



SEMESTER – I

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DPT101	ANATOMY & PHYSIOLOGY	45 Min	1 Hrs.	50	50
DPT102	INTRODUCTION OF PHYSIOTHERAPY, MASSAGE MANIPULATION EXERCISE, PHYSICAL DRILL & YOGA	45 Min	1 Hrs.	50	50
DPT103	BASICS OF EXERCISE THERAPY & ELECTROTHERAPY	45 Min	1 Hrs.	50	50
DPT104	BIOCHEMISTRY	45 Min	1 Hrs.	50	50

ANATOMY & PHYSIOLOGY

THEORY

PART A: HUMAN ANATOMY

1. Introduction to Human Anatomy

- Definition, branches & scope
- Anatomical position and terminology
- Levels of structural organization

2. Skeletal System

- Classification of bones
- Structure and function of bones
- Major bones of the body: skull, vertebral column, thorax, upper and lower limbs
- Types of joints and their movements

3. Muscular System

- Classification and types of muscles
- Structure of skeletal muscle
- Major muscle groups and their actions (upper limb, lower limb, trunk, head & neck)



4. Nervous System

- Central Nervous System: Brain & Spinal cord (structure & function)
- Peripheral Nervous System: Cranial and Spinal nerves
- Autonomic Nervous System basics
- Reflex arc

5. Cardiovascular System

- Structure and function of heart
- Circulation of blood (systemic & pulmonary)
- Major arteries and veins
- Blood pressure and pulse

6. Respiratory System

- Anatomy of upper & lower respiratory tract
- Mechanics of breathing
- Gas exchange process

7. Digestive System

- Structure and function of digestive organs
- Accessory organs: liver, pancreas
- Process of digestion and absorption

8. Urinary System

- Kidneys: structure and function
- Ureters, bladder, urethra
- Urine formation

9. Reproductive System

- Male and female reproductive organs
- Menstrual cycle basics

10. Endocrine System

- Major glands: pituitary, thyroid, adrenal, pancreas
- Hormones and their functions

11. Integumentary System

- Structure of skin, layers, and appendages



- Functions of skin

12. Special Senses

- Eye: anatomy and visual pathway
- Ear: anatomy and auditory pathway
- Taste and smell: brief overview

PART B: HUMAN PHYSIOLOGY

1. Cell Physiology

- Structure and function of cell
- Cell membrane transport mechanisms
- Cell division (mitosis, meiosis)

2. Blood & Lymph

- Composition and functions of blood
- Blood groups & coagulation
- Structure and function of lymphatic system

3. Muscular Physiology

- Muscle contraction mechanism (sliding filament theory)
- Neuromuscular junction

4. Cardiovascular Physiology

- Cardiac cycle
- Heart sounds and ECG basics
- Regulation of blood pressure

5. Respiratory Physiology

- Mechanics of respiration
- Lung volumes and capacities
- Regulation of respiration
- Gas exchange and transport

6. Gastrointestinal Physiology

- Digestive enzymes and functions
- Absorption in small intestine



7. Renal Physiology

- Functions of kidneys
- Urine formation
- Regulation of water and electrolytes

8. Endocrine Physiology

- Hormone regulation and feedback mechanisms
- Role of major hormones

9. Nervous System Physiology

- Neuron structure & nerve impulse
- Synaptic transmission
- Reflexes and sensory/motor pathways

10. Reproductive Physiology

- Puberty, menstruation, and pregnancy physiology
- Spermatogenesis & oogenesis

11. Special Senses Physiology

- Vision mechanism
- Hearing and balance
- Taste and olfaction

PRACTICAL

ANATOMY PRACTICALS

➤ Osteology (Study of Bones)

- Identification of major bones: skull, vertebrae, scapula, clavicle, humerus, radius, ulna, femur, tibia, fibula, pelvis
- Surface features of bones (muscle attachments, joints, foramina)

➤ Arthrology (Study of Joints)

- Classification of joints: fibrous, cartilaginous, synovial
- Demonstration of joint movements (flexion, extension, abduction, etc.)
- Study of common joints: knee, hip, shoulder, elbow, wrist, ankle



➤ **Myology (Study of Muscles)**

- Major muscle groups of body: origin, insertion, action (OIA)
- Identification on charts, models or cadaver (if available)
- Muscle palpation techniques (basic level)

➤ **Cardiovascular System**

- Demonstration of heart anatomy using models
- Identification of major arteries and veins (aorta, carotid, femoral, jugular)
- Study of circulatory pathways

➤ **Respiratory System**

- Identification of respiratory organs using charts/models
- Study of lung lobes, trachea, bronchi

➤ **Digestive System**

- Identification of digestive organs
- Liver, pancreas, stomach, intestines

➤ **Nervous System**

- Study of brain and spinal cord (parts and functions)
- Cranial nerves: names and basic functions
- Models/charts for understanding nerve pathways

➤ **Urinary & Reproductive Systems**

- Identification of kidneys, ureters, bladder
- Male & female reproductive organs (basic structure)

➤ **Endocrine & Integumentary Systems**

- Study of glands (thyroid, pituitary, adrenal) using models
- Structure of skin (layers, glands, appendages)

PHYSIOLOGY PRACTICALS

➤ **Blood & Circulation**

- Measurement of blood pressure (BP)
- Pulse rate measurement at radial and carotid artery
- Blood group determination (ABO, Rh)



- Bleeding time & clotting time

➤ **Respiratory Function Tests**

- Measurement of respiratory rate
- Chest expansion
- Peak expiratory flow rate (PEFR) (if equipment available)

➤ **Reflex Testing**

- Superficial and deep reflexes (e.g., knee jerk, biceps reflex, plantar reflex)
- Reflex arc demonstration

➤ **Sensory & Motor Examination**

- Touch, pain, temperature testing
- Muscle power grading (basic introduction)
- Range of motion testing (using goniometer – optional)

➤ **Digestive System Observations**

- Effect of saliva on starch (experiment)
- Observation of peristaltic movement (chart/video-based)

➤ **Urine Analysis (Basic)**

- Physical examination of urine (color, odor, clarity)
- Test for glucose, albumin (using dipsticks if permitted)

➤ **ECG (Observation only)**

- Components of ECG wave (P, QRS, T)
- Heart rate interpretation

INTRODUCTION OF PHYSIOTHERAPY, MASSAGE MANIPULATION EXERCISE, PHYSICAL DRILL & YOGA

THEORY

1. Introduction to Physiotherapy

- Definition and history of Physiotherapy



- Role of Physiotherapy in health care system
- Objectives and scope of Physiotherapy
- Branches/specialties in Physiotherapy:
 - Musculoskeletal
 - Neurological
 - Cardiopulmonary
 - Pediatric
 - Sports
 - Geriatric
- Principles of rehabilitation
- Ethics and professionalism in physiotherapy

2. Massage Therapy

- Definition and purpose of massage
- Historical background (Indian, Chinese, Swedish massage systems)
- Types of massage:
 - Effleurage
 - Petrissage
 - Tapotement
 - Friction
 - Vibration
- Physiological effects of massage:
 - On skin, muscles, circulation, lymph, nervous system
- Indications and contraindications of massage

3. Manipulation Exercise

- Definition of manipulation and mobilization
- Difference between active, passive, and resisted exercises
- Joint range of motion (ROM) techniques
- Stretching and strengthening exercises
- Common manipulation techniques: Maitland, Mulligan (intro level)

4. Physical Drill / Therapeutic Exercises

- Purpose and principles of therapeutic exercise
- Classification:
 - Isometric
 - Isotonic
 - Isokinetic
- Warm-up and cool-down exercises
- Posture and balance training
- Gait training (basic)
- Use of therapeutic exercise in rehabilitation



5. Yoga

- Introduction and philosophy of Yoga
- Difference between Yoga and physical exercise
- Benefits of Yoga in physical and mental health
- Types of Yoga:
 - Hatha Yoga
 - Raja Yoga
- Introduction to key components:
 - Asanas
 - Pranayama
 - Meditation
 - Surya Namaskar

PRACTICAL

➤ Introduction to Physiotherapy

- Familiarization with physiotherapy equipment and modalities (intro only)
- Patient positioning and body mechanics
- Bed mobility training: turning, sitting, transferring
- Use of mobility aids: walker, crutches, cane (demo & practice)
- Documentation of clinical assessment (basic)
- Demonstration of universal precautions & hygiene

➤ Massage Practical

- Preparation for massage: patient position, draping, hygiene
- Application of massage mediums: oils, powder
- Demonstration and practice of massage techniques:
 - Effleurage (stroking)
 - Petrissage (kneading)
 - Tapotement (percussion)
 - Friction (circular)
 - Vibration
- Regional massage practice:
 - Back massage
 - Upper limb massage
 - Lower limb massage
 - Neck and shoulder massage
- Observation and documentation of patient response

➤ Manipulation & Therapeutic Exercise Practical

- Joint movements: active, passive, active-assisted



- Manual stretching of muscle groups (e.g., hamstring, calf)
- Strengthening exercises: isometric, isotonic (demo & practice)
- Joint mobilization basics:
 - Grade I–II mobilizations (intro level)
- Goniometric measurement of Range of Motion (ROM)
- Functional mobility drills (bed to chair, sit-to-stand)

➤ **Physical Drill Practical**

- Postural assessment and correction (visual & practical)
- Warm-up and cool-down routines
- Static and dynamic balance exercises
- Physical drills: marching, spot running, arm circles, jumping jacks
- Gait training: parallel bar walking, stair climbing
- Group therapeutic exercises with music or counts

➤ **Yoga Practical**

- Demonstration and practice of basic **asanas**:
 - Tadasana, Vrikshasana, Trikonasana, Bhujangasana, Shavasana, etc.
- **Surya Namaskar**: full sequence practice
- **Pranayama** techniques:
 - Anulom-Vilom, Bhramari, Kapalbhati (intro level)
- **Meditation and breathing awareness**: 5–10 minutes
- Yoga-based relaxation: guided or self-practice using Shavasana/Yoga Nidra
- Observation of physical and mental responses to yoga practices

BASICS OF EXERCISE THERAPY & ELECTROTHERAPY

THEORY

PART A: BASICS OF EXERCISE THERAPY

1. Introduction to Exercise Therapy

- Definition, aims, objectives
- Classification of therapeutic exercises
- Principles of exercise therapy
- Effects of exercise on body systems

2. Anatomical & Mechanical Fundamentals

- Planes and axes of movement
- Types of movement: flexion, extension, abduction, rotation
- Types of muscle contraction: isometric, isotonic, isokinetic



- Lever system and its application in the human body
- Gravity and its effects in exercise therapy

3. Posture & Gait

- Normal posture and types of postural deviations
- Posture assessment techniques
- Gait cycle and phases
- Gait abnormalities and their correction

4. Range of Motion (ROM)

- Types: Active, Passive, Assisted, Active-resisted
- Indications and contraindications
- Techniques to increase ROM
- Use of goniometer

5. Strengthening & Stretching

- Types of strengthening exercises
- Progressive resistance exercise
- Manual and mechanical resistance
- Stretching techniques: static, dynamic, PNF

6. Coordination & Balance Training

- Types of coordination exercises
- Balance training techniques
- Proprioception exercises

7. Mobility Aids & Functional Training

- Walking aids: cane, walker, crutches
- Gait training in patients
- Bed mobility and transfer training
- Activities of daily living (ADL) training

PART B: BASICS OF ELECTROTHERAPY

1. Introduction to Electrotherapy

- Definition, history, scope
- Classification of electrotherapeutic agents:
 - Thermal
 - Mechanical



- Electrical
- Electromagnetic

2. Basic Physics in Electrotherapy

- Electricity: current, voltage, resistance
- Types of current: AC, DC, pulsatile
- Ohm's law and safety precautions
- Electrodes: types, placement, maintenance

3. Low Frequency Currents

- Faradic current: principles, effects, uses
- Galvanic current: principles, effects, uses
- Iontophoresis: introduction

4. Medium Frequency Currents

- Interferential Therapy (IFT): principles, indications, contraindications
- Russian Currents (overview)

5. High Frequency Currents

- Short Wave Diathermy (SWD): types, dosage, indications
- Microwave Diathermy (MWD)

6. Superficial Heating & Cooling Modalities

- Hot packs, paraffin wax bath, IR therapy
- Cryotherapy: ice packs, ice massage

7. Ultrasound Therapy

- Physiological effects
- Application methods
- Indications and contraindications

PRACTICAL

PART A: BASICS OF EXERCISE THERAPY

➤ Demonstration of Movements

- Active, passive, assisted, and resisted movements of:



- Upper limb (shoulder, elbow, wrist, fingers)
- Lower limb (hip, knee, ankle, toes)
- Neck and trunk
- Use of goniometer to measure Range of Motion (ROM)

➤ **Strengthening Exercises**

- Isometric and isotonic exercises for:
 - Quadriceps, hamstrings, biceps, triceps, etc.
- Manual resistance techniques
- Progressive resistance exercises using weight cuffs, therabands

➤ **Stretching Exercises**

- Static and dynamic stretching of major muscle groups
- Precautions during stretching
- PNF (Proprioceptive Neuromuscular Facilitation) stretching basics

➤ **Posture & Balance**

- Identification and correction of postural faults
- Posture training exercises
- Balance exercises:
 - Static: single-leg stance, tandem standing
 - Dynamic: reaching tasks, wobble board

➤ **Gait & Mobility Training**

- Gait pattern observation and correction
- Walking aids: correct usage of walker, cane, crutches
- Sit-to-stand practice
- Bed mobility: rolling, shifting, transfers

➤ **Functional Exercises**

- Activities of Daily Living (ADL) training (basic)
- Therapeutic use of:
 - Shoulder wheel
 - Pulley system
 - Therapy ball
 - Parallel bars



PART B: BASICS OF ELECTROTHERAPY

➤ Equipment Handling & Safety

- Demonstration of physiotherapy electrical machines
- Machine care and maintenance
- Patient preparation and safety precautions

➤ Electrode Placement

- Types of electrodes: carbon, sponge, self-adhesive
- Placement for different muscle groups
- Cleaning and storing electrodes

➤ Application of Low Frequency Currents

- **Faradic current:** muscle re-education
- **Galvanic current:** iontophoresis (intro)
- **TENS:** for pain relief – pad placement and operation

➤ Medium Frequency Current Therapy

- **IFT (Interferential Therapy):**
 - Electrode placement techniques
 - Use for pain and edema
- **Russian Currents:** muscle strengthening (demo)

➤ High Frequency Therapy (if available)

- **Short Wave Diathermy (SWD):** capacitive and inductive methods
- **Microwave Diathermy (MWD):** dosage and positioning

➤ Superficial Heat & Cold Modalities

- **Hot pack** application (hydrocollator packs)
- **Paraffin wax bath** technique
- **Infrared lamp therapy**
- **Cryotherapy:** ice massage, cold pack

➤ Ultrasound Therapy

- Coupling techniques (gel application)
- Continuous and pulsed modes
- Indications and contraindications
- Treatment of soft tissue injuries



BIOCHEMISTRY

THEORY

1. Introduction to Biochemistry

- Definition and scope in physiotherapy
- Importance of biochemistry in health and disease
- Structure and function of cell, cell organelles
- pH and buffer systems in the human body
- Water, electrolytes, and acid-base balance

2. Carbohydrates

- Definition, classification, and functions
- Monosaccharides, disaccharides, polysaccharides (glucose, fructose, starch, glycogen)
- Digestion and absorption of carbohydrates
- Glycolysis, Krebs cycle, glycogenesis, gluconeogenesis (intro level)
- Blood glucose regulation
- Diabetes mellitus (brief concept)

3. Proteins and Amino Acids

- Classification, structure, and functions of proteins
- Essential and non-essential amino acids
- Protein digestion and absorption
- Plasma proteins and their functions
- Urea cycle (basics)
- Protein-energy malnutrition

4. Lipids

- Classification and biological functions
- Saturated and unsaturated fatty acids
- Digestion, absorption, and transport of lipids
- Cholesterol: structure, function, and disorders
- Ketone bodies and ketosis (brief)

5. Enzymes

- Definition, classification, and characteristics
- Mechanism of enzyme action
- Factors affecting enzyme activity (pH, temperature, concentration)



- Clinical significance of enzymes (e.g., CPK, SGOT, SGPT, LDH)

6. Vitamins

- Classification: fat-soluble (A, D, E, K) and water-soluble (B-complex, C)
- Sources, functions, daily requirements
- Deficiency disorders
- Role in wound healing, muscle and nerve health

7. Minerals

- Major minerals: Calcium, Phosphorus, Sodium, Potassium, Magnesium
- Trace elements: Iron, Zinc, Iodine
- Functions, sources, deficiency disorders
- Importance in muscle contraction, nerve conduction, and bone health

8. Hormones (Introductory)

- Definition and classification
- Functions of important hormones:
 - Insulin, glucagon
 - Thyroid hormones
 - Cortisol, adrenaline
- Hormonal effects on metabolism and physical activity

9. Clinical Biochemistry (Overview)

- Normal values and significance of:
 - Blood glucose
 - Urea, creatinine
 - Bilirubin
 - Uric acid
- Basic interpretation of:
 - Liver function test (LFT)
 - Renal function test (RFT)
- Biochemical markers in inflammation and muscle injury

10. Acid-Base Balance

- Concept of pH in the human body
- Buffers: bicarbonate, phosphate, proteins
- Disorders: acidosis and alkalosis (basic understanding)



PRACTICAL

➤ **Laboratory Safety and Orientation**

- Introduction to biochemistry lab equipment (pipettes, centrifuge, colorimeter, etc.)
- Lab safety rules and precautions
- Use of lab coats, gloves, goggles
- Cleaning and maintenance of glassware
- Handling of biohazardous material and waste disposal

➤ **Preparation Techniques**

- Preparation of standard solutions (normal and molar)
- Dilution techniques
- Buffer solution preparation
- Reagent preparation for biochemical tests

➤ **Qualitative Analysis of Biomolecules**

A. Carbohydrates

- Molisch's test (general test for carbohydrates)
- Benedict's test (reducing sugars)
- Barfoed's test (monosaccharides)
- Iodine test (starch)
- Fehling's test
- Seliwanoff's test (ketoses)

B. Proteins

- Biuret test (peptide bonds)
- Ninhydrin test (amino acids)
- Xanthoproteic test (aromatic amino acids)
- Millon's test (tyrosine)
- Lead acetate test (sulfur-containing amino acids)

C. Lipids

- Grease spot test
- Saponification test
- Sudan III stain
- Emulsification test



➤ **Quantitative Estimations (using Colorimeter/Manual Methods)**

- Estimation of blood glucose (glucose oxidase method)
- Estimation of urea (diacetyl monoxime method)
- Estimation of serum cholesterol (Zak's method)
- Estimation of total protein (Biuret method)
- Estimation of creatinine

➤ **Clinical Biochemistry Procedures (Demonstration Level)**

- Sample collection techniques (blood & urine)
- Serum/plasma separation
- Preservation of biochemical samples
- Urine analysis:
 - Physical examination (color, odor, volume)
 - Chemical analysis: glucose, albumin, ketones, bile salts (using dipsticks or Benedict's test)

