SEMESTER – I

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DOTT101	HUMAN ANATOMY & PHYSIOLOGY	45 Min	1 Hrs.	50	50
DOTT102	BIOCHEMISTRY & PATHOLOGY	45 Min	1 Hrs.	50	50
DOTT103	FUNDAMENTAL OF OPERATION THEATRE	45 Min	1 Hrs.	50	50
DOTT104	BASIC CONCEPT OF SURGERY	45 Min	1 Hrs.	50	50

HUMAN ANATOMY & PHYSIOLOGY

Theory

1. Introduction to Human Body

- Definition of anatomy & physiology
- Levels of structural organization
- Anatomical terms and body positions
- Body planes, cavities, and directional terms

2. Cells and Tissues

- Structure & function of a typical cell
- Cell organelles
- Cell division: Mitosis and Meiosis
- Types of tissues and their functions (Epithelial, Connective, Muscular, Nervous)

3. Skeletal System

- Structure and function of bones
- Types of bones
- Major bones of the body (Skull, Vertebral column, Limbs, Ribs, Sternum)
- Joints and their types
- Common disorders (Fractures, Arthritis)

4. Muscular System

- Types of muscles (Skeletal, Smooth, Cardiac)
- Structure and functions of skeletal muscles

- Major muscles of the body
- Muscle contraction mechanism

5. Circulatory System

- Structure and function of heart
- Blood vessels (Arteries, Veins, Capillaries)
- Cardiac cycle and circulation
- Blood: composition, types, blood groups, clotting
- Common diseases: Hypertension, MI, Anemia

6. Respiratory System

- Anatomy of respiratory tract (Nose to alveoli)
- Mechanism of breathing
- Gas exchange in lungs and tissues
- Lung volumes
- Common disorders: Asthma, COPD, Pneumonia

7. Digestive System

- Structure and function of organs of digestion (Mouth to anus)
- Accessory organs: Liver, Pancreas, Gall bladder
- Digestive enzymes and their actions
- Common disorders: Ulcer, Hepatitis, Appendicitis

8. Nervous System

- Central nervous system (Brain & spinal cord)
- Peripheral and autonomic nervous system
- Functions of brain parts
- Reflex arc
- Common disorders: Stroke, Epilepsy

9. Endocrine System

- Major endocrine glands (Pituitary, Thyroid, Adrenal, Pancreas)
- Hormones and their functions
- Common disorders: Diabetes, Goiter

10. Urinary System

- Anatomy of kidney and urinary tract
- Formation of urine
- Role in homeostasis
- Disorders: UTI, Renal failure

11. Reproductive System

- Male & female reproductive organs
- Menstrual cycle
- Fertilization and pregnancy basics
- Contraceptive methods

12. Integumentary System

- Structure and functions of skin
- Skin appendages (hair, nails, glands)
- Temperature regulation
- Skin infections and disorders

13. Special Senses

- Eye: Structure & function
- Ear: Hearing and balance mechanism
- Nose, tongue, skin: Role in smell, taste, touch

Practical

➢ Introduction to Practical Work

- Familiarization with laboratory equipment (microscope, sphygmomanometer, stethoscope)
- Basic laboratory safety and handling of specimens
- Use of anatomical charts, models, and mannequins

➢ Cell & Tissues

- Identification of cell structure (using charts and diagrams)
- Observation of different tissue types under microscope:
    - Epithelial tissue
    - Connective tissue
    - Muscle tissue
    - Nervous tissue

➢ Skeletal System

- Identification of major bones (Skull, Femur, Humerus, Vertebrae, Pelvis, Ribs)
- Identification of joints and types of joints (hinge, ball & socket, pivot, etc.)
- Differentiating male and female pelvis (if available)
- Demonstration of bone marrow and types (if possible with models or images)

➢ Muscular System

- Identification of major muscles using charts/models
- Observation of skeletal muscle under microscope
- Demonstration of muscle movements and actions (flexion, extension, etc.)

➢ Circulatory System

- Measurement of blood pressure using sphygmomanometer
- Recording of pulse (radial, carotid)
- Study of heart anatomy using models or specimens
- Identification of major blood vessels (aorta, vena cava, carotid, etc.)

➢ Respiratory System

- Counting respiratory rate
- Demonstration of breathing movements
- Identification of parts of respiratory system using models/charts
- Use of spirometer for basic lung capacity test (if available)

➢ Digestive System

- Identification of parts of digestive system using models and charts
- Demonstration of salivary glands, liver, pancreas
- Study of digestion using visual aids

➢ Nervous System

- Demonstration of reflex arc (knee jerk, light reflex)
- Identification of brain and spinal cord parts using models
- Study of neuron structure using charts
- Observing spinal cord sections under microscope (if available)

➢ Urinary System

- Identification of kidneys, ureters, bladder, and urethra using models
- Study of nephron structure using charts
- Urine output observation and color/clarity reporting (if safe and hygienic setup is available)

➢ Reproductive System

- Identification of male and female reproductive organs using charts/models
- Observation of uterus, ovaries, testis, and sperm under microscope (prepared slides)
- Menstrual cycle chart explanation

➢ Endocrine System

- Identification and location of major endocrine glands using charts/models
- Observation of thyroid and pancreas slides (if available)

➢ Integumentary System

- Demonstration of skin layers using models
- Identification of skin appendages (hair, sweat glands)
- Observation of skin under microscope

➢ Special Senses

- Identification of eye and ear parts using models
- Testing of simple reflexes: visual reflex, auditory response
- Observation of tongue papillae (if possible)

➢ Diagrams & Labeling

- Drawing and labeling of all major systems and organs
- Chart preparation for anatomy revision
- Practice of anatomical positions and directional terms

BIOCHEMISTRY & PATHOLOGY

Theory

BIOCHEMISTRY

1. Introduction to Biochemistry

- Definition and scope of biochemistry
- Importance of biochemistry in clinical practice and OT

2. Carbohydrates

- Definition, classification, and functions
- Monosaccharides, disaccharides, polysaccharides
- Blood sugar regulation
- Tests for glucose (Benedict's, Fehling's, etc.)

3. Proteins

- Definition, classification, and biological functions
- Essential and non-essential amino acids
- Structure of proteins

- Protein metabolism
- Biuret test and other qualitative tests

4. Lipids

- Classification and functions
- Saturated and unsaturated fats
- Cholesterol – types, role, and normal values
- Lipid metabolism basics

5. Enzymes

- Definition and types
- Mechanism of enzyme action
- Factors affecting enzyme activity
- Clinical importance of enzymes (e.g., SGOT, SGPT, amylase, lipase)

6. Vitamins & Minerals

- Classification (fat-soluble & water-soluble)
- Sources, functions, and deficiency diseases
- Common clinical applications

7. Water and Electrolyte Balance

- Body water compartments
- Role of sodium, potassium, chloride
- Acid-base balance basics
- Dehydration and fluid therapy

8. Biochemical Investigations

- Blood sugar test (FBS, PPBS)
- Blood urea, serum creatinine
- Serum electrolytes
- Liver and kidney function tests (LFT, KFT)
- Blood lipid profile

PATHOLOGY

1. Introduction to Pathology

- Definition and scope
- Types of pathology: General & Systemic
- Role of pathology in diagnosis and OT procedures

2. Inflammation & Repair

- Types of inflammation: acute and chronic
- Signs and stages of inflammation
- Healing and tissue repair

3. Cell Injury & Adaptation

- Causes and types of cell injury
- Necrosis and apoptosis
- Cellular adaptations (hypertrophy, atrophy, etc.)

4. Immunopathology

- Basic concepts of immunity
- Hypersensitivity reactions
- Autoimmune diseases (basic overview)

5. Hematology

- Composition and functions of blood
- Red blood cells (RBCs): morphology, anemia
- White blood cells (WBCs): types and leukemias
- Platelets and bleeding disorders
- ESR, Hemoglobin test, Total and Differential WBC Count

6. Clinical Pathology (Urine & Body Fluids)

- Physical, chemical, and microscopic examination of urine
- Proteinuria, glycosuria, ketonuria
- Collection and preservation of specimens
- Examination of sputum, CSF, and other fluids

7. Histopathology

- Basic tissue processing (fixation, embedding, sectioning, staining)
- Introduction to biopsy and cytology
- Role of histopathology in cancer diagnosis

8. Microbiology Basics (if integrated)

- General idea about common pathogens in OT settings
- Sterilization and infection control
- Nosocomial infections

Practical

BIOCHEMISTRY

➢ Basic Laboratory Techniques

- Proper use and handling of laboratory glassware
- Preparation of reagents and solutions
- Use of pipettes, centrifuge, colorimeter, glucometer

➢ Qualitative Analysis of Biomolecules

- **Carbohydrates:**
  - Benedict's test for reducing sugars
  - Fehling's test
  - Molisch's test
  - Barfoed's test
- **Proteins:**
  - Biuret test
  - Xanthoproteic test
  - Ninhydrin test
- **Lipids:**
  - Grease spot test
  - Saponification test

➢ Quantitative Biochemistry Tests

- Estimation of blood glucose (manual & glucometer method)
- Estimation of urea and creatinine (kit-based)
- Estimation of serum cholesterol (kit-based)
- Estimation of SGOT/SGPT (using semi-auto analyzer or kit)
- Liver and kidney function test parameters demonstration

➢ Urine Analysis (Biochemical)

- Testing for:
  - Glucose (Benedict's test)
  - Protein (Heat coagulation and Sulfosalicylic acid test)
  - Ketone bodies (Rothera's test)
  - pH, specific gravity using dipsticks

PATHOLOGY

➢ Hematology

- Collection of blood samples (venipuncture techniques – demonstration)

- Preparation of peripheral blood smear
- Staining of smear (Leishman's stain)
- Hemoglobin estimation (Sahli's method or Hemocue)
- Total Leukocyte Count (TLC)
- Differential Leukocyte Count (DLC)
- Red Blood Cell Count (manual method)
- Platelet Count (manual/demonstration)
- ESR (Westergren method)
- PCV and MCH/MCHC calculation (if applicable)

➢ Urine Analysis (Microscopic and Physical)

- Physical examination: color, clarity, volume, specific gravity
- Chemical analysis: sugar, protein, ketones
- Microscopic examination of urine sediments: pus cells, RBCs, casts, crystals

➢ Examination of Body Fluids

- Collection and preservation techniques (urine, sputum, CSF – demonstration)
- Sputum examination (physical/microscopic – stained smear if applicable)

➢ Histopathology Basics (Demonstration/Observation)

- Fixation of tissue samples (Formalin use)
- Processing of tissue: embedding, microtomy, and staining basics
- Observation of normal and pathological slides (under microscope)
    - Liver, kidney, lung, intestine, etc.
    - Tumor cells vs. normal cells

➢ Infection Control & Sample Handling

- Biomedical waste segregation
- Use of PPE in lab
- Disinfection and sterilization of lab equipment
- Sample labeling, storage, and transport protocols

FUNDAMENTAL OF OPERATION THEATRE

Theory

1. Introduction to Operation Theatre

- Definition and importance of OT
- History and development of OT techniques
- Types of operation theatres (General, Emergency, Specialized)
- Structure and layout of OT complex

2. Operation Theatre Design & Zoning

- Four zones of OT:
  - Protective zone
  - Clean zone
  - Sterile zone
  - Disposal zone
- Airflow system (Laminar flow, HEPA filters)
- Positive pressure ventilation

3. Sterilization & Disinfection

- Principles of sterilization
- Methods of sterilization:
  - Physical (Autoclave, Hot air oven)
  - Chemical (Cidex, Formalin)
  - Radiation-based (UV, gamma rays)
- Disinfection of OT instruments and surfaces
- Fumigation procedure

4. Surgical Instruments

- Classification: Cutting, Grasping, Retracting, Clamping, Suturing
- Name and uses of common instruments
- Handling, cleaning, and storage of instruments

5. Infection Control in OT

- Asepsis and antisepsis
- Universal precautions
- Surgical hand washing
- Personal Protective Equipment (PPE)
- Biomedical waste management (color coding)

6. Pre- and Post-Operative Patient Care

- Pre-operative preparation (shaving, fasting, medication)
- Patient positioning and draping
- Post-operative monitoring and shifting

- Role in recovery room

7. OT Equipment & Environment

- OT lights, tables, suction machine, cautery, anesthesia machine
- Emergency crash cart setup
- Maintenance and safety checks
- Electrical and fire safety in OT

8. Surgical Team & Duties

- Members of surgical team:
  - Surgeon
  - Assistant surgeon
  - Anesthetist
  - Scrub nurse/technician
  - Circulating nurse
- Roles and responsibilities of OT technician

9. Positioning of Patients

- Common surgical positions:
  - Supine
  - Prone
  - Lithotomy
  - Trendelenburg
  - Lateral
- Pressure point care and safety precautions

10. Preparation of Operation Theatre

- OT cleaning schedule (daily, weekly, terminal)
- Trolley setting for different surgeries
- Linen management and OT attire protocol
- Handling sterile and unsterile items

11. OT Records and Documentation

- OT register
- Consent forms
- Instrument and sponge count chart
- Incident reporting

Practical

➢ Orientation to Operation Theatre

- Demonstration of different **zones of OT** (Protective, Clean, Sterile, Disposal)
- Identification of **OT layout** and workflow
- OT attire demonstration: cap, mask, gown, gloves, shoe cover

➢ Hand Hygiene & Gowning

- Demonstration of **surgical handwashing** (7-step technique)
- Gowning and closed gloving techniques
- Aseptic precautions during dressing and setup

➢ Sterilization & Disinfection Techniques

- Operation and monitoring of **autoclave**
- Sterilization using **hot air oven**, **chemical agents**, and **UV light**
- Fumigation process (observation and steps)
- Disinfection of OT table, walls, and instruments

➢ Handling of Surgical Instruments

- Identification of basic **surgical instruments** (Scalpel, Forceps, Scissors, Retractors, etc.)
- Proper handling, cleaning, packing, and storage
- Sharps handling and disposal (needle burner, puncture-proof container)
- Trolley setup for basic procedures

➢ OT Equipment Handling

- Demonstration of **OT light**, **OT table**, **suction machine**, **cautery unit**
- Pre-use check and basic troubleshooting
- Crash cart setup and usage
- Use of oxygen cylinder and regulator

➢ Patient Preparation

- Demonstration of **pre-operative shaving and skin preparation**
- Positioning of patients for surgery:
    - Supine
    - Prone
    - Lithotomy
    - Lateral
    - Trendelenburg
- Transfer of patient using stretcher and trolley safely

➢ Aseptic Practices & Infection Control

- Proper **wrapping, labeling, and storage** of sterile packs
- Maintaining sterile field during minor OT procedures
- Biomedical waste segregation and disposal (as per color coding)
- Use and disposal of **Personal Protective Equipment (PPE)**

➢ Surgical Trolley & Draping

- Setting up sterile surgical trolleys for various types of surgeries
- Counting instruments, sponges, gauze (before and after procedure)
- Demonstration of **draping** techniques around operative site

➢ Emergency Procedures

- Familiarization with emergency **crash cart and defibrillator**
- OT technician's role in emergency (code blue response – demo/mock drill)
- Use of suction and oxygen during emergencies

➢ OT Documentation

- OT register maintenance
- Pre- and post-operative checklists
- Recording of sterilization cycles
- Sponge/instrument count sheet documentation

BASIC CONCEPT OF SURGERY

Theory

1. Introduction to Surgery

- Definition and history of surgery
- Classification of surgeries:
  - Elective
  - Emergency
  - Major & minor surgeries
- Aims and objectives of surgical treatment
- General principles of surgery

2. Pre-Operative Care

- Pre-operative assessment and preparation
- Patient history taking and physical examination
- Informed consent
- Pre-operative fasting and medication

- Skin preparation and hair removal
- Psychological preparation of the patient

3. Intra-Operative Care

- OT environment and aseptic techniques
- Scrubbing, gowning, and gloving
- Positioning of patient during surgery
- Use of drapes and maintenance of sterile field
- Sponge, instrument, and needle count protocols
- Role of OT technician during the surgical procedure

4. Post-Operative Care

- Immediate post-operative monitoring
- Observation of vital signs, consciousness, and wound site
- Pain management basics
- Identification and initial management of post-operative complications
- Patient transfer to recovery or ward

5. Types of Surgical Incisions & Wounds

- Common types of incisions:
  - Midline
  - Paramedian
  - Transverse
  - Oblique
  - Pfannenstiel
- Types of wounds:
  - Clean, contaminated, infected
  - Surgical wound classification
- Healing of surgical wounds
- Factors affecting wound healing

6. Sutures and Suturing Techniques

- Types of sutures: absorbable & non-absorbable
- Suture materials: catgut, silk, vicryl, nylon, etc.
- Types of suturing techniques (simple interrupted, mattress, continuous)
- Instruments used in suturing
- Removal of sutures and wound dressing techniques

7. Hemorrhage and Shock

- Types of hemorrhage (arterial, venous, capillary)
- Stages and types of shock (hypovolemic, septic, etc.)

- Recognition of signs and symptoms
- Basic management and first aid measures
- OT technician's role during hemorrhage

8. Asepsis, Antisepsis & Infection Control

- Principles of aseptic techniques
- Methods of sterilization and disinfection
- Preparation of surgical field
- Hospital-acquired infections and their prevention
- Hand hygiene and PPE protocols

9. Surgical Instruments & Equipment

- Introduction to surgical instruments: classification and use
- Handling and care of instruments
- Common instruments for general surgery
- OT lights, cautery, suction machine basics

10. Drainage & Catheterization

- Purpose and types of surgical drains (Penrose, JP, etc.)
- Insertion and care of surgical drains
- Urinary catheterization: types and techniques
- Post-operative drain and catheter care

11. Bandaging and Dressing

- Types of dressings (dry, wet, occlusive)
- Steps of wound dressing and bandaging
- Use of sterile technique in dressing changes
- Dressing trolley preparation

12. Common Surgical Conditions & Procedures *(Introductory Knowledge Only)*

- Hernia
- Appendicitis
- Cholecystectomy
- Cesarean section
- Fracture repair
- Abscess drainage

Practical

➢ Pre-operative Preparation

- Demonstration of patient shaving and skin preparation
- Recording pre-operative vital signs (BP, Pulse, Temperature, SpO_2)
- Preparation of surgical trolley
- Assisting in taking informed consent
- Preparing patient psychologically and physically before surgery

➢ Surgical Hand Hygiene

- 7-step surgical hand washing technique
- Use of antiseptic hand rub
- Closed gloving and gowning (self and assisted method)

➢ Patient Positioning

- Demonstration of various surgical positions:
  - Supine
  - Prone
  - Lithotomy
  - Lateral
  - Trendelenburg
- Use of safety straps and padding over pressure points

➢ Draping Techniques

- Use of sterile drapes
- Demonstration of four-corner draping method
- Draping of different regions (abdomen, limbs, perineum)

➢ Sponge, Instrument & Needle Count

- Pre-operative and post-operative count procedures
- Maintenance of count record
- Identification and handling of surgical sponges, gauze, and instruments

➢ Identification & Handling of Surgical Instruments

- Recognition and demonstration of:
  - Cutting instruments (scissors, scalpel)
  - Grasping instruments (forceps, clamps)
  - Retractors
  - Suturing instruments
- Passing instruments correctly to the surgeon
- Cleaning and sorting of used instruments post-surgery

➢ Suturing & Suture Removal (Demo/Practice on Dummy)

- Types of suture materials and their identification
- Practice of simple interrupted suturing (on sponge pads or dummies)
- Demonstration of suture removal and dressing

➢ Preparation and Use of Drains & Catheters

- Demonstration of different types of surgical drains (Penrose, JP drain)
- Assisting in drain insertion/removal
- Catheterization: insertion of Foley catheter (male/female models)
- Drain and catheter care

➢ Dressing & Bandaging Techniques

- Preparation of dressing trolley
- Wound dressing using aseptic technique
- Use of bandages: roller, triangular, elastic
- Demonstration of pressure bandage application

➢ Assisting During Surgical Procedure (Simulated or Live Observation)

- Setting up minor OT
- Scrubbing in for minor procedures (under supervision)
- Maintaining sterile field
- Providing instruments to surgeon
- Managing instrument tray and surgical site cleanup

➢ Handling Emergencies (Demo/Mock Drills)

- Recognizing signs of shock and hemorrhage
- Crash cart setup and emergency supply identification
- Assisting during resuscitation (CPR – demo on mannequin)
- Oxygen therapy setup demonstration