आर्यभट्ट ज्ञान विश्वविद्यालय
ARYABHATTA KNOWLEDGE UNIVERSITY

Aryabhatta Knowledge University, Patna
SYLLABUS
FOR
FIRST BACHELOR OF PHYSIOTHERAPY (B.Ph.T.)
EXAMINATION

Aryabhatta Knowledge University, Patna
(Duration of Course 4 ½ Years including 6 months Internship)

First Bachelor of Physiotherapy (B.PhT) (1 ½ Years)

Subject	Short Form	Theory		Practical		Total	
		Marks	Hours	Marks	Hours	Marks	Hours
Human Anatomy	(H.Ana)	100	3	100	3	200	6
Human Physiology	(H. Physio)	100	3	100	3	200	6
Movement and Bio-Mechanics	(Mov & Bio-mech)	100	3	100	3	200	6
Pathology	(Patho)	50	2	---	---	50	2
Bio-Chemistry	(Bio-Chem)	50	2	---	---	50	2
Bio Physics	**G.Total**	400	13	300	9	700	22

Second Bachelor of Physiotherapy (B.PhT) (1 ½ Years)

Subject	Short Form	Theory		Practical		Total	
		Marks	Hours	Marks	Hours	Marks	Hours
Medicine	(Med)	100	3	050	1 ½	150	4 ½
Surgery	(Surg)	100	3	050	1 ½	150	4 ½
Pharmacology	(Pharma)	100	3			100	3
Exercise Therapy	(Ex.Th.)	100	3	100	3	200	6
Medical Electronics & Electrotherapy	(Med. Electro0	100	3	100	3	200	6
General & Social Psychology	(Gen. & Soc.)	50	2	---	---	50	2
	G.Total	550	17	300	9	850	26

Final Bachelor of Physiotherapy (B.PhT) (1 Year)

Subject	Short Form	Theory		Practical		Total	
		Marks	Hours	Marks	Hours	Marks	Hours
Physiotherapy in Medicine	(PTM)	100	3	100	3	200	6
Physiotherapy in Surgery	(PTS)	100	3	100	3	200	6
Rehabilitation & Therapeutic Management	(Rehab.&Th. Manag.)	100	3	---	---	100	3
Applied Mathematics & Statistics	(AMS)	50	2	---	---	50	2
Psychiatry	(Psych.)	50	2	---	---	50	2
Orthotic & Prosthetic	(Ortho & Prosth.)	100	3			100	3
	G.Total	500	16	200	6	700	22

Total Marks: 700+850+700=2250

ARYABHATTA KNOWLEDGE UNIVERSITY, PATNA

1. HUMAN ANATOMY
SECTION – I
GENERAL & SYSTEMIC ANATOMY

1. **INTRODUCTION :**
   Scope of Anatomy Cell as a structural and functional Unit, Organization of tissue, organs and system; Anatomical position of the body.
2. Skin and the appendages of the skin.
3. **MUSCLES:**
   Voluntary and involuntary muscles, short description of the structure of different muscles.
4. **MUSCLES:**
   Classification of Voluntary muscle, origin and Insertion Tendon, Isometric and isotonic contraction of the muscle.
5. **BONES:**
   Hard connective tissue, composition and functions, classification of bone according to Morphology and Development, various terms as ridge, tuberosity and trochanter.
6. **BONES:**
   Development of bones, parts of long bones and blood supply of bones, central remarks about the bones of skull, thorax, vertebral column and extremities.
7. **JOINTS:**
   Definition, classification of joints, structure of fibrous and cartilaginous joints.
8. **JOINTS:**
   Structure of synovial joint, movements of joints, blood supply of bone and joints.
9. **NERVOUS SYSTEM:**
   Nerve cell, Synapse and Reflex Arc.
10. **NERVOUS SYSTEM:**
    Organization of Central Nervous system, Spinal nerves and Nerve endings with demonstrations of various parts.
11. **CARDIOVASCULAR SYSTEM:**
    Blood as a connective tissue, functions in short, gross anatomy of heart with demonstration and surface anatomy.
12. **CARDIOVASCULAR SYSTEM:**
    Arteries, Veins, Capillaries, Collateral circulation, nervous control of blood circulation, with demonstration and surface anatomy.
13. **RESPIRATORY SYSTEM:**
    General outline of Respiratory Passages, Gross anatomy of Lung Pleura; with demonstration of surface anatomy.
14. **RESPIRATORY SYSTEM:**
    Broncho-pulmonary segments, intercostal muscle and mechanism of respiration.
15. **DIGESTIVE SYSTEM:**
    General idea or outline of Gastro-intestinal tract and associated glands; Demonstration of organs.

16. **EXCRETORY SYSTEM:**
Structure and function of kidneys, general outline of uterus, urinary bladder and urethra; demonstration of organs.

17. **REPRODUCTIVE SYSTEM:**
General outline of Male and Female genital organs, detail in female, brief in male.

18. **ENDOCRINES:**
Definition, structure in general, control of secretion of pituitary, thyroid, Adrenal pancreas with demonstration.

19. **LYMPHATIC SYSTEM:**
Lymph circulation, Lymph nodes and Lymphoid tissue in details.

20. **GENERAL EMBRYOLOGY:**
(1) Female and Male Genital organs and development of ovum and sperms.
(2) Fertilization and formation of three germ layers and their dominations.
(3) Development of Bones, axial and appendicular skeleton and muscles.
(4) Neural tube, brain vesicles and spinal cord.
(5) Development of Brain and Brain stem structures.

DEMONSTRATIONS: Practical as per Syllabus.
(1) Muscles of the whole body.
(2) Demonstration of organs in Thorax and abdomen.
(3) Demonstration of viscera of Head, Face and Neck.
(4) Demonstration of all the Glands in the body.
(5) Surface marking on living body of lung, pleura, fissures and Lobes of Lungs, Heart, Abdominal viscera.
(6) Identification of body prominences on inspection and palpation in the body especially of extremities. Points to palpate nerves and arteries, Identification of prominent muscles.
(7) Extra-Ocular muscles and salient points about the eyeball.
(8) Ear-Specially the Internal Ear.
(9) Demonstration of Brain.

SECTION-II
MUSCULO-SKELETAL AND NEURO - ANATOMY

1. **SUPERIOR EXTREMITY:**
Osteology: Clavicle, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals.
Soft Parts: Breast, Pectoral Region, Axilla, Front of Arm, Back of Arms, Cubital fossa, Front of Forearm, Back of forearm, nerves and vessels of forearm, palm, Dorsum of hand, shoulder girdle, shoulder joints, elbow joint Radio-Ulnar joint, wrist joint, joints of hand.

2. **INFERIOR EXTREMITY:**
Osteology: Hip Bone, Femur, Tibia, Fibula and Patella, Tarsals Metatarsus.
Soft Parts: Front of thigh-Femoral triangle, Femoral canal & femoral hernia, Adductor canal, Medial compartment of thigh Gluteal region back of thigh, Popliteal Fossa, Anterior compartment of leg, Posterior compartment of leg, sole of foot, Lymphatic drainage of leg, drainage venous if leg, Hip joint, knee joint, ankle joint, tarsal joints.

3. **TRUNK:**

Osteology: Cervical, Thoracic, Lumbar vertebrae, Sacrum, Coccyx, and Ribs.
Soft tissue: Inter-vertebral joints, cost-vertebral joints, Inter-vertebral Disc, Ligaments and Muscles.

4. **THORACIC CAGE:** With muscles and Movements.
Head, Neck, Face region : Bones, Muscles, Nerves of face and neck muscles.
Joints: Temporomandibular, Atlanto-occipital joint.
Dissection of Extremities and Demonstration of dissection: Parts of trunks; brain, thoracic and abdominal contents.

5. **NEURO-ANATOMY:** In details with applied and clinical aspect with demonstration of Brain and spinal cord.
   1. Sulci and Gyri and various areas of cerebral Hemispheres.
   2. Thalamus, Hypothalamus, Basal Ganglion.
   3. Cerebellum.
   4. Pons, Medulla.
   5. Spinal Cord.
   6. Ascending tracts.
   7. Descending tracts.
   8. Clinical application of knowledge of the tracts.
   9. Autonomic nervous system.
   10. Nervous control of urinary bladder and bladder dysfunction.
   11. Vestibule cochlear system.
   12. Cranial nerves.

2. HUMAN PHYSIOLOGY

Section-I : General Physiology

General Physiology:

1. Cell structure and Organelles.
2. General Principles of Biophysics.
3. Body Fluid Compartments.

Blood:

1. Composition of blood, Plasma Proteins formation and their function.
2. Structure formation and function of R.B.C.
3. Structure formation and function of W.B.Cs and Platelets.
4. Coagulation and its defects, bleeding, clotting time.
5. Blood group and their significance Rh. Factor.
6. Reticule Endothelial system. Jaundice structure and functions of spleen.
7. Hemoglobin and E.S.R.

Cardiovascular System:

1. Structure, properties of Heart muscle and nerve supply of Heart. Structure and function of arteries, capillaries and veins.
2. Cardiac cycle and heart sounds.
3. Cardiac output, measurement, factors affecting.
4. Heart rate and its regulation, cardio vascular reflexes.
5. Blood pressure, its regulations and Physiological variations.
6. Peripheral resistance, factors controlling role in B.P.

7. Hemorrhage.
8. E.C.G.
9. Changes in muscular exercise.

Respiratory System:

1. Mechanism of respiration. Intra-pleural and Intra-pulmonary pressure.
2. Lung volumes and capacities.
3. O_2 and CO_2 carriage and their exchange in tissues & lungs.
4. Nervous chemical regulation of respiration – Respiratory centers.
5. Respiratory states – Anoxia, Asphyxia cyanosis …. Acclimatization.

Digestive System:

1. General outline and salivary digestion.
2. Gastric secretion & its mechanism of secretion & functions.
3. Mechanism of secretion of succus entericus and pancreatic juice and its functions.
4. Structures and secretions and functions of liver.
5. Digestion, absorption and metabolism of carbohydrates.
6. Digestion, absorption and metabolism of Fats.
7. Digestion, absorption and metabolism of proteins.
8. Vitamins, sources functions and requirements.
9. Balanced diet in different age groups and occupation.

Endocrines:

1. Anterior Pituitary.
2. Post pituitary and parathyroid.
3. Thyroid.
4. Adrenal cortex.
5. Adrenal Medulla, Thymus.
6. Pancreas and blood sugar regulation.

Reproduction System:

1. Sex determination and development, puberty.
2. Male sex hormones and their functions, spermatogenesis.
3. Female sex hormones and functions, menstrual cycle, Ovulation and contraceptives.
4. Pregnancy, functions of placenta and lactation.

Excretory System:

1. Gross and minute structure of kidney and features of renal circulation.
2. Mechanism of formation of urine, GF.R. & Tubular function.
3. Renal function, Tests.
4. Physiology of Micturition.

SECTION-II
(NEURO-MUSCULAR PHYSIOLOGY)

MUSCLE AND NERVE:

1. Structure of neurons, membrane potential and generation of action potential.
2. Nerve impulse conduction saltatory conduction.
3. Nerve muscular junction and drugs acting on it, Myasthenia gravis.

4. Degeneration and regeneration of peripheral Nerves, reaction of degeneration Wallerian degeneration, Electro-tonus and Pfluger's law.
5. Types of Muscle, Microscopic structure of Muscle, Properties of muscle, comparison of various types of muscle.
6. Sarcomere, Mechanism of muscular contraction.
7. Thermal and chemical changes during muscular contraction.
8. Starlings law, Isotonic, Isometric contractions, Chronaxie, Rheobase.
9. Action potential.
10. Motor Units and its properties, clonus, tetanus, fatigue, summation, all or none law, beneficial effect.
11. Electromyography, applied aspects.
12. Nerve fibers classification, spread or impulse.
13. Velocity of nerve conduction, factors, affecting velocity.

NERVOUS SYSTEM:

1. Types and properties of Receptors, types of sensations.
2. Structure of synapse Reflex arc and its properties, occlusion summation, subliminal fringe etc.
3. Sensory tracts of spinal cord.
4. Motor tracts – Pyramidal and Extrapyramidal.
5. Hemi sections and complete section of Spinal Cord. Upper and lower motor neuron paralysis.
6. Cerebral Cortex, areas and functions of E.E.G.
7. Structure – connections and functions of cerebellum, and hypo-thalamus.
8. Basal ganglia and thalamus. Connections and functions.
9. Reticular formation tone, posture and vestibular apparatus.
10. Autonomic Nervous system.

SPECIAL SENSES:

1. Broad feature of Eye, Errors of refractions, lesions of visual pathways.
2. Speech and its disorders.
3. Ear and Vestibular apparatus.

PRACTICAL AND DEMONSTRATION

A.
1. Haemoglobinometer and total R.B.C. count.
2. Total W.B.C. Count.
3. Preparation and staining of Blood smears. Determination of differential W.B.C. count.
4. Blood Grouping.
5. Erythrocyte Sedimentation Rate.
6. Bleeding and clotting time.

B.
1. Artificial Respiration.
2. Pulmonary function tests.

HUMAN PHYSIOLOGY EXPERIMENTS

C.
1. Heart sound, Radial Pulse, Tracing, Basal Metabolic Rate
2. Arterial Blood pressure in man.
3. Cardiac efficiency tests.
4. Recording and study of Electrocardiogram.

D. 1. Testing of peripheral sensations and cranial nerves.
2. Superficial and deep reflexes.
3. Study of special senses.

ANIMAL PHYSIOLOGY EXPERIMENTS
PRACTICAL

E. 1. Electrical Reactions & Electro diagnostic tests.
2. Varieties of stimuli, Electrical Apparatus for Physiological Experiments.
3. Frog's Nerve-muscle preparation and demonstration of the following experiments on it.
4. Electromyography – Principle & application.
5. Simple muscle twitch.
6. Effect of load, Temperature and fatigue of Muscular Contractions.
7. Frog's normal cardiogram.

Effect of followings on normal cardiogram of Frog:

- Temperature.
- Extrasystole.
- Stimulation of Vagal sympathetic trunk.
- Stannius ligature.
- Radial pulse tracing.
- Basal Metabolic rate.
- Work Physiology.

Physiological effect of Electrical stimulation & use of High frequency current and various heat therapy agents.

3. MOVEMENTS MANIPULATIONS & BIOMECHANICS
SECTION-I : Movements, Manipulations

1. Analysis of Joint Movement and Muscle Action:
   (i) Normal Joint Range and variations within normal limits.
   (ii) Muscle action-agonist, antagonist, fixate, synergist.
   (iii) Isotonic and Isometric contractions.
   (iv) Group Action of muscles.

2. Analysis of Movement:
   (i) Fundamental Positions and their uses-lying, sitting, standing, kneeling and hanging.
   (ii) Derived positions of moving limbs, back trunk and head.
   (iii) Analysis of pattern of movement including rolling, lying to sitting, sitting to standing, walking.
   (iv) Developmental Sequence of movement from baby to adult.

(v) Common postures in Yoga in supine, prone and sitting standing positions, (Asanas).

3. Classifications, definitions and effects of passive, assisted, active and resisted movements.

4. Massage Manipulations:
   (i) Definition, classification and Contra-indication and effect, effect of massage in general and specific.
   (ii) Preparation of the patient and lubricants.
   (iii) Techniques of different manipulations of massage on different parts of body:
      (a) Effleurage and stroking.
      (b) Petrissage – Kneading, picking, wringing.
      (c) Frictions.
      (d) Percussions – clapping, beating, and pounding.
      (e) Vibration-shaking.

5. Manipulations of Joints:
   (i) Manipulations of soft tissue and joints by passive means.
   (ii) Mobilization techniques of all joints.
   (iii) Traction by mechanical or manual methods.

6. Testing Procedures:
   (i) Range of Movement.
   (ii) Manual examination of joint movement and tissue resistance and Muscle Power.

SECTION-II : Biomechanics & Kinesiology

1. Gravity, Centre of Gravity, line of Gravity, equilibrium, base and balance.
2. Friction, leavers, axis of movements, range of movement and planes, movements, liner, angular, velocity, acceleration.
3. Nature and effects of forces-Newton's Law and inertia, acceleration, reaction, force and force system linear, parallel and concurrent.
4. Composition and resolution of forces, related to muscle forces, angle of pull leverage etc.
5. Prevention of Postural Strain and Occupational Hazards:
   Correct & use of body mechanics at home, at school, at work, recreation, particular application of patients, physiotherapist and other staff.
6. Biomechanics of Normal Human Locomotion.

Practical as per Syllabus.

4. PATHOLOGY AND BACTERIOLOGY

31/10/17 31/10/17 31/10/17 31/10/17 31/10/17

1. Aims and objects of study of Pathology, Meaning of the terms etiology, pathogenesis, lesions and disease.
2. Various causes of disease and an approach to laboratory study and diagnosis of process of disease.
3. Brief outline of sick cells, degenerations, necrosis, gangrene etc.
4. **Inflammation:** Definition, Vascular and cellular, Phenomenon, tissue changes, exudates and pus formation, Difference between acute and chronic inflammation.
5. Repair (bone, skin, nerves and muscles etc.).
6. Circulatory disturbances with emphasis on ischemia, thrombosis, embolism, infarction. Diseases of cardio vascular system.
7. General approach to bacterial and viral infections, emphasis on tuberculosis, syphilis, leprosy, fungal infections.
8. General approach to immunity and allergy.
9. Neoplasia, Benign and malignant, spread of tumours.
10. Diseases of nervous system, joints, bones and muscles.
11. Brief outline of blood disorders and parasitic infections.
12. Animal parasites.
13. Deficiency diseases, pigments and pigmentation.
14. Physical irritants and chemical poisons.
15. Ionizing radiations.
16. Medical Genetics.
17. Regional pathology of heart, blood vessels, female reproduction system, Nervous system, the bones, these joints, the muscles the skin etc.
18. Disease of respiratory system and genitourinary systems.

No practical

5. BIOCHEMISTRY AND BIOPHYSICS

BIOCHEMISTRY:

1. Biochemical characteristics of living matter.
2. Biochemistry morphology of cell-Physiology.
3. Nucleic acids.
4. Proteins.
5. The enzymes.
6. Metabolism-carbohydrates; Proteins; Vitamins, Lipids.
7. Hormones.
8. Nutrition.
9. Biochemistry of connective tissues, Nerve tissue and muscle.
10. Water, electrotype and acid base balance.
11. Chemistry of biological materials-blood, C.S.F., Milk.
12. Physio-chemistry phenomenon.
13. Common procedures use in biochemistry.
14. Laws of solution: Diffusion and osmotic pressure; Permeability of membrane, colloids, surface tension; Absorption; Hydrogen on concentration; enzymes. Digestion and absorption.

15. Chemistry of lipids; including sterols and phospholipids; chemistry of carbohydrates, proteins, nucleoproteins; blood and lymph, hemoglobin and its derivatives, bile, urine, urinary deposit, faeces etc.

BIOPHYSICS:

1. Molecular Biophysics. Structure thermodynamics.
2. Electro-chemistry.
3. Micro-bio, including Electro-microscopy, spectroscopy, configurations, chromatography, electro phrases, tracer technique.
4. Cell biophysics.
5. Computers.
6. Reduction biology.

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SYLLABUS
FOR
SECOND BACHELOR OF PHYSIO THERAPY
(B.Ph.T.) EXAMINATION

1. MEDICINE
SECTION-I
GENERAL MEDICINE

I. **Diseases of Cardio-Vascular System:** Ischemic Heart Disease, Hypertensive Heart Disease, Rheumatic Heart Disease, Congenital Heart Disease, Thyrotoxic heart disease, Syphilitic heart disease, Vascular disease, Thrombosis, Embolism.

II. **Rheumatic Disease:** Rheumatoid arthritis, rheumatic Fever, Still's Disease, Collagen disease.

III. **Diseases of Endocrine System:** Emphasis on diabetes, Mellitus and outline of Hypopituitarism, Goitre, Hyperthyroidism & Hypothyroidism.

IV. **Disease of Respiratory System:**
   a) Diseases of lung, Bronchitis, Bronchial Asthma, Bronchiectasis pulmonary embolism, pulmonary tuberculosis, lung abscess, emphysema.
   b) Disease of Pleura-pleurisy, Empyema.

V. **Diseases of Digestive System:** Gastric and Duodenal Ulcers, Hematemesis.

VI. **Deficiency Disease:** Rickets, protein deficiency.

VII. Leprosy, elementary knowledge of skin and veneral diseases and infectious diseases.

VIII. Study of other medical conditions.

IX. **Dermatology:**
   1. Characteristics of normal skin.
   2. Abnormal changes.
   3. Types of skin lesions.
   4. **Conditions:**
      Leprosy, Acne, Boil, Carbuncles, Impetigo, parasitic, infections of skin, Herpes, Urticarial, Pityriasis, Skin disorders, Associated with circulatory disturbances, water born, defects in pigmentation, psoriasis, leucoderma, fungal infections, Alopecia, Dermatitis, Eczema, skin allergies, venereal disease, syphilis etc.

X. Brief study of preventive and social medicine.
XI. Excretory diseases. Rental failure, Glomerulonephritis, Renal bone diseases.

SECTION-II: Neurology

I. General principles of Neurological diagnosis.
II. Vascular Disorders of Brain.

III. Space occupying lesions within the skull Tumors, Hematomas and Abscess.
IV. Acute infections of Nervous system: Encephalitis, Meningitis, Poliomyelitis.
V. Common infections of peripheral, spinal and cranial nerves.
VI. Injuries of brain and spinal cord.
VII. Vertebra disc. Lesions and low back pain.
VIII. Cerebral palsy, hydrocephalus, spinal bifida & Myopathies.
IX. Introduction to degenerative Neurological conditions: Syringomyelia. Disseminated sclerosis, lateral sclerosis.
X. Functional Neurology.
XI. Study of other Neurological conditions.

Practical as per syllabus.

2. SURGERY
SECTION-I: General Surgery

I. Description of events frequently accompanying surgery in General Anesthesia, Blood Transfusion and physiological response of the body to surgery.

II. Common pre and post-operative complications-clinical picture, treatment and prevention.

III. Wounds, sinuses and Ulcers: Incisions, healing and principles of treatment.

IV. Major Abdominal Surgery: Management and complications. Thoracic and cardiac surgery – Thoracotomy, Tubectomy, Pneumonectomy, Thoracoplasty, Mitral Valvotomy.

V. Thoracic and cardiac surgery: Thoracotomy, Tubectomy, Pneumonectomy, Thoracoplasty, Mitral volvotomy.

VI. Neuro-surgery – Surgery of peripheral nerves and outline of cranial and spinal cord; surgery.

VII. Plastic surgery: Principles of cineplasty, tendon transplant, cosmetic surgery. Type of grafts, surgery of hands with emphasis on management of traumatic and leprosy hand.

VIII. Burns: Classification, early and late complication and management and reconstructive surgery.

IX. Ophthalmology: Errors of refraction, conjunctivitis, trachoma, corneal ulcer, iritis, cataract, retinitis, detachment of reti-glacema, ptosis, defects of External Rectus and Hysterical blindness.

X. E.N.T.: Sinusitis, Rhinitis, Otitis media, Otosclerosis, functional amphonia and deafness.

XI. Obstetrics and Gynaecology: Review of the system, pregnancy, labour; common complications and their treatment common Gynaecological disorder and their management.

SECTION-II: Orthopaedics

I. Fractures and Dislocations and soft tissue injuries:
   a) Pathology of Fractures and Repairs of bones, reasons for Union ..... Non-union, delayed union, fibrous union, excess as callus myositis, General principles of treatment, common fractures of the upper extremity, lower extremity and fractures of the vertebra. Newer methods of fracture stabilization special references to postoperative exercises and prevent joint stiffness, spinal exercises for prevention of deformities.
   b) Dislocation of shoulder, Elbow, Hip, Knee and Spines.
   c) Soft tissue injuries: Rupture, contusion and sprains, of muscle, tendons and ligaments.

II. Deformities:
   a) Common foot deformity: Congenital torticollis cervical Rib, spinal Bifida.
   b) Acquired: Scoliosis, Kyphosis, Lordosis, Genu valgum and Varum flat foot, Genu recurvatum, Pes cavus, Matatarsalgia, Claw hand, Mallet Finger, contractures.

III. Operative procedures and Orthopaedics Appliances.
   a) Reconstructive Operations, Arthrodesis, Cineplasty, Tendon Repairs and Transfers.
   b) Amputations: Common sites of Amputations, Advantages and Disadvantages, Amputation of upper and lower extremities.

IV. Inflammatory Diseases and other affections of bones:
   a) Bones-Osteomyelitis, T.B. Bone.
   b) Joints osteoarthritis, Rheumatoid Arthritis, T.B. Joints, Synovitis.
   c) Tendon Sheath and Bursa-Tenosynovitis.
   d) Osteomalacia, Osteoporosis.

V. Study of other conditions in Orthopaedics.

RADIOLOGY

Practical knowledge of X-ray reading – X-rays of the following conditions – Fractures, dislocations, Arthritis, Tuberculosis, Bronchiectasis Abnormalities of Vertebral columns.

* Practical as per Syllabus.

3. PHARMACOLOGY
SECTION-I

1. General Pharmacology.
2. Detail study of Pharmacology.
3. Drug allergy and idiosyncracy.
4. Drug Toxicity.
5. Metabolic forte of drug.
6. Method of Administration of drugs.
7. Chemical character of drugs.
8. Drugs acting on Central Nervous System – Anesthetics, Alcohols, Alkaloids, Narcotics, Antipyretics, Hypnotics, Sedatives, Anti-convulsant, Stimulants, Psychotherapeutics. Drugs acting on Autonomic nervous systems. Drug acting on pain & inflammatory conditions.
9. Drugs acting on peripheral nervous system-stimulating and/or inhabiting cholinergic and adrenergic activity.
10. Drugs acting on neuromuscular junction and muscles; pupil ciliary movement; skin etc.
11. Drugs acting on respiratory system, gastro intestinal system on kidney and uterus.
12. Drug acting on cardio vascular system; blood & blood forming tissues, blood vessels.
13. Chemotherapeutic agents, General anesthetics, study of local and general anesthetic on eye and skin etc. and other physiological system.
14. Hormones and drugs affecting endocrine functions.
15. Vitamins, antibiotic, sulpha drugs.
16. Metabolic and other inorganic compounds.
17. Immunological products/agents.
18. Diagnostic agents.

19. Study of clinical pharmacology and pharmacotherapeutics. Mode of action of drug; Pharmacological principle of medical practices.

20. The chemical and physical basis of Pharmacology.

21. Manifestations of Pharmacological actions

22. Classification of drugs according to selective actions, general action of drugs.

23. Definition of Pharmacological terms.

24. Conditions influencing absorption and excretion of drugs.

25. Conditions influencing action of drugs e.g. allergy and idiosyncracy; anaphylaxis; tolerance and cumulative action etc.

26. Action of sera and vaccination.

27. Action of drugs on mental conditions.

28. Detail study of Pharmacotherapeutics and clinical Pharmacology.

29. Pharmacodynamics – Principle of Drug Action, mechanism of Drug Action, Drug Dosage; factors modifying D. Drug action. Instruction in experimental pharmacodynamics study of Pharmacokinetics aspect.

30. Adverse Drug Effects : Side effects, secondary effects, toxic effect, poisoning, intolerance, idiosyncrasy, drug allergy, photo sensitivity, drug dependence, drug abuse (Addition), drug withdrawal reactions, drug induced diseases.

Mechanism and types of drug reaction :-

31. Introduction of forensic medicines and toxicology; and medico-legal aspect.

32. Chemotherapy.

33. Method of prescribing and treatment for common diseases or illness or any associated clinical problems of existing earlier or arising during or after the process of therapeutic system of physiotherapy and occupational therapy, with the use of modern scientific drugs/medicine.

34. Principle practice of western medical science and modern scientific system of medicine its application in various clinical conditions.

35. Study of pharmacology including Materia Medica and Pharmacological chemistry and applied pharmacology and therapeutics elaborating the rational basis of medical treatment of diseases or illness and various clinical conditions, use of drugs.

EXERCISE THERAPY
SECTION 1 – BIO-ENGINEERING

Student should have basic knowledge of assessment and evaluation of the pattern for selecting the techniques and methods for maximum functional restoration including indications and contra-indications.

Mobilizing and strengthening techniques to achieve optimum function depending upon-cause of limitation which might involve:

(i) Particular change methods of strengthening muscle to maintain existing range and improve function.

(ii) Peri – articular change, giving swelling, muscle tension, muscle weakness, muscle spasm adhesions or scars, appropriate methods to reduce swelling, reduce hyper tonicity, strengthen muscle stretch and scars.

2. Strengthening Muscle and Increasing Endurance:
   - (i) Assisted active exercises, exercises in suspension and in water.
   - (ii) Free active exercises-involving use of gravity, fraction and levers.
   - (iii) Resisted exercises-Manual-slow reversal, holding through range, repeated contractions etc. Mechanical – P.R.E. using weights, spring and pulley's Body weight.
   - (iv) Endurance – high repetition, low resistance exercises.
   - (v) Exercises for strengthening – High resistance and low repetition.

3. Relaxation:
   - (i) Mental and Physical-tension.
   - (ii) Local and general physical tension.
   - (iii) Methods of teaching relaxation.
   - (iv) Shavasan (Still pose).

4. Re-education of posture, balance and co-ordination.
   - (i) Types of Posture, correct and incorrect posture and causes.
   - (ii) Postural deformities.
   - (iii) Postural exercise based on causes.
   - (iv) Balancing exercises-progressed from most stable to difficult position relaxed to condition of patient.
   - (v) Co-ordination exercises.

5. Breathing exercises:
   - (i) Normal breathing patterns.

(ii) Mobilization of thorax, localized breathing and exercises to develop respiratory muscles and improve vital capacity.
(iii) Postural drainage & Pre and Post-operative Breathing exercises.

SECTION-II
Locomotion and Hydro Therapy

Reduction of Hypertonicity and Rigidity and Initiation and stimulation of muscle contraction:

1. Maximum sensory stimulation when appropriate for example, touch, brushing, tendon tapping.

2. Irradiation from strong components in movements for from resistance to other part of the body, P.N.F.

3. Successive Induction.

4. Spasm, Spasticity: Support and positioning (including reflex inhibitory positions, shakings, movement for example reciprocal relaxation, hold relax, use of other parts of the body reflexes.

5. Rigidity: Methods of facilitating movement.

6. Re-education of Gait:
   (i) Normal human Locomotion.
   (ii) Causes of gait deviation.
   (iii) Exercises and methods to improve gait.
   (iv) Uses of crutches and crutch walking.

7. Hydrotherapy:
   (i) Physical and Therapeutic effects of exercise in warm water.
   (ii) Principles of treatment buoyancy assisted, buoyancy as support, buoyancy resisting.
   (iii) Starting positions.
   (iv) Dangers and precautions.
   (v) Pool, lank and accessory equipment.

8. Some techniques of exercise – therapy:
   (i) Group therapy.
   (ii) Recreational therapy.
   (iii) Sport therapy.
   (iv) Yoga therapy.
   (v) Pre & Post Natal Exercises Muscle Testing.
   (vi) To study of the muscle work, joint positions stability of fundamentals and derived positions.

5. MEDICAL ELECTRONICS AND ELECTOTHERAPY
SECTION-I
Medical Electronics, T.N.S. & Low Frequency Current

I. Basic Principles:

1. Structure and properties of matter-solids, liquids and gases-cohesion, adhesion, grace tension, viscosity, density and elasticity.
2. Structure of atom, molecules, elements and compounds.
3. Electron theory, static and current electricity.
4. Conductors, insulators, potential, resistance.
5. Ohm's Law.

II. Rectifying devices-thermionic valves, semiconductors, transistors, amplifiers and oscillation circuits.
Capacitance, condensers in D.C. and A.C. Circuits.

III. **Effect of current Electricity:**

1. Chemical effect-ions and electrolytes, ionization, production of an E.M.F. by chemical actions.
2. Magnetic effects, molecular theory of magnetism, magnetic fields, electro-magnetic induction.
3. Thermal effects-Joule's Law and heat production.

IV. Low Frequency Current:

1. Direct and A.C. currents.
2. Production of Direct current: Physiological and therapeutic effects of constant current Anodal and cathodal galvanism, ionization and their application in various conditions.
3. Modified direct current-various pulses, duration and frequency and their effect on Nerve and Muscle tissue. Production of interrupted and surged direct current circuit diagram and principles of working.
4. Physiological and therapeutic effects – their application and techniques in various conditions.
5. Acupuncture and its therapeutic applications and their techniques.

V. Main supply-brief outline of mains distribution, dangers-short circuits precautions - Safety devices, earthing, fuses etc.

VI. **Electrical Reactions and Electro-diagnostic tests:**

1. Electrical stimuli and normal behavior of Nerve and muscle tissue to these stimuli.
2. Types of lesions and development of reaction of degeneration.
3. Faradic-I.D.C. Test.
4. Nerve conduction Test.
5. S.D. Curve and its interpretation.

6. Pulse Ratio.
7. Chronaxie, Rheobase, Myasthenia and Myotonic reactions.
8. Elements of E.M.G.
9. T.N.S. and Interferential therapy, Actino-therapy and Laser.

SECTION-II

I. **High Frequency Current:**

(1) Introduction – Difference between low frequency and high frequency current and heat production in tissues.

(2) Principles of production of High Frequency currents – Circuit diagram and principles of working. Common methods of currently regulation. Interference with Ratio communication and principles of stabilizing frequency and eliminations of Harmonics, Physiological and therapeutic effects.

(3) Application of short wave Diathermy, condenser field and inducts methods. Heating of the tissues in series and parallel. Various methods in treating various types of tissues in Body-co-planner, contra planner various types of coil methods. Size and spacing of electrodes, position of electrodes and various types of coils. Deep heating and superficial heating.

(4) Techniques of application of S.W. Diathermy to various part of body in various conditions by suitable methods of achieving maximum effects. Application of Microwave in general and in specific conditions to various parts of body.

II. **Microwave Diathermy:**

Principles of production (elementary knowledge); specific physiological and therapeutic effects. Application of Microwave in general and in specific conditions to various parts of body.

III. **Ultra-Sonic Therapy:**

(1) Definitions of sound and Ultra sound and its physical properties velocity, density and characteristic impedance, reflection, refraction, transmission, absorption, cavitation and half-valve thickness.

(2) Production of Ultra sound, Physiological and therapeutic effects of Ultra sound, Micro massage and thermal effect, Biological effects – Chemical and electrical effects.

(3) Principles of Treatment-Technique of application, dose, indications and contra-indications, Dangers and precautions.

(4) Electromagnetic waves, electromagnetic spectrum, physical properties of electromagnetic radiations-reflection, Refraction, absorption, Penetration, Grethus Law, Gosline Law, Inverse spare law and their uses.

IV. **Laser-therapy:**

Principle of production, physiology and therapeutic effects and its applications, indications and contra-indications.

V. Infra—red and Ultra-Violet radiations:
Introduction and physical properties production.
Physiological and therapeutic effects, technique of applications, doses, dangers and precautions.
- Special technique of U.V. Radiations i.e. indolent wounds, Psoriasis etc.

Electro Therapy and Active Therapy (Practical)

1. To experience Sensory and motor stimulation of nerves and muscles by various types of low frequency currents on self.
2. To locate and stimulate different motor points region wise.
3. Therapeutic application of different low frequency current Faradic Foot Bath, Faradism under pressure, stimulation of pelvic floor muscles, ionotophoresis, anodal and cathodal galvanism.
4. To study the reaction of degeneration of nerves. To plot strength duration curves. To find Chronaxie and Rheobase.
5. To study a hydro-collator unit, its operation & therapeutic application of Hot Pack-region wise.
6. To study various types of infrared lamps and their application to body-region wise.
7. To study a short wave Diathermy unit, its operation and different methods of application wise.
8. To study micro wave diathermy unit, its operation and methods of application region wise.
9. To study a paraffin wax unit, its operation and different methods of application region wise.
10. To study an Ultra Sonic therapy unit, its operation and different methods of application region wise.
11. To study a high frequency apparatus, its operation and application – region wise.
12. To study a high frequency apparatus, its operation and application – region wise.
13. To study an electric vibrator, its operation and application – region wise.
14. To study a Cryo-therapy unit, its operation and application of cold packs-region wise.
15. To study a trans-cutaneous stimulator, its operation and application-region wise.

6. GENERAL AND SOCIAL PSYCHOLOGY

(A) General Psychology

1. i) Nature of Psychology – Behaviour and experiences, conscious, Sub-conscious and unconscious mind.
   ii) Fields of Psychology: Introspective and Experimental methods.
   iii) Schools of Psychology – Associationism; Psychoanalytical theory, behaviourism; Gestalt psychology; structuralism and functionalism.

2. Heredity (Chromosome theory): Environment – Physical, psychological and social environment.

3. Motivation – Principle of Homoeostasis, need and its relation to structure and environment; kinds of motives – Physiological, psychological social and unconscious motives, life goals and levels of aspirations; interests and attitudes as motivational forces.

4. Emotion-Its nature and relationship with autonomic nervous system; James-Lange theory of Emotion; McDougall's theory of emotion; sentiments and feeling; pathological and functional disorders of emotions; emotional hygiene.

5. Conflict and frustration, common defensive mechanisms – Identification, Regression, repression, projection, sublimation and rationalization.

6. Learning-Role of learning in Human life; Types of learning.
   a) Thorndike's Trial and Error learning.
   b) Associative (Conditioning) Learning, Practical application of conditioning technique as in morbid fears, compulsion to steal and other neurotic behavior in eliminating undesirable behavior.
   c) Learning by insight-gestalt learning, Kolber's experiments on animal learning; Transfer of learning.

7. Memory (Retention): Types of memory – Recall, recognition and Rose memory, causes of forgetting, retroactive inhibition, disorders or memory – Amnesia, par amnesia , hyper amnesia.

8. Attention and perception – Nature of attention, factors determining attention; nature of perception, principles of perceptual grouping, illusions and hallucinations.

9. Intelligence – Definition, intelligence tests-their uses: How the test is standardized; Intelligence Quotient (I.Q.) General intelligence and special intelligence.

10. Personality – Definition; Types approach and Trait approach, Measurement of personality – Interview, Questionnaire Rating, performance, projective methods factors contributing towards development of personalities Biological and social factors.

(B) Social Psychology

1. Nature and scope of social Psychology.
2. Social Interaction – Primary and social stimulation.
3. Psychological groups and their classification.
4. Socialization of the individual.
5. Social control (Social Heredity) – Morals, costumes, Fashions; Propaganda its technique.
6. Leadership (Personal social control) – Functions, role and qualities of a leader.
7. Personality-culture and personality.
8. Attitudes and prejudices-classification of Attitudes; Evils and causes of prejudices. How to change attitudes and prejudices.
9. Crowds and public opinion.
10. Social change and progress.

Aryabhatta Knowledge University, Patna

SYLLABUS
FOR
FINAL BACHELOR OF PHYSIOTHERAPY
(B.Ph.T.) EXAMINATION

SYLLABUS
FOR
FINAL BACHELOR OF PHYSIO THERAPY (B.Ph.T.) EXAM, 1998

1. **PHYSIO-THERAPY IN MEDICINE**

SECTION-I

Physiotherapy-in-General Medicine.

I. **Pathological Changes:**

1. Review Pathological changes and principles of the treatment by Physical therapy of –
   (i) Inflammation – acute, chronic and supportive.
   (ii) edema-traumatic obstructive paralytic, edema due to poor muscle and laxity of the fascia.

II. **Arthritis and Allied conditions (in details):**

(i) Osteoarthritis – Generalized, Degenerative and traumatic, Spondylosis and disorder.
(ii) Rheumatoid Arthritis, Still's diseases, infective Arthritis.
(iii) Spondylitis - Ankylosing Spondylitis.
(iv) Non-articular Rheumatism – fibro myalgia, funiculitis, bursitis.

III. **Diseases of the respiratory system:**

1. Mechanism of Respiration.
2. Examination of chest of patients and principles of Physiotherapy treatment.
3. Bronchitis Asthma, Lung abscess, bronchiectasis, Emphysema.
4. Pleurisy and Empyema, Pneumonias.
5. Bacterial Disease – Tuberculosis.
6. Rheumatic fever-carcinoma of respiratory tract.

IV. **Common conditions of skin:**

Acne, Psoriasis, Alopecia, Leucoderma, Leprosy.

V. **Common Cardiac Disorders:**

Thrombosis, Embolism, Buerger's disease, Arterio-Sclerosis, Thrombophlebitis, Phlebitis, Gangrene, Congestive Cardiac Failure, Hypertension.

VI. **Deficiency Diseases:** Rickets.

VII. **Excretory Disease – Renal Failure, Renal Bone Diseases:**

SECTION-II

PHYSIO-THERAPY IN NEUROLOGY CONDITIONS

1. Examination of Neurological disorders and principles of treatment.
2. Hemiplegia, Paraplegia, Cerebral Palsy, Tabes Dorsalis, Cerebellar ataxia, extra pyramidal lesions (in details).
3. Disseminated sclerosis, peroneal muscular atrophy, Amytrophic lateral sclerosis, progressive muscular atrophy, syringomylia sub-acute combined degeneration ---- ---- (in outline).
4. Peripheral Nerve lesions (in details).
5. Neuritis and Neuralgia – Brachial, Sciatica and facial palsy (in details) erb's palsy.
6. Infections-Poliomyelitis, Meningitis, Encephalitis, Poly neuritis.
7. Myopathies.
8. Pediatrics and Geriatrics:
   (i) Special problems of elderly and children related special conditions to which they are prone.
   (ii) Treatment as modified to their particular needs of each age group.
9. Practicals: Syllabus Evaluation of Long - ---- short cases Demonstrations of Techniques.

PHYSICAL THERAPY PRACTICAL EXAMINATION

To examine and evaluate the patients suffering from Muscular Neurological and Skeletal conditions.

I. Examination

1. Motor
   - Muscle Tone
   - Muscle power grading
   - Measurement of girth

2. Range of Motion:
   - Goniometry
   - Contracture, deformity and measurement of limb length.

3. Sensory:
   - Touch, Pain, Temperature, Pressure and Kinesthetic sense.

4. Neurological:
   - Primitive Reflexes, Motor development, superficial and deep tendon reflexes.
   - Involuntary movements.
   - In coordination.
   - Gait.

5. Respiratory System:
   - Measurement of chest expansion.
   - Pattern of Breathing, Diaphragmatic, localized ---- breathing.

6. Functional evaluation of A.D.L.'s
   I. The aims and plan of treatment of the patients suffering from the diseases as per theory syllabus.
   II. To operate the electro-therapeutic and mechanic-therapeutic equipment for treatment of patients as per Electro therapy and exercise therapy practical syllabus of year.

2. PHYSIOTHERAPY IN SURGERY
SECTION-I
Physiotherapy in Surgery

I. Complications common to all operations: Pre and Post-operative Physiotherapy.

II. Wounds, local infectious, ulcers, surgical procedures related to peripheral vascular diseases.

III. Burns, degree of burns, skin grafts.

IV. **General abdominal surgery and obstetrics and Gynaecology:**
   (i) Abdominal incisions: its pre and post-operative Physiotherapy.
   (ii) Operations of stomach; intestines; Appendectomy, Spleenectomy, Cholecystectomy.
   (iii) Operations on abdominal wall, hernia.
   (iv) Operations of Genitourinary system; prostatectomy, Nephrectomy.
   (v) Prolapse; rectum.
   (vi) Antenatal and post natal training.
   (vii) Complications of Pregnancy.
   (viii) Weak abdominal and pelvic floor muscles.
   (ix) Stress incontinence.
   (x) Prolapse uterus.
   (xi) Special points related to pelvic surgery.
   (xii) Pelvic inflammatory conditions.
   (xiii) Surgery of breast radical mastectomy, physiotherapy related to above conditions.

V. **Thoracic Surgery:**
   (i) Thoracic incisions, pre and post-operative treatment and later rehabilitation of the patients.
   (ii) Lobectomy, Pneumonectomy, Thoracotomy, Thoracoplasty.
   (iii) Operations on chest wall.
   (iv) Common complications with emphasis to atelectasis, Pneumothorax, Broncho-pulmonary fistula, Pre and post-operative physiotherapy related to cardiothoracic surgery.

(v) Operations on pericardium and heart, chronic constructive pericarditis, valvular incompetence and stenosis. Mitral volvotomy, congenital heart defects, patent ductus arterious; Tetralogy of fallout.

VI. Ear, Nose and Throat Conditions: Otitis, media, Sinusitis, Disomotor, Rhinorrhea, Adenoids, Tonsillitis, Physiotherapy related to above conditions.

VII. **Neurosurgery:**

(i) **Cranial Surgery:** Head injuries, intra cranial abscess. Intra cranial tumours.

(ii) Surgery of spinal cord and cauda equina. Spinal Bifida and its complications. Infections of the spine. Epidural abscess, tuberculosis. Lumber Disc, Herniation, and cervical disc herniation. Laminectomy. Pre and post-operative physiotherapy treatment related to above conditions.

(iii) Surgery of peripheral nerves. Peripheral nerve injuries. Pre and post-operative physiotherapy treatment as applicable to above conditions.

VIII. Pre and Post-operative Physiotherapy, relating to Plastic Surgery:

(i) Tendon transplantation in Leprosy, Polio etc. Pre and Post-operative Physiotherapy related to above conditions.

SECTION-II

1. Orthopaedics:

(i) Fractures and dislocations.
(ii) Classifications.
(iii) Types of displacement.
(iv) Immediate and late signs and symptoms.
(v) Changes at fracture site and in surrounding tissues.
(vi) Reasons for Union, non-union, delayed union.
(vii) Methods of reduction and fixation.
(viii) Healing of fracture and factors influencing.
(ix) Common fractures of upper and lower extremity and their complication.
(x) **Physiotherapy for each fracture:**
  (a) During immobilization period.
  (b) During mobilization period.
(xi) Dislocations with possible complications.
(xii) **Corrective Surgery:**
  (a) Arthroplasty, Arthrodesis, Osteotomy, Tendon transplant, soft tissue release, grafting.
  (b) Physiotherapy treatment as applicable to above conditions.

II. (i) Soft tissue injuries: Synovitis, capsulitis, Bursitis, etc. Volkmann's ischemic contracture.

(ii) Crush injuries.

(iii) Repair of injured tendon and nerves.
(iv) Injuries of semilunar cartilage and cruciate ligaments of knee; Physio-therapy treatment as applicable to above conditions.

III. Deformities:
(i) **Congenital:** Torticollis, cervical rib, sprangels shoulder, spina-bifida, hallux valgus, pes caves, pes planus and other common deformities.
(ii) **Acquired:** Scoliosis, Kyphosis, Lordosis, Coxa vara, Genu Valgum, Genu varum and recurvatum, Planus and other common deformities.
(iii) Other miscellaneous Orthopaedic conditions commonly treated by Physiotherapy.
(iv) Physiotherapy treatment related to above conditions.

IV. (i) Amputation: Traumatic, elective, common sites of amputation in upper and lower extremities. Advantages and disadvantages. Physiotherapy treatment as applicable to care of Prosthetic training with emphasis on lower extremity.

Note:

Emphasis should be on the assessment of disability with the selection of treatment based on these.
Where possible treatment should be related to the activities of daily living and patient's occupation and directed towards the development of self-confidence and independence.

PHYSICAL THERAPY PRACTICAL EXAMINATION

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- Involuntary movements.
- In coordination.
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6. Functional evaluation of A.D.L.'s
   I. The aims and plan of treatment of the patients suffering from the diseases as per theory syllabus.
   II. To operate the electro-therapeutic and mechanic-therapeutic equipments for treatment of patients as per Electro therapy and exercise therapy practical syllabus of year.

3. REHABILITATION AND THERAPEUTIC MANAGEMENT

~~REHABILITATION~~

I. **REHABILITION:** Concept and Principle.
   (a) The Philosophy and need of rehabilitation.
   (b) Principles of rehabilitation medicine.
   (c) Basic principles of administration and organization.

II. **REHABILITATION APPROACH:**
   (i) Nursing.
   (ii) Communication problem.
   (iii) Social problems.
   (iv) Psycho-social aspect.
   (v) Vocational problems and vocational placement.
   (vi) Community based rehabilitation programme & community resources.
   (vii) Other aspects of rehabilitation.

III. Rehabilitation programme for Medical, surgical, orthopaedic, neurological conditions and various other clinical conditions, and in specific conditions.

THERAPEUTIC AND CLINICAL MANAGEMENT (PRINCIPLE & PRACTICE)

The students are required to undergo detail study and extensive Practical Training and Clinical Practice in the following areas to qualify and authorize them to practice Physiotherapy or Occupational therapy system and Western Medical Science for Preventive, Curative, Restorative treatment and rehabilitative management as well as Health Care of the patients and disability groups.

I. Clinical evaluation and investigation.

II. Diagnosis and differential diagnosis.

III. Prescription writing and treatment planning.

(a) Use of Physiotherapy or Occupational Therapy system for functional, Physical and Mental Restoration or other desired achievements.

(b) Principe and practice of Western Medical Science and Modern Scientific System of Medicine and its application in various clinical conditions.

(c) Method of prescribing the treatment of general or common diseases or illness or any associated clinical problems existing earlier or arising during or after the process of Physiotherapy or Occupational Therapy System; through Modern Scientific Medicine.

IV. Referral approach for specialized diseases or clinical conditions.

V. Rehabilitative approach and management.

VI. Disability percentage & certification, physical fitness condition and certification.

4. APPLIED MATHEMATICS AND STATISTICS

1. Frequency distribution, normal distribution curve, histogram.
2. Measures of central value-mean, median, mode.
3. Measures of variability – Range, semi-inter-quartile range (S.I.Q.R.). Standard deviation, variance, coefficient of variation.
4. Finding percentile norms, percentile rank by interpolation in cumulative distributions.
5. Correlation – Product-movement coefficient of correlation, rank – difference correlation.
6. Reliability and significance – Standard error of a mean and its interpretation, reliability of a difference between means.
7. Testing hypotheses – 'T' and 'F' tests.
8. Computation of Chi Square from a contingency table and its interpretation.

5. PSYCHIATRY

I. **a)Mental Health:**

i. Normal Mental Health.
ii. Criteria of normality of matured personality.
iii. Factors contributing to normal mental health.
iv. Self-actualizing individual.

(b) Study of Abnormal Personality:

Neurotics, Hysterical, Psychotic, Paranoid, Schizoid, Psychopathic etc.

II. General Etiological Factors:

Hereditary, Genetic, constitutional, acquired traumatic, inductive, toxic, degenerative, social and environmental including pathogenic family pattern, precipitating causes, frustration and conflicts.

III. Symptomatology and treatment of:

(a) Psychosis:

(i) Functional:

Functional Schizophrenic, Reaction group, simple paranoid, catatonic, hebephrenic, paranoid, state, paranoia, juvenile schizophrenia, autistic thinking Dementia.

(ii) Organic-Toxic confused states, Senile Psychosis, Arteriosclerotic, Degenerative, G.P. I.

(b) Affective Disorders:

Dynamics of Mania, Hypomania, Chronic Mania, M.D.P. Involutional Depression, Senile Depression, Post–Partum depressive reactions, Reactive and Neurotic Depression, Endogenous Depression, Suicide (Egoistic, Altruistic, Anomic).

(c) Epileptic Disorders:

Epileptic Psychosis.

IV. Neurosis:

Symptomatology, Diagnosis and treatment and Psychodynamics of Anxiety State, Hysteria, Conversion reaction, Dissociative reaction, dual personality, obsessional neurosis, Phobias, Hypochondriasis, Neurasthenia and Mental fatigue.

V. Mental Retardation:

(i) Definition.

(ii) Etiological factors: Pre-natal, Post-natal, inceptive, Hormonal, Congenital.

(iii) Types of mental retardation clinical types-Microcephaly.

(iv) Symptomatology of various grades of retardation, differential diagnosis and treatment.

VI. Child Psychiatry:

Behaviour disorders-Nail biting, Enuresis stealing, Truancy Thumb sucking, speech difficulties, pica, vomiting, anorexia, delinquency.

VII. Introduction to the dynamics of Psychological disorders:

Asthma, Skin, rashes, hypertension, bowel disorders.

Introduction to treatment in Psychiatry.

(a) E.C.T.

(b) Insulin coma therapy.

(c) Drug therapy – (Tranquilizers, Mood elevators, hypnotics and sedatives).

(d) Psychotherapy – Deep and superficial, individual and group, expressive, suppressive, environmental manipulation, reductive.

(e) Psychodrama.

(f) Psychoanalysis.

(g) Play-therapy.

(h) Occupational therapy and physiotherapy.

6. ORTHOTICS AND PROSTHETICS

SECTION-I
ORTHOTICS

Principle, fabrication, measurement, fitting, training and check out.

1. Orthotic component and system:
   Terminology, objectives, types of hand, Orthotics, U.E. (Upper Extremity) Shoulder, elbow, wrist).

2. Orthotic component and system Terminology, Description, fabrication and fitting and types-Hip, Knee, Ankles and foot.

3. Shoe and shoe modification.

4. Spinal Orthotics:
   COMPONENTS:
   (a) Pelvic band.
   (b) Thoracic band.
   (c) Anterior extension of Thoracic band with sub-clavicular extension.
   (d) Lumbo Sacral and thoracic uprights.
   (e) Lateral uprights.
   (f) Oblique lateral uprights.
   (g) Infra and Capsular band.
   (h) Full front abdominal support.
   TYPES:
   (i) Chair back (ii) Knight (iii) William (iv) Tayler (v) Knight Tayler (vi) Collars (vii) Flexible spinal corsets & belts (viii) Jewitt (Ash Brace) (ix) Cervical orthosis (x) Milwaukee's Principle & indication (xi) For treatment.

SECTION-II
PROSTHETICS

Principle; fabrication; measurement; fitting, training & check out.

1. Prosthetic component parts and system:
   (a) Terminal device, wrist unit and elbow unit, upper arm calf, sockets, cable components and harness, stump sock.
   (b) Pre-prosthetic training.
   (c) Prosthetic training: (i) Check out (ii) Control system & efficiency.
   (d) Prosthetic training programme.

2. (a) Foot amputation (b) Symes (c) Below Knee (d) Through Knee (e) Above Knee (f) Hind Quarter.

3. Prosthetic components for Below knee:

(a) Post ankles assembly (b) Conventional foot (c) Sach foot (d) Internal keel (e) Shank (f) Socket, P.T.B. Socket, air cushion socket, suspension, system, supracondylar calf, supracondylar walls on flare, supra patellar walls on socket (g) Biomechanics of below knee prosthesis.

4. Prosthetic components of through knee:
1. Conventional, 2. Suction Socket, 3. Quadrilateral socket, 4. Hip disarticulation.

5. Prosthesis for Hind-Quarter & very short above knee stumps, (a) Saucer socket (b) Tilting table (c) Canadian.

6. Prosthetic joint deviations in A.K. & B.K. Prosthesis.

7. Prosthetic, gait and gait analysis.

8. Self help devices, Rehabilitation aids.