following diseases along with outline of management: Obstructive Pulmonary diseases (Bronchial Asthma, COPD), pulmonary infections (Pneumonia, Bronchitis, Lung abscess, Tuberculosis), Respiratory failure, occupational lung diseases
12. Neurology:
Brief Description of Headache, migraine, raised intra-cranial pressure.
Inflammatory conditions – meningitis (bacterial, tubercular), rabies
Disorders of cerebral circulation - ischaemia, haemorrhages (CVA), HT encephalopathy
Demyelinating diseases- acute disseminated encephalomyelitis, multiple sclerosis
Extra pyramidal syndromes - Parkinson's disease, Chorea, Athetosis, Dystonia, hemiballismus,
Spasmodic Torticollis
Convulsive disorders - epilepsy (GM, PM, Psychomotor), tetany
13. Developmental and degenerative syndromes –
Cerebral palsy, kernicterus, hereditary ataxias, motor neuron disease, Peroneal muscular atrophy
14. Disorders of Spinal cord and Cauda Equina-
Spinal cord injury, paraplegia, quadriplegia, spina-bifida, transverse myelitis, Neurogenic bladder and bowel
15. Peripheral nerve disorders –
Traumatic / compression or entrapment neuropathy, polyneuritis, GB syndrome, diabetic polyneuropathy and spinal radiculopathies. Special emphasis on brachial and lumbo-sacral plexuses and major nerves – radial, ulnar, median, femoral, and sciatic nerve
16. Muscle disorders –
Progressive muscular dystrophy, polymyositis, myasthenia gravis, floppy infant syndrome

PEDIATRICS

1. Normal Growth and development of child :
Motor, mental, language and social
2. Common infectious diseases in children:
Brief description of following infectious diseases along with outline of management:
Tetanus, diphtheria, Mycobacterial, measles, chicken pox, gastroenteritis, HIV, and Malaria
3. Immunization programmes:
WHO schedule, different vaccinations, rationale; special consideration to various disease eradication programmes like Pulse-Polio
4. Child and nutrition :
Nutritional requirements, malnutrition syndrome, Vitamins (A, B, C, D & K) and Minerals (iron, calcium phosphorus, iodine) deficiencies in children and management in brief
5. Clinical presentation, management & prevention of the following :
Cerebral palsy, Poliomyelitis, Muscular dystrophy
6. Childhood rheumatism :
Types, clinical presentation, & management in brief
7. Acute CNS infections:
Clinical presentation, complications and management of bacterial and tubercular infections in brief
8. Clinical presentation, management & prevention of the following respiratory conditions: URI, LRI, bronchiolitis, asthma, TB
9. Clinical presentation, management & prevention of the following cardiac conditions: Rheumatic heart disease, SABE, Congenital heart disease - ASD, VSD, PDA

PSYCHIATRY

1. Modalities of psychiatric treatment
2. Psychiatric illness and physical therapy link
3. Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illnesses -
 - a. Anxiety neurosis
 - b. Depression
 - c. Obsessive compulsive neurosis
 - d. Psychosis- Définition & types
 - e. Maniac-depressive psychosis
 - f. Post-traumatic stress disorder
 - g. Psychosomatic reactions: Stress and Health, theories of Stress – Illness Link
4. Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illness
 - a. Drug dependence and alcoholism
 - b. Somatoform and Dissociate Disorders – conversion reactions, Somatization, Dissociate Amnesia, and Dissociate Fugue
 - c. Personality disorders
5. Child psychiatry:
Brief descriptions of manifestations, and management of childhood disorders - attention deficit syndrome, and behavioral disorders
6. Geriatric Psychiatry (in brief)

GENERAL SURGERY

1. Fluid, Electrolyte and Acid-Base disturbances –
Diagnosis and management ; Nutrition in the surgical patient., Shock - Clinical feature, pathology & management.
2. Transfusion therapy in surgery – blood components, complications of transfusion .
3. Wounds :
 - a) Classification, acute wounds, chronic wounds.
 - b) Wound healing – Basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, scars - type and treatment.
 - c) Wound Infections, - physiology & manifestation, types of infections, treatment, principle of antimicrobial treatment.
4. Pre & postoperative complications of surgery and their management.
5. Hemostasis –
Components, hemostatic disorders, factors affecting bleeding during surgery.
6. Types of anaesthesia and its affects on the patient, pain relief.
7. Types of Incisions ; Clips Ligatures and Sutures; General Thoracic Procedures, Radiologic Diagnostic procedures, Endoscopy–types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery.
8. Burn:
Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management.
9. Skin Grafts :
Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.
10. Infections and injuries of Hand :
Hand infection, suppurative infection, other infection, hand injuries, dupuytren's contracture.
11. Surgical Oncology – Cancer –
Definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer.
12. Disorders of muscles, tendons and ligaments, sports related injuries. Periarticular inflammations acute muscle injury, chronic muscle injury, Tendon disorders, tendon sheath disorder, fascia, Ganglia, Bursae, Repetitive strain injury.
13. Neurological disorder affecting to musculo-skeletal system. , Motor dysfunction and treatment, cerebral palsy, acquired abnormalities, inherited disorder, neuromuscular disorder, sensory disorder.
14. The cranium :
The scalp, the skull, head injuries.
15. Thoracic and cardiac surgery :
Thoracotomy, lobectomy, pneumonectomy, thoracoplasty, mitral valvotomy, open heart surgery.
16. Various surgical heart diseases with respect to clinical presentation, complications and management -
Valvular heart disease, congenital heart disease –e.g., ASD, VSD, PDA, Ischaemic heart disease. Outline of postoperative complications in cardiac surgery and their management.

17. 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.
18. Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Nephrectomy, Prostatectomy.
19. Obstetrics & Gynecology :
Surgical procedures involving child birth. Incontinence – Types, Causes, Assessment and Management, Common gynecology disorders - salpingitis, parameteritis, retroverted uterus prolapse of uterus, pelvic inflammation , Definition & indications of– Hysterosalpingography, Dilatation and Curettage, Laproscopy, Colposcopy, & Hysterectomy,
20. ENT:
Common problems of ear, otitis media, Otosclerosis, functional aphonia and deafness, facial palsy - classification, medical and surgical management of lower motor neuron type of facial palsy.
21. Ophthalmology:
common inflammation and other infections of eye, ptosis, defects of the external rectus, cataract, refractions, pleoptic exercises, physiologic defects of vision.

COMMUNITY MEDICINE

1. Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease.
2. Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening.
3. Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropodborne infections, Zoonoses, Surface infections, Hospital acquired infections Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness Accidents and Injuries.
4. Public health administration- an overview of the health administration set up at Central and state levels. The national health program-highlighting the role of social, economic and cultural factors in the implementation of the national programs. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups.
5. Health programs in India: Vector borne disease control program, National leprosy eradication program, National tuberculosis program, National AIDS control program, National program for control of blindness, Iodine deficiency disorders (IDD) program, Universal Immunisation program, Reproductive and child health program, National cancer control program, National mental health program, National diabetes control program, National family welfare program, National sanitation and water supply program, Minimum needs program.
6. Demography and Family Planning: Demographic cycle, Fertility, Family planning- objectives of national family planning program and family planning methods, A general idea of advantage and disadvantages of the methods.
7. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics: MCH problems, Antenatal, Intranatal and post natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare program for women and children, Preventive medicine and geriatrics.
8. Nutrition and Health: Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition program.
9. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology.

10. Hospital waste management: Sources of hospital waste, Health hazards, Waste management.
11. Disaster Management: Natural and man made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness.
12. Occupational Health: Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from occupational hazard accidents and diseases. Details of compensation acts.
13. Mental Health: Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health.
14. Health Education: Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education.

RESEARCH METHODOLOGY AND BIOSTATISTICS

RESEARCH METHODOLOGY

1. **Introduction to Research methodology:**
Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research.
2. **Research problem:**
Statement of research problem, Statement of purpose and objectives of research problem, Necessity of defining the problem
3. **Research design:**
Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design.
4. **Measurement & scaling techniques:** Measurement in research-
Measurement scales, sources of error in measurement. Technique of developing measurement tools, Meaning of scaling, its classification, important scaling techniques.
5. **Methods of data collection:** collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.
6. **Computer technology:**
Introduction to Computers, computer application in research computers & researcher.

BIOSTATISTICS

1. **Introduction:** Meaning, definition, characteristics of statistics. Importance of the study of statistics, Branches of statistics, Statistics and health science, Parameters and Estimates, Variables and their types, Measurement scales.
2. **Tabulation of Data:** Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.
3. **Measures of Central Tendency:** Need for measures of central Tendency, Definition and calculation of **Mean** – ungrouped and grouped, interpretation and calculation of Median-ungrouped and grouped, Meaning and calculation of Mode, Geometric mean & Harmonic mean, Guidelines for the use of various measures of central tendency.

4. **Measures of Dispersion** : Range, mean deviation, standard deviation & variance.
5. **Probability and Standard Distributions**: Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skewness, kurtosis.
6. **Correlation & regression** : Significance, correlation coefficient, linear regression & regression equation.
7. **Testing of Hypotheses , Level of significance, Degrees of freedom.**
8. **Chi-square test, test of Goodness of fit & student t-test.**
9. **Analysis of variance & covariance**: Analysis of variance (ANOVA), what is ANOVA? Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANACOVA)
10. **Sampling**: Definition, Types- simple, random, stratified, cluster and double sampling. Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors.

PHYSIOTHERAPY IN ORTHOPEADIC CONDITIONS

1. PT assessment for Orthopedic conditions - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental, girth measurement, muscle length testing-tightness, Contracture and flexibility, manual muscle testing, peripheral neurological examination dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follows up.
2. Fractures - types, classification, signs and symptoms, complications. Fracture healing – factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartmental syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period.
3. Specific fractures and dislocations: PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures.
4. Principles of various schools of thought in manual therapy – Maitland, Mackenzie, Mulligan
5. Degenerative and inflammatory conditions: Definition, signs and symptoms, clinical features, path physiology, radiological features, deformities, medical, surgical management. Describe the PT assessment and management and home program for the following conditions – Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder.
6. Infective conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, Pyogenic arthritis, TB spine and major joints - knee and hip.
7. Define; review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program.

8. Deformities:
Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions : Congenital : CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vera, genu varum, valgum and recurvatum.
9. Poliomyelitis:
Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program.
10. Leprosy:
Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.
11. Amputations:
Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.
12. Spinal conditions:
Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.
13. Osteoporosis : Causes, predisposing factors, investigations and treatment.
14. Orthopedic surgeries:
Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as: Arthrodesis, Osteotomy, Arthroplasty-partial and total- Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release-tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy.
15. Shoulder joint:
Shoulder instabilities, TOS, RSD, Impingement syndrome – conservative and Post operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears- conservative and surgical repair. Subacromial decompression - Post operative PT management.
16. Elbow and forearm:
Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.
18. Wrist and Hand:
Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.
19. Hip:
Joint surgeries- hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management.

20. Knee:
Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome - conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation.
21. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management.

PRACTICALS

1. Practical demonstration of basic principles of physiotherapy assessment, functional assessment and application of physiotherapy in orthopaedics conditions.
2. Student must maintain a logbook. The duly completed logbook should be submitted during practical examination.

PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS

THEORY

- 1) Review of basic Neuro - Anatomy and Physiology
- 2) Physiotherapy evaluation of a neurological patient, electro diagnostic procedures, interpretations and prognosis in different neurological conditions, Upper and Lower motor neuron lesions.
- 3) Principles of physiotherapy programs, reeducation and retraining techniques in neurological conditions, approaches like: Bobath's / neuro developmental therapy, Rood's approach, PNF, Vojta techniques, biofeedback, Brunnstrom movement therapy, Motor Relearning programming, sensory integration therapy.
- 4) Disturbance of speech and aphasia
- 5) Spinal cord injury:
review of anatomy and physiology, Physiotherapy Assessment of Spinal cord injury, Principles of Physiotherapy at various stages of Spinal cord injury
Rehabilitation goals and ADL training
- 6) Assessment and principles of therapeutic management of following neurological conditions:
 - Stroke, meningitis, encephalitis, Parkinson's disease, Cerebral palsy, cerebellar lesions, Brain tumors, Multiple Sclerosis, facial palsy.
 - Motor neuron disease, Disseminated sclerosis, transverse myelitis, polio, syringomyelia, spina bifida,
 - Neuropathies, neuromuscular junction disorders and myopathies
- 7) Peripheral nerve injuries, surgical resection & repair:
 - Classification & types
 - Functional assessment, investigation, diagnosis & prognosis
 - Physiotherapeutic management
 - Poly neuropathy
- 8) Traumatic brain injury:
 - Types and Mechanisms of head injury
 - Clinical features, potential complications
 - Physiotherapy principles of immediate and postoperative therapeutic management
- 9) Neurosurgery:

Post surgical Physical therapy in neurosurgical procedures – craniotomy, shunts, SOL resection, surgical treatment of spasticity, cervical cord decompression.

PRACTICAL

1. Practical demonstration of basic principles of physiotherapy assessment, functional assessment and application of physiotherapy in neurology conditions.
2. Student must maintain a logbook. The duly completed logbook should be submitted during practical examination.

PHYSIOTHERAPY IN CARDIO-RESPIRATORY & GENERAL CONDITIONS

THEORY

1. Anatomical and Physiological differences between the Adult and Pediatric lung.
2. Bedside assessment of the patient-Adult & Pediatric.
3. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiography, PFT, ABG, ECG, Hematological and Biochemical Tests
4. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP, IPPB
5. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP
6. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning
7. Drug therapy – Drugs to prevent and treat inflammation, Drugs to treat Bronchospasm, Drugs to treat Breathlessness, Drugs to help sputum clearance, Drugs to inhibit coughing, Drugs to improve ventilation, Drugs to reduce pulmonary hypertension, Drug delivery doses, Inhaled Nebulisers.
8. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars- U.V.R and other electro therapeutics for healing of wounds, prevention of Hypergranulated Scars Keoloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues
9. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhydrosis. Care of anesthetic hand and foot; Evaluation, planning and management of leprosy- prescription, fitting and training with prosthetic and orthotic devices.
10. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit.
11. Physiotherapy in Obstructive lung conditions
12. Physiotherapy in Restrictive lung conditions.
13. Management of breathlessness.
14. Pulmonary Rehabilitation.
15. Physiotherapy following Lung surgeries.

16. Respiratory failure – Oxygen Therapy and Mechanical Ventilation.
Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU -Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU.
17. Burns management - Role of physiotherapy in the management of burns, post grafted cases- Mobilization and Musculo-skeletal restorative exercises following burns.
18. Physiotherapy management following cardiac surgeries.
19. Cardiac Rehabilitation.
20. Physiotherapy management following Peripheral Vascular Disease (PVD).
21. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following surgical procedures on Abdomen and Thorax.
22. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes
23. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases
24. Home program and education of family members in patient care.
25. Physiotherapy in Obstetrics – Antenatal Care, Antenatal Education, Postnatal Care. Electrotherapy and Exercise Therapy measures for the re-education of Ano-Urethral sphincter.
26. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity.
27. Geriatrics: Problems in old age, role of physiotherapy in elderly

PRACTICAL

1. Practical demonstration of basic principles of physiotherapy assessment, functional assessment and application of physiotherapy in cardio – respiratory, OBG, Skin, and other medical conditions.
2. Student must maintain a logbook. The duly completed logbook should be submitted during practical examination.

PHYSIOTHERAPY IN SPORTS

THEORY

1. Pre-exercise evaluation
2. Diet and nutrition
Measurement of fitness components and sports skills - Measurement of muscular strength, Measurement of muscular endurance, Measurement of flexibility, Determination exercise endurance,
3. Physiological effects of exercise on body systems - Muscular system, Endocrine system, Cardio-respiratory system, Nervous system
4. Sports injuries - Spine – PIVD, Kissing spine, cervical whiplash injuries, facet joint syndrome, SI joint dysfunction, Hip – muscle strain, piriformis syndrome, ITB syndrome, osteitis pubis, Knee – menisci, cruciate, collateral, osteochondritis, chondromalacia patellae, biceps femoris tendonitis, swimmers knee, patello-femoral pain syndrome, Leg & ankle – shin splint, achillis tendonitis & rupture, TA bursitis, ankle sprain, plantar fasciitis, turf toe syndrome, Head & face – maxillo-facial injuries, helmet compression syndrome.
5. Sports injuries
Shoulder – instability, rotator cuff injury, biceps tendonitis and rupture, pectoralis major rupture, scapular dyskinesis and acromio-clavicular joint injuries, Elbow – tennis elbow, golfer's elbow, Wrist and hand – carpal tunnel syndrome, gamekeeper's thumb.
6. Principles of injury prevention.
7. Principles of training & Rehabilitation in sports injuries.
8. Sports in Special age groups: Female athletic triad, Younger athlete- Musculo-skeletal problems, management, children with chronic illness and nutrition. Older athlete- Physiological changes with aging, benefits, risks of exercise in elderly, exercise prescription guidelines for elderly.

PRACTICAL

1. Practical demonstration of basic principles of physiotherapy assessment, functional assessment and application of sports physiotherapy
2. Student must maintain a logbook. The duly completed logbook should be submitted during practical examination.

REHABILITATION ON MEDICINE THEORY

1. Introduction of Rehabilitation & History
2. Epidemiology of disability (Impairment, disability, phases of disability process, etc.).
3. Principles of Rehabilitation & concept of team approach with rolls of each individual participant.
4. Organization of Rehabilitation unit.
5. Disability prevention evaluation & principles of Rehabilitation Management.
6. Role of Physiotherapy in Rehabilitation (Preventive, treatment & restoration)
7. Brief outline of Communication disorder & its implications on Rehabilitation process.
8. Brief outline of psychosocial & vocational aspects of Rehabilitation.
9. Introduction to Occupational therapy.
10. Activities of daily living, functional assessment & training for functional independence.
11. Brief outline of basic community medicine with special reference to community based Rehabilitation, infrastructure and role of CBR
12. Assessment of disability in rural & urban setups. Health care delivery system & preventive measures with specific reference to disabling conditions. Community education program.
13. Application of Physiotherapy skills at community level with special reference to the need at rural level.
14. Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies – National level and International NGO's, Multilateral and Bilateral agencies. International Health Organizations: WHO, UNICEF, UNDP, UNFPA, FAO, ILO, World bank, USAID, SIDA, DANIDA, Rockefeller, Ford foundation, CARE, RED CROSS.
15. National District Level Rehabilitation Program: Primary rehabilitation unit, Regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker.

16. Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise program, Prescribing and devising low cost locally available assistive aids, Modifications physical and architectural barriers for disabled, Disability prevention, Strategies to improve ADL, Rehabilitation program for various neuro-musculoskeletal and cardiothoracic disabilities.

ORTHOTICS AND PROSTHOTICS

1. Introduction to surgical anatomy and various pathological deviations with respect to brace fitting.
2. Rationale of prescribing Prosthetic and Orthotic devices.
3. Types of Prosthetic and Orthotic devices: Spinal, Lower limb, and Upper limb.
4. Checkout, usage advice, precautions, and follow-up.
5. Walking aids and wheel chairs: prescription, usage advice, and follow-up.

PRACTICAL

1. Demonstration of methods of using orthotics & prosthetics devices.
2. Methods of organization of community based rehabilitation centres.
3. Visit of different rehabilitation centres and preparing a report of the visit & viva-voce of the aforesaid report.

COMPUTER

Knowing Computer: What is computer; Basic applications of computer; Components of computer system; Central processing unit (CPU); VDU; Keyboard and mouse, other input/output devices; Computer memory; Concepts of hardware and software; Concept of computing, data and information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Operating Computer Using GUI Based Operating System: What is an operating system; Basics of popular operating systems; The User Interface; Using mouse; Using right button of the mouse and moving icons on the screen; Use of common icons; Status bar; Using menu and menu selection; Running an application; Viewing of file, folders and directories; Creating and renaming of files and folders; Opening and closing of different windows; Using help; Creating short cuts; Basics of O.S. setup; Common utilities;

Understanding Word Processing and M. S. Office: Word processing basics; Opening and closing of documents; Text creation and manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document; Understanding of components of M.S. Office; M.S. word; M.S. excel sheets; M.S. power point etc;

Using Spread Sheet: Basics of spreadsheet; Manipulation of cells; Formulas and Functions; Editing of spread sheet; Printing of spread sheet;

Introduction to Internet, WWW And Web Browsers: Basics of computer networks; LAN; WAN; Concept of internet; Applications of internet; Connecting to internet; What is ISP; Knowing the internet; Basics of internet connectivity related troubleshooting; World Wide Web; Web browsing softwares; Search engines; Understanding URL; Domain name; IP address; Using e-governance website;

Communications and Collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using emails; Document collaboration; Instant messaging; Netiquettes;

Making Presentation: Basics of presentation software; Creating presentation; Preparation and presentation of slides; Slide show; Taking printouts of presentation/handouts