Government Physiotherapy College, Raipur, C.G.

SYLLABUS

Bachelor of Physiotherapy

Second Year

PATHOLOGY & MICROBIOLOGY

SECTION A - PATHOLOGY — HRS – 45

1. Introduction to pathology, & concepts of diseases. 1 hr

GENERAL PATHOLOGY

2. Cell Injury – causes, reversible injury. 1 hr

3. Irreversible cell injury – Necrosis, Gangrene. 1 hr

4. Intra cellular accumulations, fatty changes, calcification, amyloidosis.

5. Inflammation – Acute inflammation. 1 hr

6. Chronic Inflammation – Non specific and granulomatous. 1 hr

7. Healing and repair. 1 hr

8. Circulatory disturbances 3 hr

Oedema, chronic venous congestion, thrombosis, embolism, infarction, shock.

9. Deficiency disorders 1 hr

Vitamin- A, B, C, D, Protein energy malnutrition

10. Tuberculosis, Leprosy 2 hrs

11. Growth disturbance – Atrophy, Hypertrophy, hyperplasia 2 hrs

12. Tumours 2 hrs

Classification, difference between benign and malignant tumours, carcinogenesis, precancerous lesions, spread of tumours, methods of diagnosis.

13. Haematology 4 hrs

Anaemia- iron deficiency, megaloblastic , haemolytic anaemia

14. Auto immune disorders, Hypersensitivity. 1 hr

SYSTEMIC PATHOLOGY (IN BRIEF)

15. CVS 3 hrs

Atherosclerosis, Hypertension, Cardiac failure, Rheumatic Heart disease, Congenital Heart Disease.

16. Respiratory - Pneumonia, COPD, Tuberculosis, Pneumoconiosis. 4 hrs

17. GIT - Gastritis, Peptic Ulcer, Ulcerative lesions of intestine, 2 hrs

18. Liver - Hepatitis, Cirrhosis & types and its classification. 2 hrs

19. Endocrine – Diabetes, Thyroid 2 hrs

20. Urinary - UIT, Urinary calculi, Nephrotic syndrome, Nephritic syndrome, pyelonephritis 2 hrs

20. IN DETAIL ABOUT

CNS – Meningitis, encephalitis, CNS Tumour 2 hrs.

Muscle – Myopathies, Myasthenia gravis. 1 hr

Bones & Joints – 6 hr

Fracture healing, Osteomyelitis, Osteoporosis, Bone Tumours, Arthritis – Rheumatoid & Suppurative, Gout, Tenosynovitis.

RECOMMENDED BOOKS

1] Text book of Pathology-By Harsh Mohan

2] Pathologic basis of disease - By Cotran, Kumar,Robbins

3] General Pathology –By Bhende

SECTION B - MICROBIOLOGY 25 HRS

1. GENERAL MICROBIOLOGY 7 hours

- Introduction and general Historical background.
- Morphology of Bacteria.
- Growth requirements and culture of bacteria- culture media and methods
- Sterilization and disinfections.

2. IMMUNOLOGY 4 hours

- Antigen and antibodies
- Antigen antibody reactions with their practical applications.
- Immunity – acquired and innate.
- Autoimmune diseases.
- Hypersensitivity and allergy.

3. SYSTEMIC MICROBIOLOGY-

BACTERIOLOGY **8 hours**

- Gram Positive cocci – Staphylococci, Streptococci, Pneumococci
- Gram Negative cocci – Meningococci, Gonococci.
- Gram Positive bacilli – M. tuberculosis, M.leprae, Clostridium.
- Gram Negative bacilli – Salmonella, E.coli, V.cholarae, Pseudomonas.
- Spirochetes – Syphilis and sexually transmitted diseases.

VIROLOGY **4 hours**

- General Properties of viruses
- Polio, Hepatitis, Rubella, Rabies.
- HIV / AIDS

PARASITOLOGY **3 hours**

- Filaria
- Malaria
- Amoebasis

MYCOLOGY **2 hours**

- Pathogenic fungi
- Actinomycosis
- Maduramycosis
- Candidiasis

4. APPLIED MICROBIOLOGY 2 hours

- As relevant to diseases of bones joints, muscles, skin and C.N.S.
- Wound infections and Burn infections.

- Hospital acquired Infections.

DEMONSTRATION **4 hours**

- Collection of clinical specimen.
- Morphology and staining of Bacteria – Gram's and Ziehl – Nelson Staining.
- Sterilization and Disinfection.
- Serological tests of syphilis V. D. R. L., R. A. factor, A. S. O. Titre, C. R. P.

BOOKS RECOMMENDED

1. Text Book of Microbiology by R. Ananthnarayan and C. K. Jayram Panikar.
2. Essentials of Medical Microbiology by Bhatia and Lal – Jaypee Brothers.
3. Text Books of Microbiology by Prof. C. P. Baveja.

COMMUNITY MEDICINE

COURSE OBJECTIVES

The objective of this course is that after 60hrs. of lectures, & 20Hrs of demonstrations, practical and clinic, the student will be able to demonstrate and have understanding of the influence of social and environmental factors on the health of the individual and society.

SECTION A

1. Outline of the natural history of diseases and the influence of social, economic and cultural aspects of health and diseases. **3Hrs**

2. Outline of the various measures of prevention and methods of intervention – especially for diseases with disability**.** **4Hrs**

3. Overview Of Public Health Administration At Central & State Levels – Strategies of Health Delivery System for "The Health for All" National health programme [brief role of WHO], outline about polio, leprosy and family health programme. **6Hrs**

4. Socio-Economical & Cultural Issues related to morbidity owing to the physical Disability & Handicaps of Structural / Neuro-motor & Psycho-somatic origin-

A) Health problems of vulnerable groups

i] Pregnant & lactating women, Pelvic floor Dysfunction, Urinary incontinence,

ii] Pre-term babies with high risk, Infants & Pre-School Children-Brain Damage, during birth injury, Congenital & Acquired structural Deformities, Spinal Dysraphysm, T.B. Meningitis, Polio, Cerebral palsy, Other Hereditary Neuro-motor Conditions, such as Myopathies & Muscular Dystrophies, Malnutrition – Rickets,

iii] Auto-immune & Hereditary diseases- Rheumatoid arthritis, S.L.E. Sero-ve arthritis, Ankylosing Spondylitis, Multiple Sclerosis, Spinal Muscular Atrophies & Myopathies, Dystrophies in adults.

iv] Geriatric-Osteoporosis, Malnutrition, Alzheimer's disease, Parkinsons, Ataxia, CHD, Hypertension.

v] Addiction – Alcoholic – Neuro-motor & Psychosomatic disorders, Smoking – asthma, COPD. **12Hrs**

B) Definition of occupational health and list methods of prevention of occupational diseases and hazards **6Hrs**

5. FAMILY PLANNING – objectives of National Family Planning Programmes & Family Methods, General Idea of Advantage & Disadvantage of the Methods. **3Hrs**

SECTION B

6. MENTAL HEALTH – Socio-economical & cultural aspect, role of Physiotherapist in mental health problems i.e mental retardation**.** **2Hrs**

7. EPIDEMIOLOGY OF DISEASES -

- Communicable diseases - with reference to reservoir, mode of transmission, route of entry and levels of prevention- Malaria, Filaria, TB, Leprosy, Polio, Viral Encephalitis, Universal Immunization programme, Diarrhoea, ARI, Polio control programme. **12Hrs**
- Non communicable diseases - Accidents, Blindness, Rheumatic heart disease, cancer, Ischaemic heart disease and cerebro vascular accidents **6Hrs**

8. IMMUNIZATION PROGRAMMES– children & hospital staff. **2Hrs**

9. PRINCIPLE OF HEALTH EDUCATION -Methods of communication and role of health education in rehabilitation services. **2Hrs**

10. DISASTER MANAGEMENT – Brief overview of natural and man made disasters, disaster impact and response, relief phase, disease control, nutrition, rehabilitation. **2Hrs**

TEXT BOOK RECOMMENDED

1] K. Park – Park's Textbook of Preventive & Social Medicine

2] P.K. Mahajan & M.C. Gupta – Textbook of Preventive & Social Medicine

PHARMACOLOGY

COURSE OBJECTIVES **60 Hrs**

- Basic knowledge of Pharmacology is required for all those who deal with the patients.
- Physiotherapist too comes in the contact with patients who are referred to physiotherapy department from different facility of medical science.
- Though the Physiotherapist do not have to prescribe this drug but they must have the knowledge about this drug given to the patience can create a problem at the time of physiotherapy like anti diabetic drug can produce hypoglycemia in patient due to exercise, similarly Antihypertensive drug can produce postural hypotension.
- Therefore it becomes necessary for this student of physiotherapy must have this knowledge about this advice drug vacation a can be practice at this time of physiotherapy and should have knowledge to give fist aid and to primary management of condition.

While teaching Pharmacology to the physiotherapy students a teacher must have in mind

- Physiotherapist does not prescribe this drug.
- They should not be taught in detail like, mechanism of action, dosage, chemistry source of drug.
- More emphasis should be about the adverse situation created by drug at the time of physiotherapy.
- The physiotherapist should be able to handle this situation arising due to the drug and first aid.

SECTION A

1. **GENERAL PHARMACOLOGY** (Brief description only)
    - Introduction & general concepts
    - Pharmaco-kinetics (routes of administration, metabolism & elimination)
    - Pharmaco-dynamics - Factor modifying the drug action or effect (mechanism of drug action, therapeutic & side effects, toxicity)

2**. AUTONOMIC NERVOUS SYSTEM**
    - Brief outline of Sympathetic-parasympathetic nervous system
    - Therapeutic agents-uses, effects and interaction with physical therapy i.e Drug alters this autonomic function and physiotherapy can also alter. Myasthenia – gravis, Parkinsonism, skeletal muscle spasm, spasticity, skeletal muscle relaxants.

3. **CARDIO VASCULAR SYSTEM**
    - Antihypertensive drug especially which cause's postural hypotension.
    - Drug used in Angina, CCF.
    - DIURETICS - Dehydration electrolyte imbalance

- SHOCK- Types of shock and primary treatment
- Antiarrythmic- Name of drugs and side effect

4. GASTRO INESTINAL TRACT

- Drug used in peptic ulcer.
- Drug used in constipation.
- Drug used in diarrhea: O.R.S.

SECTION B

5. INFLAMMATORY/IMMUNE DISEASES

- Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactins 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/Inflmmatory Diseases: Myasthena gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythmatosus, Scleroderma, Demyelinating Disease

6. RESPIRATORY SYSTEM

- Asthma – drugs producing asthma and management.
- Respiratory tract infection

Any defect in respiratory system may affect the physiotherapy given to patient .

7. CENTRAL NERVOUS SYSTEM

- Anesthetic agents- uses, side effects and interaction with physical therapy
- Sedatives and hypnotics - uses, side effects and interaction with physical therapy
- Anti epileptic drugs- uses, side effects and interaction with physical therapy
- Analgesics - uses, side effects and interaction with physical therapy
- Anti inflammatory drugs- uses, side effects and interaction with physical therapy
- Psychotherapeutic agents- uses, side effects and interaction with physical therapy
- Alcoholism and drug dependence and interaction with physical therapy
- Therapeutic agents used for movement disorders- uses, side effects and interaction
- With physical therapy

8. HORMONES

- Anti diabetic drug- hypoglycaemia and management.
- Corticosteroid – osteoporosis, hypertension, Peptic ulcer, Anabolic steroid.
- Female sex hormone

- Male sex hormone

9. Miscellaneous

- Antiemetics – Emetis
- Anti histamines.
- Antibiotic – Tubercular, leprosy, malaria.
- Anticancer – Side effect of Anti cancer drugs.
- Counter irritants – ointment, liniment gel, Lotion
- Antifungal drug-
- Doping- drug banned in sports and the drugs which decrease the performance in sport
- Vitamin – D, Calcium, Phosphorus, Magnesium.

TEXTBOOKS RECOMMENDED

1. Lippincott's Pharmacology.
2. Essential of Medical Phramacology by Tripathi
3. Text book of Medical Pharmacology by Padmaja udaykumar
4. Pharmacology by N.Murugesh
5. Pharmacolgy & Pharmacotherapeutics by Sadoskar.

GENERAL MEDICINE & PEDIATRICS

COURSE DESCRIPTION

This course covers relevant aspects of General Medicine, Pediatrics, and Radiology.

COURSE OBJECTIVES

The objective of this course is that after 65 hours of lectures & 100 hours of demonstrations, in addition to clinics the student will be able demonstrate a general understanding of the diseases that therapists would encounter in their practice. They should have a 'brief idea of the aetiology and pathology, what the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the diseases on any therapy that may be prescribed.

A particular effort has been made to avoid over burdening the student with clinical sings and diagnostic maneuvers except in certain specific diseases such as rheumatoid arthritis.

Broad outline of goals of pharmacological and surgical therapy should be imparted in those diseases in which physical therapy will be an important component of over all treatment.

SECTION A- MEDICINE **30 Hrs**

A. INFECTIONS **5Hrs**

Introduction: Brief outline of subject of medicine, a medical patient, common signs & symptoms of disease

Bacteria – Tetanus,

Viral - Herpes simplex, Zoster, Varicella, Measles, Hepatitis B, AIDS,

Protozoal - Filaria.

B. HAEMATOLOGY **6Hrs**

Diseases of the blood: Examinations of blood disorders – Clinical manifestations of blood disease; Anemia iron deficiency, Vitamin B_{12}, Folic acid, Sickle cell – signs and symptoms – types and management; Hemophilia – cause, clinical features, severity of disease, management, complications due to repeated hemorrhages – complications due to therapy.

C. DISEASES OF GASTROINTESTINAL TRACT **5Hrs**

- Brief description of manifestations of alimentary tract disease & general principle of diagnosis & outline of management of following diseases: pharyngitis, vomiting, dysentery, diarrhea, Peptic ulcer disease
- Brief description of liver diseases along with outline of management: Hepatitis & Jaundice, Cirrhosis of liver

D. DISEASES OF CONNECTIVE TISSUE **3Hrs**

- Brief introduction to concept of autoimmune disease.

- Define; Systemic lupus erythematous, Polymyositis, Dermatomyositis, polyartheritis Nodosa, Sclerodema.

F. RENAL DISEASES **2Hrs**

- Define and briefly outline acute and chronic renal failure.
- Urinary tract infection. Pathogenesis. Outline common clinical conditions complicated by UTI.

G. METABOLIC DISEASES **4Hrs**

- Common presenting features of endocrine diseases - common classical disease presentation, clinical features and its management.
- Diabetes-define and outline aetiology. List types of diabetes & complications and briefly outline use of insulin, diet and oral hypoglycemic agents in management of diabetes.
- Obesity - Define and outline management.

F. SKIN **2Hrs**

Characteristics of normal skin, abnormal changes, types of skin lesions & Psoriasis.

H. GERIATRICS **3Hrs**

1. List diseases commonly encountered in the elderly population and their role in causing disability; osteoporosis, falls and immobility

RECOMMENDED BOOKS

1. Davidson's Principles and Practice of Medicine
2. Harrison's Internal Medicine
3. Braunwald Text of Cardiology
4. Text Book of Cardiology by Hurst

SECTION B - PAEDIATRICS 40 Hrs

1. Describe growth and development of a child from birth to 12 years: including physical, social, adaptive development and target milestones. **(2Hrs)**

2. Outline the maternal and neonatal factors contributing to high risk pregnancy; the neonate: inherited diseases; maternal infections-viral and bacterial; maternal diseases incidental to pregnancy, such as gestational diabetes, pregnancy induced hypertension; chronic maternal diseases such as heart diseases, renal failure, tuberculosis, diabetes, epilepsy; bleeding in the mother at any trimester. **(5Hrs)**

3. Briefly describe community programmes: International (WHO), national and local, for prevention of poliomyelitis, blindness, mental retardation and hypothyroidism. Outline the immunization schedule for children. **(3Hrs)**

4. Cerebral Palsy: Define and briefly outline etiology-Pre-natal, Perinatal and Postnatal causes; briefly mention pathogenesis, types of cerebral palsy (Classification), findings on examination; General examination, examination of C.N.S, Musculoskeletal system, Respiratory system, G.I.T. & Nutritional status.

Briefly outline associated defects: Mental retardation, Microcephaly, Blindness, Hearing and Speech impairment, Squint and Convulsions.

Outline prevention, appropriate management of high risk pregnancies, prevention of neonatal and postnatal infection & metabolic problems. **(6Hrs)**

5. Muscular dystrophy: Outline various forms, modes of inheritance and clinical manifestation; physical findings in disabilities, progression of various forms and prognosis. Describe treatment goals in forms that are and are not fatal. **(4Hrs)**

6. Spina bifida, meningomyelocele Outline development, clinical features of lower limbs, bladder and bowel control; complications-U.T.I. & Hydrocephalus; medical treatment and surgical treatment. **(2Hrs)**

7. Still's disease: classification, pathology in brief, physical findings, course & prognosis. Outline treatment, prevention & correction of deformity. **(2Hrs)**

8. Acute C. N. S. infections: Classify (Bacterial and viral) and outline the acute illness, CNS sequel leading to mental retardation, blindness, deafness, speech defect, motor paralysis, bladder and bowel problems seizure disorder and special problems such as subdural effusion, hydrocephalus, pressure sores, feeding difficulties, acute flaccid paralysis and polio. **(5Hrs)**

9. Normal diet of newborn and child: List dietary calorie fat, protein, mineral and vitamin requirement, their functions and outline their deficiency in a normal child and in a child with malnutrition. Classify and outline etiology findings and treatment of Rickets: Vitamin D deficiency, resistant rickets. **(3Hrs)**

10. Lung infections: Outline the clinical findings, complications and medical treatment of bronchiectasis, lung abscess and bronchial asthma, pulmonary T.B. **(4Hrs)**

11. **Common infectious diseases in children**: Brief description of following infectious diseases along with outline of management- Tetanus, measles. **(4Hrs)**

CLINICAL

1] Normal reflexes of a neonate/abnormal reflexes in brain damage

2] Examination of the nervous system

3] Examination of respiratory system

RECOMMENDED TEXT BOOKS-

1] Essentials of Paediatrics- by O. P. Ghai-Inter Print publications

2] D.K. series in Paediatrics

EXERCISE THERAPY

Course description

This course involves a detailed study of physiological effects, application techniques, effects, indications, and contra-indications, precautions for exercises used in Physiotherapy.

Course Objectives

After 170hrs of lectures demonstrations & 80hrs of practical trianing student should be able to explain the rationale for the prescription of safe and effective exercises.

SECTION A

1. **Mechanics** **(8hrs)**

Define the following terms and describe the principles involved with suitable examples.

a) Force: Composition of force, Parallelogram of forces. Equilibrium: Stable, unstable, neutral. Forces applied to the body

b) Gravity: Centre of gravity, Line of gravity.

c) Levers: 1st order, 2nd order, 3rd order, their examples in the human body and their practical applications in physiotherapy.

d) Pulleys: Fixed, Movable.

e) Springs: Series and Parallel, Tension, Elasticity: Hooke's law.

f) Axis: Sagittal, Frontal/Transverse &Vertical. Planes: Sagittal, Frontal & Horizontal.

g) Definition of: Speed, velocity.

h) Work, Energy, power, Acceleration, Momentum, Friction and Inertia.

2. **Muscle Action** **(4hrs)**

Muscle work: Isotonic (concentric, eccentric), Isometric (static). Group action: Agonists (prime movers), Antagonists, synergists, Fixators. Angle of muscle pull, Mechanical efficiency of the muscles.

3. Pelvic Tilt **(3hrs)**

Normal pelvic tilts, alterations from normal, anterior tilt (forward) posterior tilt (backward), Lateral tilt. Muscles responsible for alterations and pelvic rotation. Identification of normal pelvic tilt, pelvic rotation and altered tilts and their corrective measures.

4. Starting Positions **(5hrs)**

Positions, their muscle work, effects and uses. Specify the importance and derived positions for each one: standing, kneeling, sitting, lying, and hanging.

5. Movements **(5hrs)**

a) Anatomic movements: Flexion, Extension, Abduction, Inversion, Eversion, Supination, Pronation, Internal rotations, External rotations, Gross flexion, Gross extension, Trunk side flexion.

b) Surface Anatomy of the individual joints.

c) Rhythm of movement. Timing of movement. Duration of movement.

d) Classification of Movement: Active, passive, Effects of exercise: Physiological effects, Therapeutic effects. Indications and contra - indications of the following and demonstrate technique for each: Active movements: Voluntary (free, active assisted, assisted resisted, resisted, Involuntary (associated reflex, peristaltic, visceral, cardiac). Passive movements: Relaxed passive, mobilizing passive (forced P.M. manipulations, serial manipulations). Passive stretching.

6. **Passive Movements** **(8hrs)**

Passive stretching of following muscles/ muscle groups and describe the indications, contra - indications, physiological effects, advantages and disadvantages of each. Upper limb: pectoralis major, biceps brachi, triceps brachi, and long flexors of the fingers.

Lower limb: rectus femoris, iliotibial band (tensor fascia lata), gastro - soleus, hamstrings, hip abductors, iliopsoas. Neck: Sternocleidomastoid.

7. Active Movements **(8hrs)**

Types, techniques, indication and contraindications, physiological effects, advantages and disadvantages and demonstrate three progressive resisted exercises in progression for the following muscle groups: Shoulder abductors, shoulder forward flexors, Triceps Brachi, Hip abductors, Hip flexors, Quadriceps femoris, Abdominal Muscles, Back extensors. Home programme for strengthening neck muscles and back extensors

8. Progressive Resisted Exercises **(8hrs)**

Advantages and disadvantages and demonstrate the techniques of the following types of PRE's: Fractional system, Mac queens set system, Mac Queen's power system. Delorme's boot, Dumbbells, Sand bags in pulleys, powder board and suspension therapy.

9. Muscle Grading **(10hrs)**

a) Principles and applications techniques of manual muscle testing

b) Testing position, procedure and grading of muscles of the upper limb, lower limb and trunk etc.

10. Re- Education of Muscles **(5hrs)**

a) Re-Education of Muscles: Techniques, Spatial Summation, Temporal Summation.

b) Re-Education Techniques and Facilitating Methods on Various Groups of Muscles. Progressive Exercises In Strengthening Using Various Applications: (According To Their Muscle Power) Grade 1- Grade IV.

11. Joint Mobility **(8hrs)**

Joint ranges (outer range, middle range, inner range). Individual joint structures, joint movements (anatomic, accessory). Causes of joint range limitations, prevention of joint stiffness. Positioning (physiological resting position) of joints and teaching home programme.

12. Goniometry **(8hrs)**

a) Normal range of various joints, Description of goniometer, range of measuring systems (180 foot trunk and head), Techniques of goniometry. Demonstrate measuring of individual joint range using goniometer.

b) Demonstrate measurement of limb girth (using measuring tape): arm, forearm, thigh

13. Crutch Walking **(5hrs)**

Components of a crutch, classifications of crutches, characters of a good crutch, preparing a patient for crutch walking, crutch walking muscles, Measurement of crutches (axillary piece, hand piece). Crutch stance, crutch palsy. Types of crutch walking (4 point, 3 point, 3 point) (non - weight bearing and partial weight bearing), modified 3 point (paraplegic and shuffling gait, swing to and swing through. Crutch measurement (sitting standing and lying positions) and various types of crutch walking (even ground stairs and ramps).

SECTION B

14. Relaxation **(3hrs)**

Relaxation, Muscle fatigue, Muscle spasm, General causes, signs, symptoms of tension (mental and physical). Factors contributing to fatigue. Types of relaxation (local and general), indications for relaxation, and techniques of relaxation (local and general).

15. Posture **(5hrs)**

a) Posture (static and dynamic). Definition of good posture, Muscles responsible for good posture.

b) Postural mechanisms

c) Definition of abnormal posture (Kyphosis, Scoliosis, Lordosis, Kypho - scoliosis, kypholordosis).

d) Assessment of posture (inspection, measurement - length of legs, width of pelvis, plumb line. ROM of trunk in flexion, extension, side flexion and rotation). Postural correction by: strengthening of muscles, mobilisation of trunk, Relaxation, Active correction of the deformities. Passive correction (traction) postural awareness, abdominal and back extensor.

e) Outline principles in bracing of the trunk and surgical correction. Identification of abnormal posture, and postural corrective measures.

16. Gait **(10hrs)**

a) Gait and centre of gravity of the human body.

b) Muscles responsible for normal gait, six determinants of gait (pelvic rotation, pelvic tilt, hip flexion, lateral displacement of pelvis knee flexion in stance phase, normal foot pattern during walking).

c) Walking cycle: Stance (heel strike, foot flat, midstance, and push off), Swing (acceleration, mid swing and deceleration).

d) Following pathological gaits: Gluteus medius Gait, Gluteus maximus gait, Hip flexor weakness gait, Quadriceps weakness gait; Foot drop gait, hemiplegics gait, Ataxic waddling gait, equinus gait, calcaneus's gait, Equinovarus gait.

e) Skills in identifying pathological gait and proper gait training.

17. Co - Ordination (5hrs)

Balance (static and dynamic). Mechanism of neuromuscular co-ordination. ln coordination: Lower motor neuron lesions, upper motor neuron lesions (spasticity), Cerebellar lesions, Loss of kinesthetic sense (tabes dorsalis, syringomyelia, leprosy), imbalance due to muscular disease. Re-education of balance. Re-education co-ordination: Frenkels Exercises, proprioceptive neuromuscular facilitation (PNF) techniques. Re-education techniques of balance and coordination.

18. Suspension Therapy (4hrs)

Basic physics of simple pendulum and pendular movement. Type of suspension: Pendular, Axial, Eccentric fixation (anterior, posterior, medial and lateral). Indications and technique for each type of suspension. Axial and eccentric fixation for mobilizing, strengthening and re - education of various muscles and joints.

19. **Hydrotherapy (5hrs)**

Hydrostatic pressure, upward thrust of water, buoyancy. To list the indications and contra indications for hydrotherapy. Dress codes for patients and therapists, and necessary hydrotherapy equipment. Construction of hydrotherapy tank: Design, Construction, safety features, cleaning the pool, water heating systems, Hygiene of patient and pool.

20. Bed Rest Complications (2hrs)

Complications of patients on prolonged bed rest. Maintenance exercises for patients on prolonged bed rest.

21. Massage (10hrs)

i. History of massage. Mechanical points to be considered. Points to be considered while giving massage. Manipulations. The time of day for treatment. The comfort and support of the patient (draping and positioning). Position of operator (therapists stance)Using body weight, Contact and continuity, Techniques, indications, and contra indications. Physiological effects of massage on various system of body: Excretory system, Circulatory system, Muscular system, Nervous system and Metabolic system

ii. Various manipulation techniques used in massage.

iii. Stroking manipulation: Effleurage, stroking. Pressure manipulations: Kneading:

Squeezing, stationary, circular ironing (reinforced kneading), Finger kneading, petrissage(picking up, wringing, rolling), Frictions. Percussion manipulation: Tapotement, hacking, clapping, Beating and pounding. Shaking manipulations: Vibration, shaking, Technique, effects, uses and contra indications of the following manipulations: Stroking

manipulations. Pressure manipulations. Percussion manipulations Shaking manipulations. Massage for upper limb, Scapular region, Shoulder joint, Upper arm, Elbow joint, Forearm, Wrist, Hand. Massage for lower Iimb: Thigh, Knee joint, Leg, Foot (including ankle joints and toes). Massage for back: Neck and upper Middle and lower back. Gluteal region, arm and leg, Massage for the face.

22. Motor Learning & Motor Control **(5hrs)**

a) Introduction to motor learning

- Classification of motor skills
- Measurement of motor performance

b) Introduction to motor control

- Theories of motor control
- Applications
- Learning Environment
- Learning of skill
- Instructions and augmented feed back
- Practice conditions

23. Therapeutic Gymnasium **(10hrs)**

- Set-up of gymnasium & its importance
- Various equipment in the gymnasium
- Operational skills, effects, & uses of each equipment

24. Functional re-education **(3hrs)**

General therapeutic techniques to re-educate ADL function.

25. Special Techniques **(8hrs)**

a) Introduction to special mobilization & manipulation techniques, effects indications, effects, indications & contraindications.

b) Conceptual framework, principle of proprioceptive neuromuscular facilitation (PNF) techniques, including indications, therapeutic effects and precautions.

c) Review normal breathing mechanism, types, techniques, indications, contraindications, therapeutic effects & precautions of breathing exercises.

26. Basic principles of General fitness - warming up exercises, aerobics - cool down Exercises **(2hrs)**

27. Introduction to manual therapy techniques such as Maitland's, Cyriax, Mulligan's, etc. **(3hrs)**

EXERCISE AND MANUAL THERAPY LAB HOURS

1. Soft tissue manipulative techniques regionwise-upper limb, lower limb, neck, back and face.
2. Measurement of ROM of joints-upper limb, lower limb and trunk.

3. To practice the grading of muscle strength regionwise upper limb and lower limb and trunk.

4. Position of joints, muscle work, and stability of various fundamental and derived positions.

5. Different types of muscle contraction, muscle work, group action of muscles and coordinated movement.

6. Various types of suspension therapy and its applications on various part of body-region wise.

7. Local and general relaxation techniques.

8. Structure and functions along with application of various equipment in a gymnasium.

9. Assessment & evaluative procedures, including motor, sensory, neuromotor coordination, vital capacity, limb length & higher functions.

10. Various techniques of mobilization of joints region wise.

11. Various techniques of progressive strengthening exercises of muscles region wise.

12. Use of various ambulation aids in gait training.

13. Evaluate ADLs and practice various training techniques.

14. Mat exercises.

15. Normal and abnormal posture & practice various corrective techniques.

16. Equilibrium/balance & practice various to improve balance.

17. Structure and functions of hydrotherapy equipment and their applications.

18. Various traction techniques, including manual, mechanical & electrical procedures.

19. Various group exercise therapies.

20. Breathing Exercises.

21. Postural Drainage.

22. Warm up exercises, aerobics - cool down exercises.

23. Introduction to manual therapy techniques such as Maitland's, Cyriax, Mulligan's, Kaltenborne etc.

RECOMMENDED BOOKS

1. Principles of Exercise Therapy-Dena Gardiner

2. Massage, Manipulation & Traction---Sydney Litch

3. Therapeutic Exercise----------Do--------

4. Massage- Holly

5. Suspension Therapy In Rehabilitation—Margaret Hollis

6. Hydrotherapy - Duffield

7. Measurement Of Physical Function - Cynthia Norkins

8. Therapeutic Exercise—Carolyn Kisner

ELECTROTHERAPY

COURSE DESCRIPTION

This course involves a detailed study of physiological effects, application techniques, effects, indications, and contra-indications, precautions for exercises used in Physiotherapy.

COURSE OBJECTIVES

After 250hrs of lectures demonstrations & practical student should be able to explain the rationale for the prescription of safe and effective exercises.

SECTION A

SECTION 1 – THERAPEUTIC ELECTRICITY

Section I A - Low frequency Currents

1. Basic types of current
    - Direct Current: types, physiological & therapeutic effects.
    - Alternating Current
2. Types of Current used in Therapeutics
    - Modified D.C
    - Faradic Current
    - Galvanic Current
    - Modified A.C
    - Sinusoidal Current
    - Diadynamic Current.
    - Ultrareiz 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, and Dangers.
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.
5. Sinusoidal Current & Diadynamic Current in Brief.
6. HVPGS – Parameters & its uses
7. Ionization / Iontophoresis: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyper hydrosis, wound healing**.**
8. Cathodal / Anodal galvanism.
9. Micro Current & Macro Current
10. Types of Electrical Stimulators
    - 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 – Water bath, Uni- polar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance**.**
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, and Stimulation for Tissue Repair.
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS and Modulated TENS. Types of electrodes, placement of electrodes, dosage parameters, physiological & therapeutic effects and its indications & contraindications.
14. Pain: Define Pain, Theories of Pain (Outline only), and Pain Gate Control theory in detail.

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.
3. Nerve conduction velocity studies
4. EMG: Construction of EMG equipment.
5. Bio-feed back.

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. Russian Current
3. Rebox type Current

SECTION B

SECTION III - THERMO & ACTINOTHERAPY (HIGH FREQUENCY CURRENTS)

1. Electro Magnetic Spectrum.
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications &Contraindications, Dangers, Dosage parameters
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.

4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MWD, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD**.**
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 and Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US.
6. IRR: Define IRR,wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
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. LASER: Define LASER, Types of LASER, Principles of Production, and Production of LASER by various methods. Methods of application, Dosage, Physiological & Therapeutic effects, Safety precautions and Classifications of LASER. Energy density & power density

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

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 & Plastanga
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.