

**DAYANANDA SAGAR UNIVERSITY**

Shavige Malleshwara Hills, Kumaraswamy Layout,

Bengaluru - 560078, Karnataka.

**SCHOOL OF HEALTH**

**SCIENCES COLLEGE OF**

**PHYSIOTHERAPY**



**SCHEME &  
SYLLABUS FOR  
BACHELOR OF PHYSIOTHERAPY (BPT) –  
2017 (ANNUAL SCHEME)  
(1<sup>st</sup> to 4<sup>th</sup> Year) (With Effect from 2017-18)**

**YEAR – II**

SL NO	COURSE CODE	COURSE TITLE	M / S	NO. OF TEACHIN G HOURS			SCHEME OF EVALUATION							TOTAL
				D	C L	P	THEORY				PRACTICAL			
							W	VV	C A	IA	P	CA	IA	
1	17PT201	PATHOLOGY ( SECTION A)	M	02	--	--	40	--	05	05	--	--	--	50
	17PT202	MICROBIOLOGY (SECTION B )	M	02	--	--	40	--	05	05	--	--	--	50
2	17PT203	PHARMACOLOGY	M	02	--	--	80	--	10	10	--	--	--	100
3	17PT204	EXERCISE THERAPY	M	04	--	--	100	30	10	10	--	--	--	150
4	17PT205	ELECTRO THERAPY	M	04	--	--	100	30	10	10	--	--	--	150
5	17PT271	EXERCISE THERAPY	M	--	--	06	--	--	--	--	40	05	05	50
6	17PT272	ELECTRO THERAPY	M	--	--	06	--	--	--	--	40	05	05	50
<b>GRAND TOTAL</b>				<b>14</b>	<b>--</b>	<b>12</b>	<b>360</b>	<b>60</b>	<b>40</b>	<b>40</b>	<b>80</b>	<b>10</b>	<b>10</b>	<b>600</b>
7	17PT291	PERSONALITY DEVELOPMENT & SOFT SKILLS & COMMUNICATION	S	02	--	--	40	--	10	--	--	--	--	50
8	17PT292	COMPUTER APPLICATION & ANIMATION	S	02	--	--	40	--	10	--	--	--	--	50
9	17PT293	PROFESSIONAL CONDUCT & ETHICS/CLINICAL OBSERVATION POSTING	S	02	--	--	40	--	10	--	--	--	--	50
10	17PT294	CONSTITUTION OF INDIA	S	01	--	--	40	--	10	--	--	--	--	50
11	17PT295	ENVIRONMENTAL SCIENCE	S	01	--	--	40	--	10	--	--	--	--	50
<b>GRAND TOTAL</b>				<b>08</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>TOTAL NUMBER OF HOURS/WEEK</b>				<b>34</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

**Note:** M- Main Course, S – Subsidiary Course , D – Didactic, CL – Clinical, P – Practical, W – Written,  
VV – Viva Voce, CA – Continuous Assessment, IA – Internal Assessment

**YEAR : II YEAR**  
**COURSE CODE : 17PT201**  
**TITLE OF THE COURSE :**  
**PATHOLOGY**

## **COURSE OBJECTIVES**

THE COURSE WILL ENABLE STUDENTS TO UNDERSTAND THE CONDITIONS IN MICROBIOLOGY AND PATHOLOGY AND ITS APPLICATION IN RELATION WITH PHYSIOTHERAPY. STUDENTS WILL LEARN THE PATHOLOGICAL CHANGES IN VARIOUS CONDITIONS, DISEASES AND DISORDERS, WHICH ARE COMMONLY TREATED BY PHYSIOTHERAPY.

## **COURSE OUTCOMES**

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES AND DEMONSTRATIONS IN ADDITION TO CLINICAL APPLICATIONS THE STUDENT WILL BE ABLE TO UNDERSTAND THE CAUSES, SIGNS, SYMPTOMS, INVESTIGATIONS, DIFFERENTIAL DIAGNOSIS, FINAL DIAGNOSIS, MANAGEMENT IN RELATION WITH PHYSIOTHERAPY.

### **UNIT I: 20 Hrs**

#### **General Pathology**

#### **1. Introduction to Pathology [1 Hour]**

#### **2. Cell injuries: [3 Hours]**

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, Mucoïd changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin. Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.

#### **3. Inflammation and Repair [4 Hours]**

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. Immunopathology [4 Hours]**

Immune system: General concepts.

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

AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

#### **5. Infectious diseases [4 Hours]**

Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.

Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Ricktsia, Chlamydial infection, HIV infection.

Fungal disease and opportunistic infections.

Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

#### **6. Circulatory Disturbances [4 Hours]**

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.

### **UNIT II: 20Hrs**

#### **1. Growth Disturbances and Neoplasia [4 Hours]**

Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.

Precancerous lesions.

Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma.

Malignant Neoplasia: Grades and Stages, Local & Distant spread.

Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.

Benign & Malignant epithelial tumoursEg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumoursEg:

Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

## **2. Nutritional Disorders [2 Hour]**

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

## **3. Genetic Disorders [1 Hour]**

Basic concepts of genetic disorders and some common examples and congenital malformation.

## **Systemic pathology**

### **4. Hematology [4 Hours]**

Constituents of blood and bone marrow, Regulation of hematopoiesis.

Anemia: Classification, clinical features & lab diagnosis.

Nutritional anemias: Iron deficiency anemia, Folic acid, Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations.

Hereditary hemolytic anaemias: Thalessemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies. Acquired hemolytic anaemias. Alloimmune, Autoimmune ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.

Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis.

Coagulopathies - (i) Inherited (ii) Acquired with lab diagnosis.

Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and disproteinemias.

Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

### **5. Respiratory System [3 Hours]**

Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases

### **6. Cardiovascular Pathology [3 Hours]**

Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.

Endocarditis.

Rheumatic Heart disease.

Vascular diseases: Atherosclerosis, Monckeberg's medial calcification, Aneurysm and Arteritis and tumours of Blood vessels.

Ischemic heart Disease: Myocardial infarction.

Hypertension and hypertensive heart Disease.

### **7. Alimentary tract [3 Hours]**

Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.

Stomach : Gastritis, Ulcer & Tumours.

Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.

Pancreatitis and pancreatic tumours :i) Exocrine, ii)

Endocrine Salivary gland tumours : Mixed, Warthin's

## **UNIT III: 20Hrs**

### **1. Hepato – biliary pathology [3 Hours]**

Jaundice: Types, aetio-pathogenesis and diagnosis.

Hepatitis: Acute, Chronic, neonatal.

Alcoholic liver disease

Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic.

Tumours of Liver

### **2. Lymphatic System [ 3 Hours]**

Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma.

Lymphadenitis - Non specific and granulomatous

Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours. Causes of Splenic Enlargements.

### **3. Musculoskeletal System [5 Hours]**

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.

#### **4. Endocrine pathology [ 4 Hours]**

Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis

Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.

Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

#### **5. Neuropathology [4 Hours]**

Inflammations and Infections : TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess

Tuberculosis, Cysticercosis

CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma

#### **6. Dermatopathology [1 Hour]**

Skin tumors : Squamos cell carcinoma, Basal cell carcinoma, Melanoma

#### **Recommended Textbooks**

1. Text book of pathology: Harshmohan
2. General systemic pathology: Churchill Livingstone
3. Text book of Pathology: Robbins

**YEAR : II YEAR**  
**COURSE CODE : 17PT202**  
**TITLE OF THE COURSE : MICROBIOLOGY**

### **COURSE OBJECTIVES**

THE COURSE WILL ENABLE STUDENTS TO UNDERSTAND THE CONDITIONS IN MICROBIOLOGY AND PATHOLOGY AND ITS APPLICATION IN RELATION WITH PHYSIOTHERAPY. STUDENTS WILL LEARN THE PATHOLOGICAL CHANGES IN VARIOUS CONDITIONS, DISEASES AND DISORDERS, WHICH ARE COMMONLY TREATED BY PHYSIOTHERAPY.

### **COURSE OUTCOMES**

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES AND DEMONSTRATIONS IN ADDITION TO CLINICAL THE STUDENT WILL BE ABLE TO UNDERSTAND THE CAUSES, FINDINGS, INVESTIGATIONS, MANAGEMENT IN RELATION WITH PHYSIOTHERAPY.

### **UNIT I:**

#### **1. General Microbiology [5 Hours]**

Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.

Normal flora of the human body.

Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.

Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated.

Physiology: Essentials of bacterial growth requirements.

Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.

Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

#### **2. Immunology [5 Hours]**

Basic principles of immunity immunobiology : lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.

Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity. Immunology of hypersensitivity, Measuring immune functions.



## UNIT II

### 3. Bacteriology [12 Hours]

To be considered under the following headings

Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports

Staphylococci,

Streptococci and Pneumococci,

Mycobacteria: Tuberculosis, M.leprae, atypical mycobacteria,

Enterobacteriaceae,

Vibrios : V. cholerae and other medically important vibrios, Campylobacters and

Helicobacters, Pseudomonas,

Bacillus anthracis,

Sporing and non-sporing anaerobes: Clostridia, Bacteroides and Fusobacteria,

### 4. General Virology [8Hours]

General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases.

Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents.

## UNIT III

### 5. Mycology [3 Hours]

General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycoses opportunistic infections including Mycotoxins, systemic mycoses. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents.

### 6. Clinical/Applied Microbiology [12 Hours]

Streptococcal infections: Rheumatic fever and Rheumatic heart disease, Meningitis.

Tuberculosis,

Pyrexia of unknown

origin, leprosy,

Sexually transmitted diseases,

Poliomyelitis,

Hepatitis,

Acute-respiratory infections,  
Central nervous System infections,  
Urinary tract infections,  
Pelvic inflammatory disease,  
Wound infection,  
Opportunistic infections,  
HIV infection,  
Malaria,  
Filariasis,  
Zoonotic diseases.

**Recommended Textbooks:**

1. Short text book of Medical Microbiology by Sathish Gupta
2. Text book of Microbiology by JayaramPanicker
3. Microbiology&Parasitology by Rajeshwar Reddy
4. Text book of Microbiology by Anantha Narayanan
5. Microbiology by Baveja
6. Text book of microbiology by Chakraborty

**YEAR : II YEAR**  
**COURSE CODE : 17PT203**  
**TITLE OF THE COURSE PHARMACOLOGY**

### **COURSE OBJECTIVES**

THIS COURSE COVERS THE BASIC KNOWLEDGE OF PHARMACOLOGY INCLUDING ADMINISTRATION, PHYSIOLOGIC RESPONSE AND ADVERSE EFFECTS OF DRUGS UNDER NORMAL AND PATHOLOGIC CONDITIONS. TOPICS FOCUS ON THE INFLUENCE OF DRUGS IN REHABILITATION PATIENT/CLIENT MANAGEMENT. DRUGS USED IN IONTOPHORESIS AND PHONOPORESIS WILL BE DISCUSSED IN DETAIL.

### **COURSE OUTCOMES**

THE EXPECTED OUTCOMES OF THE COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES AND DEMONSTRATIONS, THE STUDENT WILL BE ABLE TO UNDERSTAND THE EFFECTS AND THE ADVERSE EFFECTS OF VARIOUS DRUGS ON DIFFERENT SYSTEMS OF THE BODY. THIS WOULD HELP THE STUDENTS TO UNDERSTAND THE LIMITATIONS IMPOSED BY THE DRUGS ON ANY THERAPY.

### **UNIT I:**

#### **1. General Pharmacology [5 Hours]**

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

#### **2. Autonomic Nervous system [5 hours]**

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 [10 Hours]**

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

## **UNIT II:**

### **4. Neuropharmacology [8 Hours]**

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 [6 Hours]**

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

### **6. Geriatrics [ 6 Hours]**

Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly,  
Dementia, Postural hypotension

## **UNIT III:**

### **7. Inflammatory/Immune Diseases [14 Hours]**

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  
Erythematosis, Scleroderma, Demyelinating Disease  
Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of  
Obstructive airway Diseases, Allergic Rhinitis

#### **8. Digestion and Metabolism [6 Hours]**

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

#### **Recommended Textbooks**

1. Lippicott's Pharmacology.
2. Essential of Medical Phramacology by Tripathi
3. Text book of Medical Pharmacology by Padmajaudaykumar
4. Pharmacology by N.Muruges h
5. Pharmacolgy&Pharmacotherapeutics by Sadoskar.

**YEAR : II YEAR**  
**COURSE CODE : 17PT204**  
**TITLE OF THE COURSE : EXERCISE THERAPY**

## **COURSE OBJECTIVES**

IN THIS COURSE THE STUDENT WILL LEARN THE PRINCIPLES, TECHNIQUES AND EFFECTS OF EXERCISE AS A THERAPEUTIC MODALITY IN THE RESTORATION OF PHYSICAL FUNCTION.

## **COURSE OUTCOMES**

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES AND DEMONSTRATIONS IN ADDITION TO PRACTICAL AND CLINIC THE STUDENT WILL BE ABLE TO LIST THE INDICATIONS AND CONTRAINDICATIONS OF VARIOUS TYPES OF EXERCISE, DEMONSTRATE THE DIFFERENT TECHNIQUE, AND DESCRIBE THE EFFECTS.

### **UNIT I:**

#### **1. Introduction to Exercise Therapy [3 Hours]**

The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment

#### **2. Methods of Testing [15 Hours]**

- a) Functional tests
- b) Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses., Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints- **revision**
- c) Tests for neuromuscular efficiency

Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations,

Techniques of MMT for group & individual muscles : Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine

Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf Static power Test

Dynamic power Test

Endurance test

Speed test

Measurement of Limb Length: true limb length, apparent limb length, segmental limb length. Measurement of the angle of Pelvic Inclination.

d) Tests for Co-ordination

### **3. Relaxation [4 Hours]**

Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.

### **4. Passive Movements [ 4 Hours]**

Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses , Techniques of giving passive movements.

### **5. Active Movements [ 6 hours]**

Definition of strength, power & work, endurance, muscle actions.

Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction &relaxation, muscle fiber type, motor unit, force gradation.

Causes of decreased muscle performance

Physiologic adaptation to training: Strength & Power, Endurance.

Types of active movements

Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses

Active Assisted Exercise: principles, techniques, indications, contraindications, effects and uses

Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses

Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

### **6. Specific exercise regimens**

Isotonic: de Lormes, Oxford, MacQueen, Circiut weight training

Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle  
Isometrics Isokinetic regimens

## **UNIT II:**

### **7. Physiology of muscle performance: [2 hours]**

Structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fibre type, motor unit, force gradation. Causes of decreased muscle performance Physiologic adaptation to training: Strength & Power, Endurance.

### **8. Proprioceptive Neuromuscular Facilitation [6 Hours]**

Definitions & goals

Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb Procedure: components of PNF

Techniques of facilitation

Mobility: Contract relax, Hold relax, Rhythmic initiation

Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization

Stability: Alternating isometric, rhythmic stabilization

Skill: timing for emphasis, resisted progression

Endurance: slow reversals, agonist reversal

### **9. Suspension Therapy [6 Hours]**

Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy

Types of suspension therapy: axial, vertical, pendular

Techniques of suspension therapy for upper limb

Techniques of suspension therapy for lower limb

### **10. Functional Re-education [4 hours]**

Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lowerlimb and Upperlimb activities.

### **11. Aerobic Exercise [4 Hours]**

Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic



exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.

## **12. Stretching [3 Hours]**

Definition of terms related to stretching; Tissue response towards immobilization and elongation,

Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.

## **13. Manual Therapy & Peripheral Joint Mobilization [5 Hours]**

Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan

Biomechanical basis for mobilization, Effects of joint mobilisation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

## **UNIT III:**

### **14. Balance [ 4 Hours]**

Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output

Components of balance (sensory, musculoskeletal, biomechanical)

Causes of impaired balance, Examination & evaluation of impaired balance,

Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining

### **15. Co-ordination Exercise [ 4 Hours]**

Anatomy & Physiology of cerebellum with its pathways

Definitions: Co-ordination, Inco-ordination

Causes for Inco-ordination, Test for co-ordination: equilibrium test, non equilibrium test

Principles of co-ordination exercise

Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

**16. Posture [3 Hours]**

Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

**15. Walking Aids [3 hours]**

Walking aids Revision. Application : Pre crutch Training and crutch gaits.

**16. Massage [ 4 Hours]**

History and Classification of Massage

Technique Principles, Indications and

Contraindications Technique of Massage

Manipulations

Physiological and Therapeutic Uses of Specific Manipulations

**17. Hydrotherapy [ 3 Hours]**

Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipments, techniques, Effects and uses, merits and demerits

**18. Individual and Group Exercises [ 3 Hours]**

Advantages and Disadvantages, Organisation of Group exercises, Recreational Activities and Sports

**19. Introduction to Yoga [ 5 Hours]**

Asanas – Principles and elements;

Pranayamas – Principles, Methods and Techniques

**Recommended Textbooks**

1. Therapeutic exercise by Barbara Bandy
2. Therapeutic exercise by Carolyn Kisner
3. Principles of exercise therapy by M.Dena Gardiner
4. Practical Exercise therapy by Hollis Margaret
5. Therapeutic exercise by Sydney Litch
6. Therapeutic exercise by Hall & Brody
7. Therapeutic exercise by Basmajian
8. Physical Rehabilitation by o'Sullivan.
9. Therapeutic massage by Sinha
10. Principles of muscle testing by Hislop.

**YEAR : II YEAR**  
**COURSE CODE : 17PT205**  
**TITLE OF THE COURSE : ELECTROTHERAPY**

### **COURSE OBJECTIVES**

IN THIS COURSE THE STUDENT WILL LEARN THE PRINCIPLES, TECHNIQUE AND EFFECTS OF ELECTROTHERAPY AS A THERAPEUTIC MODALITY IN THE RESTORATION OF PHYSICAL FUNCTION

### **COURSE OUTCOMES**

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES, DEMONSTRATIONS, PRACTICALS AND CLINICS THE STUDENT WILL BE ABLE TO LIST THE INDICATIONS AND CONTRAINDICATIONS OF VARIOUS TYPES OF ELECTROTHERAPY DEMONSTRATE THE DIFFERENT TECHNIQUE AND DESCRIBE THEIR EFFECTS.

#### **UNIT I:**

**Section I - Introductory Physics. [This unit will have questions for short essay and short answer only]**

- 1. Electricity definition, types [1 Hour]**
- 2. Static electricity [2 Hour]**
  - a. Production of electrical charges.
  - b. Characteristics of charged body.
  - c. Characteristics of lines of forces.
  - d. Potential difference and EMG.
- 3. Current Electricity [5 Hour]**
  - a. Units of Electricity, faraday, volt, ampere, coulomb, watt.
  - b. Resistance in series and parallel.
  - c. Ohms law and its application to DC/AC.
  - d. Fuse.
  - e. Shock: Micro/ Macro shocks, safety precaution and management, earthing techniques & precautions.
  - f. Burns: electrical & chemical burns, prevention and management.
  - g. Condensators: definition, principles, types, construction, working and uses.
- 4. Magnetism: Definition, properties, electro-magnetic induction, electro- magnetic spectrum. [1 Hour]**

5. Valves, transformers, types, principles, construction and working. [1 Hour]
6. Ionization: Principles, effects of various technique of medical ionization. [1 Hour]

## **Section II – Therapeutic Electricity**

### **Section II A - Low frequency Currents**

1. **Basic types of current [1 Hour]**
  - a. Direct Current: types, physiological & therapeutic effects.
  - b. Alternating Current
2. **Types of Current used in Therapeutics [1 Hour]**

Modified D.C, Faradic Current, Galvanic Current, Modified A.C, Sinusoidal Current and Diadynamic Current.
3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers. [2 Hours]
4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles. [2 Hours]
5. Sinusoidal Current & Diadynamic Current in Brief. [1 Hour]
6. HVPGS – Parameters & its uses [1 Hour]
7. Ionization / Iontophoresis : Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing. [1 Hour]
8. Cathodal / Anodal galvanism. [1 Hour]
9. Micro Current & Macro Current [1 Hour]
10. Types of Electrical Stimulators [1 Hour]

NMES- Construction component.

Neuro muscular diagnostic stimulator- construction component

Components and working Principles.

11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance. [2 Hours]
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair. [2 Hours]
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications. [3 Hrs ]
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

## UNIT II

### Section II B - Electro-diagnosis

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie&Rheobase. [2 Hours]
3. Nerve conduction velocity studies[1 Hour]
4. EMG: Construction of EMG equipment.[1 Hour]
5. Bio-feed back.[1 Hour]

### Section II C - Medium Frequency

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications. [2 Hour]

2. Russian Current
3. Rebox type Current [**1 Hour**]

### **Section III - Thermo&Actinotherapy (High Frequency Currents)**

1. Electro Magnetic Spectrum. [**1 Hour**]
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 [**8 Hours**]
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME. [**1 Hour**]
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD. [**2 Hours**]
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal 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. [**8 Hours**]
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication. [**2 Hours**]

### **UNIT III:**

7. 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 [**8 Hours**]

8. 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 Hours]**

#### **Section IV – Superficial heating Modalities**

1. 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. **[2 Hours]**
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications. **[1 Hour]**
3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications. **[1 Hour]**
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications. **[1 Hour]**
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications. **[1 Hour]**
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications. **[1 Hour]**
7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication. **[1 Hour]**
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages. **[4 Hours]**

#### **Recommended Textbooks**

1. Claytons Electrotherapy by Forster & Plastangs
2. Electrotherapy Explained by Low & Reed
3. Clinical Electrotherapy by Nelson
4. Electrotherapy Evidence based practice by Sheila Kitchen
5. Physical agents by Michile Cameroon
6. Principles of Electrotherapy by Michile Camreeon
7. Thermal agents by Susan Michlovitz.

**YEAR : II YEAR**  
**COURSE CODE : 17PT271**  
**TITLE OF THE COURSE : EXERCISE THERAPY PRACTICALS**

### **PRACTICALS**

The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to-

1. Demonstrate the technique of measuring using goniometry
2. Demonstrate muscle strength using the principles and technique of MMT
3. Demonstrate the techniques for muscle strengthening based on MMT grading
4. Demonstrate the PNF techniques
5. Demonstrate exercises for training co-ordination – Frenkel’s exercise
6. Demonstrate the techniques of massage manipulations
7. Demonstrate techniques for functional re-education
8. Assess and train for using walking aids
9. Demonstrate mobilization of individual joint regions
10. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
11. Demonstrate the techniques for muscle stretching
12. Assess and evaluate posture and gait
13. Demonstrate to apply the technique of passive movements
14. Demonstrate various techniques of Active movements
15. Demonstrate techniques of strengthening muscles using resisted exercises
16. Demonstrate techniques for measuring limb length and body circumference.



**YEAR : II YEAR**  
**COURSE CODE : 17PT272**  
**TITLE OF THE COURSE : ELECTROTHERAPY PRACTICALS**

## **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. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
3. Demonstrate placement of electrodes for various electrotherapy modalities
4. Electrical stimulation for the muscles supplied by the peripheral nerves
5. Faradism under Pressure for UL and LL
6. Plotting of SD curve with chronaxie and rheobase
7. Demonstrate FG test
8. Application of Ultrasound for different regions-various methods of application
9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
11. Demonstrate treatment method using IFT for various regions
12. Calculation of dosage and technique of application of LASER
13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
14. Demonstrate the treatment method using whirl pool bath
15. Winding up procedure after any electrotherapy treatment method

## **Recommended Textbooks**

1. Claytons Electrotherapy by Forster &Plastangs
2. Electrotherapy Explained by Low & Reed
3. Clinical Electrotherapy by Nelson
4. Electrotherapy Evidence based practice by Sheila Kitchen
5. Physical agents by Michile Cameroon
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