SYLLABUS AND CURRICULUM OF DIPLOMA IN EMERGENCY & TRAUMA CARE TECHNICIAN COURSE

DIPLOMA IN EMERGENCY & TRAUMA CARE TECHNICIAN

This course trains students to assist doctors and nurses in emergency departments, ICUs, and trauma centers. They learn **life-saving techniques**, **emergency procedures**, and **patient management** during critical conditions such as accidents, burns, cardiac arrest, etc.

Course Overview

- **Full Form**: DIPLOMA IN EMERGENCY & TRAUMA CARE TECHNICIAN (DETC)
- **Duration**: 2 Years + 6 Months (Internship)
- **Eligibility**:
    - 10+2 pass (Science stream – PCB or PCM usually preferred)
    - Minimum 45–50% marks
    - On the basis of 10th (Only Certificate Courses)
    - On the basis of certificate – diploma in same course (lateral entry)

Career Opportunities after DETC

- **Government & Private Hospitals**
- **Emergency Departments / ICUs**
- **Ambulance & Rescue Services**
- **Disaster Relief Organizations (like NDRF, NGOs)**
- **Clinics & Trauma Centers**
- **Air Ambulance Services**

SEMESTER – I

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DETC101	HUMAN ANATOMY & PHYSIOLOGY	45 Min	1 Hrs.	50	50
DETC102	BASIC BIOCHEMISTRY	45 Min	1 Hrs.	50	50
DETC103	GENERAL PATHOLOGY & MICROBIOLOGY	45 Min	1 Hrs.	50	50
DETC104	BASICS OF EMERGENCY MEDICAL SERVICES	45 Min	1 Hrs.	50	50

HUMAN ANATOMY & PHYSIOLOGY

THEORY

1. Introduction to Human Body

- Definition and scope of Anatomy & Physiology
- Levels of structural organization: Cell → Tissue → Organ → System → Body
- Anatomical terminology: planes, positions, directions, and regions
- Human body cavities and membranes
- Homeostasis and its importance

2. The Cell

- Structure and function of the cell
- Cell membrane, cytoplasm, and nucleus
- Cell organelles: mitochondria, ribosomes, endoplasmic reticulum, Golgi apparatus, lysosomes, etc.
- Cell division: mitosis and meiosis
- Functions of different types of cells

3. Tissues

- Definition and classification of tissues
- Epithelial tissue – types & functions
- Connective tissue – bone, cartilage, blood, adipose
- Muscular tissue – skeletal, cardiac, smooth
- Nervous tissue – neuron structure & function

4. Circulatory System

- Structure of heart, major blood vessels (arteries & veins)
- Blood composition and functions
- Cardiac cycle, pulse, blood pressure
- Circulation of blood (systemic & pulmonary)
- Lymphatic system and lymph circulation

5. Respiratory System

- Organs of respiration – nose, pharynx, larynx, trachea, bronchi, lungs
- Mechanism of breathing – inspiration & expiration
- Exchange and transport of gases
- Control of respiration
- Clinical aspects: asphyxia, hypoxia, artificial respiration, CPR

6. Digestive System

- Organs of digestive tract and accessory glands
- Structure and functions of stomach, liver, pancreas, intestine
- Digestion and absorption of carbohydrates, proteins, and fats
- Common disorders: gastritis, ulcers, diarrhea

7. Excretory System (Urinary System)

- Structure and function of kidney and nephron
- Formation of urine
- Composition of urine
- Regulation of water and electrolyte balance
- Clinical relevance: renal failure, dialysis, dehydration

8. Nervous System

- Organization: central, peripheral & autonomic
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, brainstem
- Cranial nerves and spinal nerves
- Reflex arc and reflex action
- Autonomic nervous system (sympathetic & parasympathetic)

9. Musculoskeletal System

- Structure and types of bones
- Classification of joints and types of movements
- Structure of skeletal muscle and mechanism of contraction
- Major muscles of the body

- Bone & joint injuries (fractures, sprains, dislocations)

10. Endocrine System

- Glands and their hormones: Pituitary, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads
- Functions and disorders of major glands
- Role of hormones in stress, growth, and metabolism

11. Reproductive System

- Male & female reproductive organs
- Structure & function of gonads
- Menstrual cycle
- Fertilization, pregnancy, and lactation
- Common disorders

12. Integumentary System (Skin)

- Structure of skin – epidermis, dermis, glands
- Functions of skin – protection, sensation, temperature regulation
- Wound healing and burns

13. Special Senses

- Eye – structure and function, mechanism of vision
- Ear – structure and function, mechanism of hearing
- Taste and smell organs
- Touch receptors

PRACTICAL

ANATOMY

➢ Study of Human Skeleton

- Identification of bones (axial & appendicular skeleton)
- Long, short, flat, and irregular bones
- Landmarks, features, and functions of bones
- Identification of major joints and types of movements

➢ Demonstration of Human Body Systems (with Charts / Models)

- Digestive System
- Respiratory System

- Circulatory System
- Nervous System
- Urinary System
- Endocrine System
- Reproductive System
- Musculoskeletal System

➢ Identification of Organs (Models/Specimens)

- Heart, Lungs, Kidney, Liver, Brain, Stomach, Intestine, Eye, Ear
- Identification of major arteries and veins
- Demonstration of body cavities and regions

➢ Histology (Microscopic Study)

- Observation of prepared slides of tissues:
  - Epithelial tissue
  - Connective tissue
  - Muscular tissue
  - Nervous tissue
  - Bone and cartilage

➢ Surface Anatomy

- Identification of important surface landmarks:
  - Carotid artery, radial artery, femoral artery, etc.
  - Position of heart apex, lungs, liver, kidney
- Palpation of pulse points

PHYSIOLOGY

➢ Measurement of Vital Signs

- Measurement of pulse rate, blood pressure, respiratory rate, temperature
- Normal and abnormal values
- Recording and interpretation of results

➢ Blood Physiology

- Estimation of hemoglobin (demo)
- Determination of blood groups (ABO, Rh typing)
- Blood smear preparation (observation of RBCs, WBCs, platelets)
- Demonstration of clotting time and bleeding time

➢ Cardiovascular Physiology

- Recording of heart rate and pulse
- Measurement of blood pressure (manual sphygmomanometer)
- Demonstration of normal and abnormal heart sounds (with simulator)
- Study of ECG (Electrocardiogram) – lead placement and basic wave interpretation

➢ Respiratory Physiology

- Measurement of respiratory rate
- Study of chest expansion and breath sounds
- Demonstration of spirometer use
- First aid in choking, asphyxia
- Artificial respiration techniques

➢ Nervous System Physiology

- Demonstration of reflexes (knee jerk, pupillary reflex, etc.)
- Reaction time (demo)
- Coordination and balance tests (finger–nose test, Romberg's test)

➢ Sensory Physiology

- Demonstration of vision tests (Snellen chart, color blindness test)
- Demonstration of hearing tests (tuning fork test – Rinne's and Weber's)
- Demonstration of taste and smell recognition (basic only)

➢ First Aid & Emergency Physiology Applications

- Demonstration of CPR (Cardio Pulmonary Resuscitation)
- Basic Life Support (BLS) procedures
- Measurement of oxygen saturation (SpO_2) using pulse oximeter
- Demonstration of suction apparatus, oxygen mask, and nebulizer use
- Maintenance of airway (head tilt–chin lift, jaw thrust)

BASIC BIOCHEMISTRY

THEORY

1. Introduction to Biochemistry

- Definition and scope of biochemistry
- Importance in medical and emergency care
- Structure and functions of cell in relation to metabolism
- Water: properties and physiological importance
- pH, buffer systems, and acid–base balance in the body
- Clinical relevance: acidosis, alkalosis, dehydration

2. Carbohydrates

- Definition, classification, and functions
- Structure of monosaccharides (glucose, fructose), disaccharides (sucrose, maltose), polysaccharides (starch, glycogen)
- Carbohydrate metabolism:
  - Glycolysis, glycogenesis, glycogenolysis
  - Gluconeogenesis (overview)
- Blood glucose regulation and its importance
- Clinical conditions: hypoglycemia, hyperglycemia, diabetes mellitus

3. Proteins and Amino Acids

- Structure, classification, and functions of proteins
- Amino acids – basic structure and types
- Protein synthesis (basic idea)
- Denaturation and coagulation of proteins
- Plasma proteins and their role in health
- Clinical aspects: protein deficiency, edema, liver diseases

4: Lipids

- Definition and classification (simple, compound, derived lipids)
- Structure and function of triglycerides, phospholipids, cholesterol
- Lipid metabolism – beta oxidation, ketone body formation (overview)
- Role of lipids in energy storage and membrane structure
- Clinical conditions: atherosclerosis, obesity, fatty liver

5: Enzymes

- Definition, properties, and classification of enzymes
- Mechanism of enzyme action
- Factors affecting enzyme activity (temperature, pH, substrate concentration)
- Enzyme inhibition and its importance
- Diagnostic enzymes in emergency & trauma care:
  - Creatine kinase (CK-MB), LDH, AST, ALT, Amylase, Lipase
- Clinical significance of enzyme assays

6: Vitamins and Minerals

- Classification: Fat-soluble (A, D, E, K) and Water-soluble (B-complex, C)
- Sources, functions, and deficiency diseases
- Role of minerals: Na, K, Ca, Fe, I, Zn, Mg
- Importance in electrolyte and fluid balance
- Clinical relevance: dehydration, shock, anemia, bone disorders

7: Nucleic Acids & Genetics (Basic Concepts)

- Structure of DNA and RNA
- Functions and importance of nucleic acids
- Concept of gene, genetic code, and protein synthesis (brief)
- Clinical importance: mutations, hereditary diseases

8: Clinical Biochemistry & Emergency Relevance

- Normal biochemical values in human blood and urine
- Biochemical changes in:
  - Shock
  - Burns
  - Trauma and hemorrhage
  - Renal failure, liver failure
- Blood chemistry in emergency (glucose, urea, creatinine, bilirubin, electrolytes)
- Role of biochemistry laboratory in emergency care

PRACTICAL

➢ INTRODUCTION & LABORATORY ORIENTATION

1. Introduction to biochemistry laboratory
2. Laboratory safety precautions & first aid
3. Familiarization with laboratory glassware and apparatus
4. Cleaning and calibration of glassware
5. Preparation of reagents, stock solutions, and buffers
6. Units of measurement and concept of molarity & normality

➢ QUALITATIVE ANALYSIS OF BIOMOLECULES

1. Carbohydrates

- Tests for carbohydrates:
  - Molisch's test (general test for carbohydrates)
  - Benedict's test (reducing sugars)
  - Barfoed's test (monosaccharides)
  - Iodine test (starch)

  - Fehlings' test (reducing sugars)
- Identification of unknown carbohydrate sample

2. Proteins and Amino Acids

- Biuret test (for peptide bonds)
- Xanthoproteic test (for aromatic amino acids)
- Ninhydrin test (for free amino acids)
- Millon's test (for tyrosine)
- Coagulation / denaturation of proteins (heat and acid tests)
- Identification of unknown protein sample

3. Lipids

- Solubility test for lipids
- Sudan III test (fat staining test)
- Saponification and emulsification tests
- Demonstration of lipid extraction (demo only)

➢ QUANTITATIVE ESTIMATIONS (BASIC DEMONSTRATIONS)

1. Estimation of blood glucose by glucose oxidase-peroxidase (GOD-POD) method
2. Estimation of total serum protein by Biuret method
3. Estimation of urea by diacetyl monoxime method
4. Estimation of serum creatinine by Jaffe's method
5. Determination of serum cholesterol (demo)
6. Calculation and interpretation of results

➢ URINE ANALYSIS

1. Physical Examination

- Color, appearance, odor, pH, and specific gravity

2. Chemical Examination (Qualitative Tests)

- Test for sugar (Benedict's test)
- Test for protein (heat & acetic acid test)
- Test for ketone bodies (Rothera's test)
- Test for bile salts and bile pigments
- Test for urea and uric acid (demo)

3. Identification of Normal & Abnormal Constituents

- Normal: urea, uric acid, creatinine

- Abnormal: glucose, albumin, ketone bodies, bile salts, blood

➢ ACID–BASE & ELECTROLYTE STUDIES

1. Determination of pH using pH paper / pH meter
2. Preparation of buffer solutions (phosphate buffer)
3. Understanding acid–base balance in body fluids
4. Demonstration of electrolyte estimation (Na^+, K^+ – demo)
5. Clinical relevance in dehydration, shock, trauma

➢ ENZYME STUDIES

1. Demonstration of enzyme activity (e.g., catalase, amylase)
2. Effect of temperature and pH on enzyme action
3. Inhibition of enzyme activity (demo)
4. Clinical importance of enzymes (AST, ALT, CK-MB, LDH – discussion)

GENERAL PATHOLOGY & MICROBIOLOGY

THEORY

1. Introduction to Pathology

- Definition, branches, and importance of pathology
- Terminology: lesion, etiology, prognosis, diagnosis
- Causes of disease – physical, chemical, biological, nutritional
- Cellular adaptation, injury, and death
- Inflammation: types, signs, process, and role in trauma
- Repair and healing of wounds
- Hemodynamic disorders: edema, hemorrhage, shock, thrombosis, embolism

2. General Pathology

- Degenerative changes (fatty, amyloid, and cellular degeneration)
- Necrosis and gangrene – types and clinical relevance
- Atrophy, hypertrophy, hyperplasia, metaplasia
- Neoplasia – definition, types of tumors, benign & malignant differences
- Pathophysiology of common conditions:
    - Anemia
    - Diabetes mellitus
    - Myocardial infarction
    - Liver cirrhosis
    - Kidney failure
    - Burns and trauma-related changes

3. Clinical Pathology

- Collection, labeling, and preservation of biological samples (blood, urine, sputum)
- Physical, chemical, and microscopic examination of urine
- Blood tests – hemoglobin, ESR, blood grouping, cross-matching (demo)
- Routine stool examination
- Interpretation of reports in emergency conditions (dehydration, shock, infection)

4. Introduction to Microbiology

- Definition and scope of microbiology
- History and contributions (Pasteur, Koch, Fleming)
- Classification of microorganisms – bacteria, viruses, fungi, parasites
- Structure and function of bacterial cell
- Growth and reproduction of bacteria
- Normal microbial flora of human body

5. Infection & Immunity

- Infection – definition, types, sources, and routes of transmission
- Stages of infection and chain of infection
- Factors affecting pathogenicity
- Immunity – innate and acquired
- Antigens, antibodies, and their reactions (overview)
- Vaccines and immunization schedule (basic)
- Nosocomial infections and hospital-acquired infection control

6. Sterilization & Disinfection

- Definition and importance in emergency & trauma care
- Methods of sterilization:
  - Physical: Heat (dry/moist), filtration, radiation
  - Chemical: Alcohol, phenol, chlorine, formaldehyde, glutaraldehyde
- Aseptic techniques and barrier precautions
- Biomedical waste management in hospital settings
- Universal precautions and biosafety levels

7. Bacteriology (Common Pathogens)

- Morphology, mode of infection, and laboratory diagnosis of:
  - *Staphylococcus aureus* – wound infections
  - *Streptococcus* – sore throat, septicemia
  - *E. coli* – urinary tract infection
  - *Clostridium tetani* – tetanus (trauma-related)
  - *Neisseria meningitidis* – meningitis
  - *Mycobacterium tuberculosis* – TB

- Collection and transport of specimens for culture

8. Virology, Mycology & Parasitology (Basics)

- **Viruses:** structure, properties, common viral diseases (hepatitis, HIV, influenza, rabies)
- **Fungi:** types, common infections (candidiasis, ringworm)
- **Parasites:** classification, common parasites (malaria, amoebiasis, hookworm)

9. Applied Microbiology in Emergency Care

- Role of microbiology in infection control in ICUs and OTs
- Common hospital pathogens
- Use of disinfectants and antiseptics in trauma units
- Importance of hand hygiene and PPE
- Sample collection from trauma patients (wound swabs, pus, etc.)

PRACTICAL

➢ INTRODUCTION TO LABORATORY SCIENCE & SAFETY

1. Introduction to Pathology & Microbiology Laboratory – Layout and Safety Rules
2. Identification and Handling of Laboratory Instruments
3. Use of Personal Protective Equipment (PPE) – Gloves, Apron, Mask, Cap
4. Hand Washing Techniques (Medical & Surgical)
5. Biomedical Waste Segregation and Disposal (Color-coded bins)
6. Demonstration of Laboratory Biosafety Symbols and Precautions

➢ GENERAL PATHOLOGY PRACTICALS

1. Identification of Normal and Abnormal Cells (Prepared Slides)
2. Observation of Degenerative Changes and Necrosis (Demonstration)
3. Demonstration of Inflammatory Exudates and Wound Healing Slides
4. Demonstration of Blood and Lymphoid Tissue Pathology (Charts/Slides)
5. Observation of Common Pathological Conditions – Cirrhosis, Infarction, etc.

➢ CLINICAL PATHOLOGY PRACTICALS

1. Collection, Labeling, and Preservation of Biological Samples (Urine, Blood, Sputum, Stool)
2. Physical Examination of Urine – Color, Clarity, Volume, Odor
3. Chemical Examination of Urine – Tests for Sugar, Albumin, Ketone, and Bile
4. Microscopic Examination of Urine – RBCs, WBCs, Epithelial Cells, Casts, Crystals
5. Preparation and Staining of Peripheral Blood Smear (Leishman/Giemsa)

6. Identification of Blood Cells under Microscope
7. Demonstration of Stool Examination – Ova, Cysts, and Parasites (Prepared Slides)

➢ INTRODUCTION TO MICROBIOLOGY

1. Study and Handling of Microscope
2. Preparation of Bacterial Smear and Simple Staining
3. Gram Staining Technique – Identification of Gram-positive & Gram-negative Bacteria
4. Ziehl–Neelsen (Acid-Fast) Staining for *Mycobacterium tuberculosis*
5. Demonstration of Culture Media – Nutrient Agar, Blood Agar, MacConkey Agar
6. Sterilization Methods – Autoclave, Hot Air Oven, Filtration (Demo)
7. Demonstration of Bacterial Culture Techniques (Streak, Pour, Spread)
8. Identification of Common Bacteria (*Staphylococcus*, *E. coli*, *Streptococcus*) from Prepared Slides

➢ INFECTION CONTROL, IMMUNITY & ASEPSIS

1. Demonstration of Aseptic Techniques and Handling of Instruments
2. Hand Hygiene and Disinfection Procedures
3. Study of Disinfectants and Antiseptics Used in Hospitals
4. Demonstration of Sterilization Indicators (Chemical & Biological)
5. Immunology Demonstration – Antigen–Antibody Reaction (Agglutination Test / Model)
6. Observation of Hospital Infection Control Practices (Charts/Demo)

➢ VIROLOGY, MYCOLOGY & PARASITOLOGY PRACTICALS

1. Observation of Viral Models (Hepatitis, HIV, Influenza, Rabies)
2. Demonstration of Fungal Elements (Candida, Aspergillus) using Prepared Slides
3. Demonstration of Parasitic Organisms (Entamoeba, Giardia, Plasmodium)
4. Demonstration of Wound Swab Collection for Culture (Aseptic Method)
5. Demonstration of Nosocomial Infection Control in Trauma Care (PPE Use)

BASICS OF EMERGENCY MEDICAL SERVICES

THEORY

1. INTRODUCTION TO EMERGENCY MEDICAL SERVICES

- Definition and concept of Emergency Medical Services (EMS)
- Importance and scope of EMS in health care
- History and development of EMS in India and abroad
- Structure and organization of EMS system

- Components of EMS:
  - Communication system
  - Ambulance and transport
  - Hospital emergency departments
  - Prehospital and on-site care
- Roles and responsibilities of an Emergency & Trauma Care Technician (ETCT)

2. EMERGENCY DEPARTMENT ORGANIZATION

- Layout and zones of Emergency Department (ED): reception, triage, resuscitation, observation
- Staff pattern and chain of command in emergency department
- Equipment and facilities in emergency care unit
- Types of emergencies: medical, surgical, obstetric, pediatric, trauma
- Documentation and reporting in emergency care

3. BASIC LIFE SUPPORT (BLS) & FIRST AID

- Principles of Basic Life Support (BLS)
- Assessment of airway, breathing, and circulation (ABCs)
- Cardiopulmonary resuscitation (CPR) – Adult, Child, Infant
- Recovery position and choking management
- Control of bleeding and shock management
- Bandaging, splinting, and wound dressing techniques
- First aid in burns, fractures, poisoning, drowning, and electric shock
- Transport of injured patients

4. AMBULANCE SERVICES & PREHOSPITAL CARE

- Types and classification of ambulances (Basic, Advanced, ICU, Mortuary)
- Ambulance design, equipment, and maintenance
- Role of Emergency Medical Technician (EMT) in prehospital care
- Patient assessment and stabilization in prehospital setting
- Documentation and communication during transport
- Infection control and disinfection of ambulance

5. TRIAGE & DISASTER MANAGEMENT

- Definition and purpose of triage
- Triage categories (Red, Yellow, Green, Black)
- Triage in hospital and prehospital settings
- Disaster definition, types, and phases (mitigation, preparedness, response, recovery)
- Role of emergency technicians during disasters
- Mass casualty management and coordination with rescue services (fire, police, NDRF, etc.)

6. MEDICAL EMERGENCIES

- Recognition and initial management of:
  - Cardiac arrest
  - Myocardial infarction
  - Stroke
  - Asthma attack
  - Diabetic coma / hypoglycemia
  - Seizures / epilepsy
  - Anaphylactic shock
  - Heat stroke
- Emergency drug tray – contents and use
- Oxygen therapy and airway management (basic level)

7. TRAUMA & ACCIDENT CARE

- Mechanism and types of trauma: blunt, penetrating, crush injuries
- Golden hour concept in trauma care
- Initial assessment and management of trauma patient (primary and secondary survey)
- Management of head, chest, abdominal, and spinal injuries
- Control of external and internal bleeding
- Application of cervical collar and spinal immobilization techniques
- Patient shifting and transportation methods

8. COMMUNICATION & DOCUMENTATION IN EMS

- Importance of communication in emergencies
- Radio and telephone communication protocols
- EMT communication ethics and confidentiality
- Patient handover procedure (SBAR method)
- Maintenance of emergency records and forms
- Legal and ethical considerations in EMS

9. INFECTION CONTROL & SAFETY IN EMS

- Universal precautions in emergency care
- Personal protective equipment (PPE) usage
- Biomedical waste management in ambulance and ER
- Sterilization and disinfection methods
- Needle stick injury prevention
- Post-exposure prophylaxis (PEP) protocol

PRACTICAL

➢ INTRODUCTION TO EMERGENCY SERVICES & SAFETY

1. Familiarization with Emergency Department layout and zones
2. Identification and handling of emergency equipment
3. Donning and doffing PPE (Personal Protective Equipment)
4. Hand hygiene techniques and universal precautions
5. Biomedical waste segregation and disposal

➢ BASIC LIFE SUPPORT (BLS) & AIRWAY MANAGEMENT

1. Assessment of Airway, Breathing, and Circulation (ABC)
2. Adult, Child, and Infant CPR on manikins
3. Recovery position and management of choking
4. Oxygen therapy – nasal cannula, face mask, and bag-valve-mask

➢ FIRST AID & TRAUMA MANAGEMENT

1. Control of bleeding and management of shock
2. First aid for burns, fractures, and minor injuries
3. Application of splints and cervical collars
4. Wound dressing and bandaging techniques
5. Patient lifting, carrying, and transportation using stretcher, scoop, and spine board

➢ AMBULANCE SERVICES & PREHOSPITAL CARE

1. Familiarization with ambulance types and onboard equipment
2. Cleaning and disinfection of ambulance
3. Restocking and checking emergency drug tray and equipment
4. Patient stabilization and monitoring during transport

➢ TRIAGE & DISASTER MANAGEMENT

1. Triage drill – Red, Yellow, Green, Black categories
2. Mock disaster scenario and mass casualty drill
3. Coordination with rescue services and team communication
4. Documentation during triage and disaster response

➢ COMMUNICATION & DOCUMENTATION IN EMS

1. Patient handover using SBAR (Situation-Background-Assessment-Recommendation)
2. Radio and telephone communication protocols in emergency
3. Record maintenance and emergency report filling

➢ **INFECTION CONTROL & SAFETY**

1. Proper use of PPE in emergencies
2. Segregation and disposal of biomedical waste
3. Cleaning and disinfection of emergency equipment and ambulance
4. Needle-stick injury prevention and post-exposure protocol demonstration

SEMESTER – II

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DETC201	PHARMACOLOGY FOR EMERGENCY CARE	45 Min	1 Hrs.	50	50
DETC202	INFECTION CONTROL & BIOMEDICAL WASTE MANAGEMENT	45 Min	1 Hrs.	50	50
DETC203	TRAUMA CARE & MANAGEMENT	45 Min	1 Hrs.	50	50
DETC204	FIRST AID & BASIC LIFE SUPPORT (BLS)	45 Min	1 Hrs.	50	50

PHARMACOLOGY FOR EMERGENCY CARE

THEORY

1. Introduction to Pharmacology

- Definition and scope of pharmacology
- Importance of pharmacology in emergency care
- Branches of pharmacology (pharmacokinetics, pharmacodynamics, toxicology)
- Sources and classification of drugs
- Drug nomenclature (generic, brand names)
- Dosage forms and routes of drug administration

2. Pharmacokinetics

- Absorption, distribution, metabolism, excretion (ADME)
- Factors affecting drug absorption
- Bioavailability and half-life
- Drug interactions (drug–drug, drug–food)
- Special considerations in pediatric and geriatric patients

3. Pharmacodynamics

- Mechanism of drug action
- Receptors and drug binding
- Dose-response relationship
- Therapeutic index
- Adverse drug reactions and side effects

4. Drug Administration in Emergency Care

- Principles of safe drug administration
- "Five Rights" of medication administration
- Common emergency routes: IV, IM, SC, oral, inhalational
- IV fluid administration basics
- Drug dosage calculations (basic concepts)
- Handling and storage of emergency drugs

5. Drugs Used in Cardiovascular Emergencies

- Cardiac stimulants (e.g., Adrenaline)
- Antiarrhythmic drugs
- Antihypertensive drugs
- Vasodilators and vasopressors
- Drugs used in cardiac arrest (CPR drugs)
- Anticoagulants and antiplatelet drugs

6. Drugs Used in Respiratory Emergencies

- Bronchodilators
- Corticosteroids
- Antihistamines
- Oxygen therapy basics
- Drugs used in asthma and COPD exacerbation

7. Drugs Used in Shock and Trauma

- IV fluids (crystalloids, colloids)

- Blood and blood products
- Vasopressors and inotropes
- Pain management (analgesics, opioids, NSAIDs)
- Sedatives and muscle relaxants

8. Drugs Used in Neurological Emergencies

- Anticonvulsants (for seizures)
- Sedatives and anxiolytics
- Drugs used in head injury
- Drugs for stroke management (basic overview)

9. Drugs Used in Poisoning and Toxicology

- Common poisons and their effects
- Antidotes (e.g., activated charcoal, atropine, naloxone)
- Management of drug overdose
- Basic principles of decontamination

10. Drugs Used in Gastrointestinal Emergencies

- Antiemetics
- Antacids and antiulcer drugs
- Laxatives and antidiarrheal drugs
- Management of dehydration

11. Drugs Used in Allergic Reactions

- Antihistamines
- Corticosteroids
- Emergency drugs for anaphylaxis (Adrenaline)

12. Antibiotics and Infection Control

- Basic classification of antibiotics
- Indications in emergency settings
- Antibiotic resistance (basic concept)
- Principles of rational antibiotic use

13. Fluid and Electrolyte Management

- Types of IV fluids
- Electrolyte imbalance (Na^+, K^+, Ca^{2+})

- Management of dehydration and shock

14. Legal and Ethical Aspects

- Drug prescription rules (basic awareness)
- Documentation in drug administration
- Storage and handling of emergency drugs
- Ethical issues in emergency pharmacology

15. Emergency Drug Kit & Crash Cart

- Components of emergency drug kit
- Crash cart organization
- Maintenance and checking protocols

16. Basic Calculations in Pharmacology

- Dose calculation formulas
- IV drip rate calculation
- Pediatric dose calculation (basic concept)

PRACTICAL

➢ Introduction to Drug Handling

- Identification of common emergency drugs
- Reading drug labels (generic name, dose, expiry)
- Storage conditions of drugs (temperature, light sensitivity)
- Maintenance of drug inventory register

➢ Drug Administration Techniques

- Demonstration of routes of drug administration:
  - Intravenous (IV)
  - Intramuscular (IM)
  - Subcutaneous (SC)
  - Oral and sublingual
  - Inhalational (nebulizer use)
- Preparation of injections using aseptic technique
- Safe disposal of sharps and biomedical waste

➢ IV Therapy and Fluid Administration

- Setting up IV line and cannulation (demonstration/assisting)
- Preparation and administration of IV fluids

- Calculation of IV drip rate
- Monitoring IV infusion and complications
- Handling infusion pumps (basic use)

➢ Emergency Drug Preparation and Administration

- Preparation of emergency drugs (e.g., adrenaline, atropine)
- Drawing drugs from ampoules and vials
- Dilution of drugs for IV use
- Drug administration during CPR (assisting role)

➢ Crash Cart Management

- Identification of drugs in crash cart
- Arrangement and labeling of emergency drugs
- Checking expiry dates and stock
- Assisting in crash cart preparation during emergencies

➢ Dosage Calculation Practice

- Calculation of adult drug doses
- Pediatric dose calculation (weight-based)
- IV fluid calculation
- Practice of real-life emergency scenarios

➢ Administration of Respiratory Drugs

- Nebulization technique
- Oxygen therapy setup (mask, nasal cannula)
- Use of inhalers (MDI with spacer)

➢ Pain Management Techniques

- Administration of analgesics (oral/IV/IM)
- Monitoring patient response to pain medication
- Use of pain assessment scales (basic)

➢ Handling Poisoning Cases

- Identification of common poisons
- Preparation and administration of antidotes (demonstration)
- Use of activated charcoal
- Assisting in gastric lavage (observation/demo)

➢ Infection Control in Drug Administration

- Hand hygiene techniques
- Use of gloves, masks, PPE
- Aseptic technique during injections
- Biomedical waste segregation

➢ Assisting in Special Emergency Procedures

- Assisting during CPR drug administration
- Assisting in intubation (drug preparation role)
- Preparation of sedation drugs
- Assisting in minor emergency procedures

INFECTION CONTROL & BIOMEDICAL WASTE MANAGEMENT

THEORY

1. Introduction to Infection Control

- Definition of infection and infection control
- Chain of infection (agent, host, environment)
- Importance of infection prevention in emergency care
- Types of infections:
  - Community-acquired infections
  - Hospital-acquired infections (HAIs)

2. Microorganisms and Their Role in Infection

- Types of microorganisms: bacteria, viruses, fungi, parasites
- Sources and modes of transmission
- Normal flora vs pathogenic organisms
- Common hospital pathogens

3. Chain of Infection and Its Prevention

- Components of the chain of infection
- Modes of transmission:
  - Contact (direct/indirect)
  - Droplet
  - Airborne
  - Vector-borne

- Breaking the chain of infection

4. Standard Precautions

- Concept and importance of standard precautions
- Hand hygiene (WHO guidelines)
- Use of Personal Protective Equipment (PPE):
  - Gloves, masks, gowns, face shields
- Respiratory hygiene and cough etiquette
- Safe injection practices

5. Transmission-Based Precautions

- Contact precautions
- Droplet precautions
- Airborne precautions
- Isolation techniques and patient placement

6. Hand Hygiene

- Importance of hand hygiene
- Types of hand washing:
  - Routine hand wash
  - Hygienic hand wash
  - Surgical hand wash
- Use of alcohol-based hand rubs
- Steps of proper hand washing

7. Personal Protective Equipment (PPE)

- Types and uses of PPE
- Donning and doffing procedures
- Limitations of PPE
- Disposal of used PPE

8. Sterilization and Disinfection

- Definitions: sterilization, disinfection, antisepsis
- Methods of sterilization:
  - Physical (heat, radiation)
  - Chemical methods
- Levels of disinfection: high, intermediate, low
- Use of disinfectants (e.g., chlorine, alcohol)

9. Hospital-Acquired Infections (HAIs)

- Definition and types:
  - Surgical site infection (SSI)
  - Urinary tract infection (UTI)
  - Ventilator-associated pneumonia (VAP)
  - Bloodstream infections
- Prevention strategies

10. Biomedical Waste Management

- Definition of biomedical waste
- Sources of biomedical waste in hospitals
- Hazards of improper waste disposal
- Legal aspects and regulations (India rules overview)

11. Categories of Biomedical Waste

- Types of biomedical waste:
  - Infectious waste
  - Sharps
  - Pathological waste
  - Pharmaceutical waste
  - Chemical waste
- Examples of each category

12. Segregation of Biomedical Waste

- Importance of segregation at source
- Color coding system (as per Indian guidelines):
  - Yellow
  - Red
  - White (translucent)
  - Blue
- Types of containers and bags used

13. Collection, Storage, and Transportation

- On-site collection procedures
- Temporary storage guidelines
- Transportation of biomedical waste within hospital
- Safety measures during handling

14. Treatment and Disposal of Biomedical Waste

- Methods of treatment:
  - Incineration
  - Autoclaving
  - Microwaving
  - Chemical disinfection
- Final disposal methods

15. Sharps Management

- Types of sharps (needles, blades)
- Risks of needle-stick injuries
- Safe handling and disposal of sharps
- Needle destroyers and puncture-proof containers

16. Occupational Safety and Health

- Risks to healthcare workers
- Needle-stick injury prevention
- Post-exposure prophylaxis (PEP) basics
- Vaccination for healthcare workers (Hepatitis B, etc.)

17. Infection Control in Emergency Settings

- Infection prevention in trauma care
- Handling blood and body fluids
- Cleaning and disinfection of emergency equipment
- Ambulance infection control

18. Environmental Cleaning and Sanitation

- Cleaning of hospital surfaces
- Disinfection protocols for equipment
- Linen management
- Spill management (blood/body fluids)

PRACTICAL

➢ Hand Hygiene Practices

- Demonstration of proper hand washing technique (step-by-step)
- Use of alcohol-based hand rub
- Moments of hand hygiene (clinical situations)
- Assessment of hand hygiene compliance

➢ Use of Personal Protective Equipment (PPE)

- Identification of PPE components (gloves, mask, gown, face shield)
- Correct procedure of donning and doffing PPE
- Disposal of used PPE
- PPE use in different emergency situations

➢ Aseptic Techniques

- Principles of asepsis
- Preparation of sterile field
- Handling sterile instruments
- Maintaining sterility during procedures

➢ Cleaning, Disinfection, and Sterilization

- Preparation of disinfectant solutions (e.g., chlorine dilution)
- Cleaning of medical equipment and surfaces
- High-level, intermediate, and low-level disinfection practices
- Demonstration of sterilization methods (autoclave – observation/demo)

➢ Biomedical Waste Segregation

- Identification of different types of biomedical waste
- Segregation of waste as per **color coding system**:
  - Yellow bag
  - Red bag
  - White (translucent) container
  - Blue container
- Correct disposal practices at point of generation

➢ Handling and Disposal of Sharps

- Safe handling of needles and sharp objects
- Use of needle destroyer
- Disposal in puncture-proof containers
- Prevention of needle-stick injuries

➢ Collection, Storage, and Transportation of Waste

- On-site collection of biomedical waste
- Labeling and sealing of waste bags
- Temporary storage procedures
- Safe transportation within healthcare facility

➢ Spill Management

- Management of blood and body fluid spills
- Use of disinfectants for spill cleaning
- Use of PPE during spill management
- Reporting and documentation of spills

➢ Infection Control in Emergency Settings

- Safe handling of patients in emergency/trauma cases
- Infection control in ambulance services
- Cleaning and disinfection of emergency equipment
- Handling contaminated materials

➢ Occupational Safety Practices

- Identification of workplace hazards
- Prevention of needle-stick injuries
- Immediate management of exposure incidents
- Awareness of post-exposure prophylaxis (PEP)

➢ Environmental Cleaning

- Cleaning protocols for floors, walls, and surfaces
- Disinfection of frequently touched areas
- Linen handling and segregation
- Waste disposal after cleaning

TRAUMA CARE & MANAGEMENT

THEORY

1. Introduction to Trauma Care

- Definition of trauma and injury
- Epidemiology of trauma (global and Indian scenario)
- Types of trauma: blunt, penetrating, thermal, chemical
- Golden Hour concept
- Role of emergency & trauma care technician

2. Principles of Emergency Trauma Care

- Primary survey (ABCDE approach)
- Secondary survey (head-to-toe examination)
- Triage system in mass casualty incidents

- Basic life support (BLS) and advanced life support (ALS) overview

3. Airway Management

- Airway anatomy
- Airway obstruction: causes and signs
- Airway opening techniques (head tilt–chin lift, jaw thrust)
- Use of airway adjuncts (OPA, NPA)
- Suctioning techniques
- Oxygen therapy basics

4. Breathing and Ventilation

- Assessment of breathing
- Management of respiratory distress
- Chest injuries:
  - Pneumothorax
  - Hemothorax
  - Flail chest
- Oxygen delivery systems
- Basic ventilatory support

5. Circulation and Shock Management

- Assessment of circulation (pulse, BP, capillary refill)
- Types of shock: hypovolemic, cardiogenic, distributive
- Control of external bleeding
- Internal bleeding recognition
- IV fluid resuscitation basics

6. Hemorrhage Control

- Types of bleeding (arterial, venous, capillary)
- Methods of bleeding control:
  - Direct pressure
  - Pressure bandage
  - Tourniquet use
- Management of severe blood loss

7. Head and Spinal Injuries

- Types of head injuries (concussion, skull fracture)
- Signs of increased intracranial pressure
- Spinal cord injuries and immobilization
- Cervical spine protection techniques

8. Musculoskeletal Injuries

- Fractures: types and classification
- Dislocations and sprains
- Immobilization techniques (splints, bandages)
- Management of open fractures

9. Chest and Abdominal Trauma

- Types of chest injuries and management
- Abdominal injuries (blunt and penetrating)
- Signs of internal organ damage
- Emergency care and stabilization

10. Burns and Thermal Injuries

- Classification of burns (degree and extent)
- Rule of Nine (burn assessment)
- First aid and emergency care for burns
- Electrical and chemical burns

11. Poisoning and Toxic Exposure

- Common types of poisoning
- Signs and symptoms
- Emergency management principles
- Decontamination methods

12. Trauma in Special Situations

- Pediatric trauma care
- Geriatric trauma care
- Trauma in pregnancy
- Sports injuries

13. Disaster Management

- Types of disasters (natural and man-made)
- Disaster preparedness and response
- Incident command system (basic concept)
- Role of trauma technician in disasters

14. Patient Transportation

- Safe patient handling techniques

- Use of stretchers and spine boards
- Ambulance care and monitoring
- Transfer of critically injured patients

15. Infection Control in Trauma Care

- Handling blood and body fluids
- Use of PPE in trauma settings
- Prevention of cross infection

16. Pain Management in Trauma

- Pain assessment scales
- Use of analgesics (basic knowledge)
- Non-pharmacological pain relief methods

17. Documentation and Medico-Legal Aspects

- Trauma documentation and reporting
- Consent and legal issues
- Preservation of evidence (in trauma cases)
- Communication with patient and relatives

18. Rehabilitation and Follow-Up Care

- Basic principles of rehabilitation
- Physiotherapy role (basic idea)
- Psychological support in trauma patients

19. Equipment Used in Trauma Care

- Emergency equipment identification
- Use of defibrillator (basic awareness)
- Monitoring devices (BP, pulse oximeter)
- Maintenance of equipment

20. Quality Assurance and Patient Safety

- Patient safety protocols
- Error prevention in trauma care
- Continuous monitoring and improvement

PRACTICAL

➢ Primary Survey (ABCDE Assessment)

- Demonstration of **Primary Survey (ABCDE approach)**
  - Airway assessment and management
  - Breathing assessment
  - Circulation assessment
  - Disability (neurological status – AVPU/GCS basic)
  - Exposure and temperature control
- Rapid trauma assessment skills

➢ Airway Management Skills

- Airway opening techniques:
  - Head tilt–chin lift
  - Jaw thrust maneuver
- Use of airway adjuncts:
  - Oropharyngeal airway (OPA)
  - Nasopharyngeal airway (NPA)
- Suctioning techniques
- Oxygen administration (mask, nasal cannula)

➢ Breathing and Ventilation Support

- Assessment of respiratory rate and effort
- Use of oxygen delivery devices
- Bag-Valve-Mask (BVM) ventilation (demonstration)
- Recognition of respiratory distress

➢ Circulation and Hemorrhage Control

- Checking pulse and blood pressure
- Capillary refill assessment
- Control of external bleeding:
  - Direct pressure
  - Pressure bandage
  - Tourniquet application
- Recognition of shock signs

➢ Intravenous (IV) Access and Fluid Management

- Assisting in IV cannulation
- Preparation and administration of IV fluids
- Monitoring IV infusion
- Recognition of fluid overload/complications

➢ Immobilization Techniques

- Cervical spine immobilization (cervical collar application)
- Use of spine board
- Log roll technique
- Limb immobilization using splints and bandages

➢ Fracture and Musculoskeletal Injury Management

- Identification of fractures and dislocations
- Application of splints (upper and lower limb)
- Bandaging techniques (triangular, roller bandage)
- Handling open fractures

➢ Head and Spinal Injury Care

- Assessment of consciousness (AVPU/GCS basic)
- Stabilization of head injury patient
- Safe handling of spinal injury cases

➢ Chest and Abdominal Trauma Care

- Recognition of chest injury signs
- Basic management of open chest wounds (dressing)
- Abdominal injury assessment (observation skills)

➢ Burn Management

- Assessment of burn extent (Rule of Nine – basic)
- First aid for burns
- Dressing of burn wounds
- Handling chemical and electrical burns

➢ Patient Transportation Techniques

- Safe lifting and moving techniques
- Use of stretcher, wheelchair, spine board
- Transfer from bed to stretcher
- Ambulance patient care and monitoring

➢ Triage in Emergency Situations

- Demonstration of triage methods
- Categorization of patients based on severity
- Simulation of mass casualty scenarios

➢ Basic Life Support (BLS) Skills

- Cardiopulmonary resuscitation (CPR) steps
- Chest compression techniques
- Use of Automated External Defibrillator (AED) (demo)
- Recovery position

➢ Infection Control During Trauma Care

- Hand hygiene practices
- Use of PPE during trauma management
- Safe disposal of contaminated materials

➢ Pain Assessment and Basic Management

- Use of pain assessment scales
- Assisting in analgesic administration
- Patient comfort measures

➢ Emergency Equipment Handling

- Identification and use of trauma care equipment
- Monitoring devices (pulse oximeter, BP apparatus)
- Maintenance and checking of equipment

➢ Scenario-Based Training

- Simulation of trauma cases:
  - Road traffic accident (RTA)
  - Fall injury
  - Burn case
  - Head injury
- Role-play and team-based response

FIRST AID & BASIC LIFE SUPPORT (BLS)

THEORY

1. Introduction to First Aid

- Definition and principles of first aid
- Objectives of first aid
- Importance in emergency care
- Role and responsibilities of a first aider
- Legal and ethical considerations (Good Samaritan Law – basic awareness)

2. Emergency Response System

- Steps in emergency response
- Scene safety and hazard identification
- Activation of emergency medical services (EMS)
- Primary assessment approach
- Triage basics

3. Basic Life Support (BLS) Overview

- Definition and importance of BLS
- Chain of survival concept
- Components of BLS
- Differences between adult, child, and infant BLS (theory)

4. Cardiopulmonary Resuscitation (CPR)

- Definition and purpose of CPR
- Indications for CPR
- Steps of CPR (CAB approach – Compression, Airway, Breathing)
- Compression–ventilation ratio (adult, child, infant)
- Importance of early defibrillation

5. Airway Management

- Airway anatomy (basic)
- Causes of airway obstruction
- Signs of airway blockage
- Airway opening techniques:
    - Head tilt–chin lift
    - Jaw thrust
- Foreign body airway obstruction (choking) management

6. Breathing and Ventilation

- Assessment of breathing
- Rescue breathing techniques
- Use of barrier devices (mask, pocket mask)
- Recognition of respiratory distress

7. Circulation and Cardiac Emergencies

- Checking pulse and circulation
- Cardiac arrest recognition
- Use of Automated External Defibrillator (AED) (theory)

- Signs of heart attack
- Basic management of cardiac emergencies

8. Management of Unconscious Patient

- Causes of unconsciousness
- Assessment using AVPU scale
- Recovery position
- Monitoring vital signs

9. Control of Bleeding and Wound Care

- Types of bleeding (arterial, venous, capillary)
- Methods of bleeding control:
  - Direct pressure
  - Pressure bandage
  - Tourniquet (basic knowledge)
- Types of wounds and first aid management

10. Fractures and Musculoskeletal Injuries

- Types of fractures
- Signs and symptoms
- Sprains and dislocations
- Immobilization principles
- First aid for fractures

11. Burns and Scalds

- Types of burns (thermal, chemical, electrical)
- Classification (degree of burns)
- First aid management of burns
- Complications of burns

12. Shock and Its Management

- Definition and types of shock
- Signs and symptoms
- First aid management of shock

13. Poisoning and Toxic Emergencies

- Types of poisoning (ingestion, inhalation, injection)
- Signs and symptoms
- First aid management

- Do's and Don'ts in poisoning cases

14. Environmental Emergencies

- Heat stroke and heat exhaustion
- Hypothermia
- Drowning
- Snake bite and insect stings
- First aid management

15. Medical Emergencies

- Seizures (epilepsy)
- Fainting (syncope)
- Asthma attack
- Diabetic emergencies (hypoglycemia, hyperglycemia)
- First aid management

16. Transportation of Injured Patients

- Principles of safe patient handling
- Methods of lifting and carrying
- Use of stretcher and improvised methods

17. Infection Control in First Aid

- Hand hygiene
- Use of gloves and PPE
- Prevention of cross infection

18. First Aid Kit

- Components of a standard first aid kit
- Use of common first aid materials
- Maintenance of first aid kit

PRACTICAL

➢ Scene Assessment and Safety

- Assessment of scene safety (hazards identification)
- Use of personal protective equipment (gloves, mask)
- Activation of emergency response system (calling for help)
- Primary survey approach

➢ Primary Assessment (Initial Evaluation)

- Checking responsiveness (AVPU method)
- Airway, Breathing, Circulation (ABC/CAB approach)
- Checking pulse and breathing
- Rapid assessment of patient condition

➢ Cardiopulmonary Resuscitation (CPR)

- Demonstration of **adult CPR**
- Demonstration of **child CPR**
- Demonstration of **infant CPR**
- Correct hand positioning and compression technique
- Compression–ventilation ratio practice
- Two-rescuer CPR (basic concept)

➢ Use of Automated External Defibrillator (AED)

- Identification of AED
- Steps of AED use (switch on, pad placement, shock delivery)
- Safety precautions during defibrillation

➢ Airway Management Techniques

- Head tilt–chin lift method
- Jaw thrust maneuver
- Clearing airway obstruction
- Use of airway adjuncts (basic awareness/demo)

➢ Management of Choking (Foreign Body Airway Obstruction)

- Heimlich maneuver (abdominal thrust) – adult and child
- Back blows and chest thrusts (infants)
- Self-management of choking (basic awareness)

➢ Rescue Breathing Techniques

- Mouth-to-mouth ventilation
- Use of pocket mask/barrier devices
- Assessment of chest rise

➢ Recovery Position

- Placing an unconscious breathing patient in recovery position
- Monitoring patient while in recovery position

➢ Control of Bleeding

- Direct pressure application
- Pressure bandage
- Use of tourniquet (basic demonstration)
- Elevation technique

➢ Wound Care and Bandaging

- Cleaning and dressing wounds
- Types of bandages:
  - Roller bandage
  - Triangular bandage
- Application techniques

➢ Fracture Management

- Identification of fractures
- Immobilization using splints
- Use of slings
- Handling suspected spinal injuries

➢ Burn Management

- First aid for burns
- Cooling of burn area
- Dressing of burn wounds
- Handling chemical burns

➢ Management of Shock

- Identification of shock signs
- Positioning of patient
- Basic supportive care

➢ Management of Medical Emergencies

- First aid for seizures
- Management of fainting (syncope)
- Assistance in asthma attack (inhaler use)
- Management of diabetic emergencies (basic care)

➢ Environmental Emergency Management

- First aid for heat stroke and heat exhaustion

- Hypothermia management
- Drowning rescue basics (demo/awareness)
- Snake bite first aid

➢ Patient Transportation Techniques

- Safe lifting and carrying methods
- Use of stretcher and wheelchair
- One-person and two-person carry techniques

➢ First Aid Kit Handling

- Identification of items in first aid kit
- Use of common first aid materials
- Maintenance and restocking

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE during first aid
- Safe disposal of contaminated materials

20. Scenario-Based Training

- Simulation of emergency situations:
  - Cardiac arrest
  - Road traffic accident
  - Choking case
  - Burn injury
- Team-based response drills

SEMESTER – III

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DETC301	MEDICAL & SURGICAL EMERGENCIES	45 Min	1 Hrs.	50	50
DETC302	NEONATAL & PAEDIATRIC EMERGENCIES	45 Min	1 Hrs.	50	50
DETC303	OBSTETRIC & TRAUMA EMERGENCIES	45 Min	1 Hrs.	50	50

DETC304	CRITICAL CARE & INTENSIVE CARE UNIT TECHNIQUES	45 Min	1 Hrs.	50	50

MEDICAL & SURGICAL EMERGENCIES

THEORY

1. Introduction to Medical & Surgical Emergencies

- Definition and classification of emergencies
- Difference between medical and surgical emergencies
- Role of emergency care technician
- Principles of emergency management
- Triage and prioritization

2. Initial Assessment and Stabilization

- Primary survey (ABCDE approach)
- Secondary survey
- Vital signs monitoring
- Patient history taking (AMPLE history)
- Emergency resuscitation basics

3. Cardiovascular Emergencies

- Acute coronary syndrome (heart attack)
- Cardiac arrest
- Arrhythmias (basic concept)
- Hypertensive emergencies
- Heart failure
- Basic management principles

4. Respiratory Emergencies

- Acute asthma attack
- Chronic Obstructive Pulmonary Disease (COPD) exacerbation
- Pneumonia
- Pulmonary embolism (basic awareness)
- Respiratory failure
- Oxygen therapy basics

5. Neurological Emergencies

- Stroke (CVA)
- Seizures (epilepsy)
- Headache emergencies
- Unconsciousness and coma
- Meningitis and encephalitis (basic awareness)

6. Gastrointestinal Emergencies

- Acute abdominal pain
- Appendicitis
- Gastrointestinal bleeding
- Vomiting and diarrhea
- Liver emergencies (basic overview)

7. Endocrine and Metabolic Emergencies

- Diabetes mellitus emergencies:
  - Hypoglycemia
  - Diabetic ketoacidosis (DKA)
- Thyroid emergencies (basic concept)
- Electrolyte imbalance

8. Renal and Urological Emergencies

- Acute kidney injury
- Renal colic (kidney stones)
- Urinary retention
- Urinary tract infections (severe cases)

9. Poisoning and Toxicological Emergencies

- Types of poisoning
- Drug overdose
- Alcohol and substance abuse
- Signs and symptoms
- Basic management principles

10. Allergic and Immunological Emergencies

- Allergic reactions
- Anaphylaxis
- Management of severe allergic reactions

11. Infectious Emergencies

- Sepsis and septic shock
- Fever with unknown origin
- Communicable diseases in emergency settings
- Infection control measures

12. Hematological Emergencies

- Anemia (severe cases)
- Bleeding disorders
- Blood transfusion reactions

13. Obstetric and Gynecological Emergencies

- Ectopic pregnancy
- Antepartum and postpartum hemorrhage
- Complications during labor
- Basic emergency care in pregnancy

14. Pediatric Emergencies

- Common pediatric conditions
- Fever, dehydration, seizures
- Respiratory distress in children
- Emergency management principles

15. Surgical Emergencies

- Acute abdomen
- Trauma requiring surgical intervention
- Burns
- Wound infections
- Hernia complications

16. Orthopedic Emergencies

- Fractures and dislocations
- Sprains and soft tissue injuries
- Emergency immobilization

17. ENT and Eye Emergencies

- Epistaxis (nosebleed)
- Foreign body in ear, nose, throat

- Eye injuries and infections

18. Environmental Emergencies

- Heat stroke and heat exhaustion
- Hypothermia
- Drowning
- Snake bite and insect stings

19. Emergency Procedures and Interventions

- Oxygen therapy
- IV fluid administration (basic knowledge)
- Basic wound care
- Catheterization (assisting role)

20. Patient Transportation and Transfer

- Safe transfer of patients
- Ambulance care
- Monitoring during transport

21. Infection Control in Emergencies

- Standard precautions
- PPE use
- Prevention of cross infection

22. Equipment Used in Emergency Care

- Monitoring devices (BP, pulse oximeter)
- Emergency equipment identification
- Maintenance and safety

PRACTICAL

➢ Initial Patient Assessment

- Demonstration of **Primary Survey (ABCDE approach)**
- Secondary assessment (head-to-toe examination)
- Recording vital signs (BP, pulse, respiration, temperature)
- Taking brief history (AMPLE method)

➢ Airway and Breathing Management

- Airway opening techniques (head tilt–chin lift, jaw thrust)
- Use of airway adjuncts (OPA/NPA – demo)
- Oxygen therapy administration (mask, nasal cannula)
- Nebulization technique
- Bag-Valve-Mask (BVM) ventilation (basic demo)

➢ Cardiovascular Emergency Skills

- Recognition of cardiac arrest
- Performing CPR (basic demonstration)
- Use of Automated External Defibrillator (AED) (demo)
- Monitoring pulse and blood pressure
- Assisting in cardiac emergency management

➢ IV Access and Fluid Management

- Assisting in IV cannulation
- Preparation and administration of IV fluids
- Monitoring IV infusion
- Recognition of complications (infiltration, overload)

➢ Drug Administration (Emergency Use)

- Identification of common emergency drugs
- Preparation and administration (oral, IV, IM – demo)
- Dosage calculation (basic practice)
- Safe drug handling and documentation

➢ Management of Respiratory Emergencies

- Assisting in asthma attack management
- Use of inhalers and spacers
- Oxygen support for respiratory distress
- Positioning of patient

➢ Neurological Emergency Management

- Assessment of consciousness (AVPU/GCS basic)
- Care of unconscious patient
- First aid for seizures
- Recovery position

➢ Wound Care and Surgical Emergency Skills

- Cleaning and dressing of wounds
- Control of bleeding (pressure bandage, dressing)
- Assisting in minor surgical procedures
- Handling sterile instruments

➢ Fracture and Orthopedic Management

- Identification of fractures and dislocations
- Application of splints and slings
- Immobilization techniques
- Safe handling of injured limbs

➢ Burn Management

- Assessment of burn injury (basic)
- First aid for burns
- Dressing of burn wounds
- Handling chemical burns

➢ Management of Shock

- Recognition of shock signs
- Positioning and supportive care
- Monitoring vital signs

➢ Poisoning and Toxicology Management

- Identification of poisoning signs
- First aid in poisoning cases
- Assisting in gastric lavage (demo/observation)
- Use of antidotes (basic awareness)

➢ Obstetric and Pediatric Emergency Skills

- Assisting in basic obstetric emergencies
- Care of newborn (basic)
- Pediatric vital signs assessment
- Handling pediatric emergencies

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE

- Safe disposal of biomedical waste
- Prevention of cross infection

➢ Patient Transportation and Transfer

- Safe lifting and moving techniques
- Use of stretcher and wheelchair
- Transfer of critically ill patients
- Monitoring during transport

➢ Emergency Equipment Handling

- Identification of emergency equipment
- Use of monitoring devices (pulse oximeter, BP apparatus)
- Maintenance and checking of equipment

NEONATAL & PAEDIATRIC EMERGENCIES

THEORY

1. Introduction to Neonatal & Paediatric Emergencies

- Definition and scope
- Differences between adult and pediatric patients
- Importance of early intervention
- Role of emergency care technician

2. Growth and Development

- Stages of growth: neonate, infant, child
- Normal vital signs in neonates and children
- Developmental milestones (basic overview)

3. Initial Assessment of Pediatric Patient

- Pediatric assessment triangle (appearance, breathing, circulation)
- Primary survey (ABCDE approach)
- Secondary assessment
- Pediatric history taking (AMPLE method)

4. Neonatal Resuscitation

- Immediate care of newborn
- APGAR score (basic understanding)
- Steps of neonatal resuscitation

- Airway management in newborns

5. Airway and Breathing Emergencies

- Airway obstruction in children
- Respiratory distress and failure
- Common conditions:
  - Bronchiolitis
  - Pneumonia
  - Asthma
- Oxygen therapy basics

6. Cardiovascular Emergencies

- Pediatric cardiac arrest
- Congenital heart diseases (basic awareness)
- Shock in children
- Basic life support (BLS) in children

7. Neurological Emergencies

- Seizures and epilepsy
- Febrile seizures
- Head injury
- Altered consciousness

8. Gastrointestinal Emergencies

- Diarrhea and dehydration
- Vomiting
- Acute abdominal pain
- Intestinal obstruction (basic awareness)

9. Endocrine and Metabolic Emergencies

- Hypoglycemia
- Diabetic ketoacidosis (DKA) (basic concept)
- Electrolyte imbalance

10. Infectious Emergencies

- Fever in children
- Sepsis (basic awareness)
- Meningitis
- Vaccine-preventable diseases (overview)

11. Trauma in Children

- Common pediatric injuries
- Fractures and soft tissue injuries
- Head and spinal injuries
- Burns in children

12. Neonatal Emergencies

- Birth asphyxia
- Neonatal jaundice
- Neonatal infections (sepsis)
- Hypothermia in newborn

13. Poisoning and Toxic Emergencies

- Accidental poisoning in children
- Drug overdose
- First aid and emergency care

14. Allergic and Respiratory Emergencies

- Allergic reactions
- Anaphylaxis
- Asthma attack

15. Environmental Emergencies

- Heat stroke and dehydration
- Hypothermia
- Drowning
- Snake bites and insect stings

16. Fluid and Electrolyte Management

- Dehydration assessment (mild, moderate, severe)
- Oral rehydration therapy (ORT)
- IV fluid therapy (basic knowledge)

17. Pain Management in Children

- Pain assessment scales (basic)
- Non-pharmacological pain management
- Basic pharmacological concepts

18. Child Abuse and Neglect

- Identification of abuse signs
- Legal and ethical responsibilities
- Reporting procedures

19. Communication with Child and Family

- Communication techniques with children
- Dealing with parents/guardians
- Psychological support

20. Patient Transportation and Safety

- Safe handling of neonates and children
- Use of pediatric transport equipment
- Monitoring during transport

21. Infection Control in Pediatric Care

- Hand hygiene
- Use of PPE
- Prevention of cross infection

22. Equipment Used in Neonatal & Pediatric Care

- Pediatric resuscitation equipment
- Oxygen delivery devices
- Monitoring devices

23. Quality Assurance and Patient Safety

- Safety protocols for children
- Error prevention
- Continuous monitoring and improvement

PRACTICAL

➢ Pediatric & Neonatal Assessment

- Demonstration of **Pediatric Assessment Triangle (PAT)**
- Primary survey (ABCDE approach) in children
- Measurement of pediatric vital signs (HR, RR, temperature, SpO_2)
- Weight estimation (for drug/fluid calculation)
- Pediatric history taking (AMPLE method)

➢ Neonatal Resuscitation Skills

- Immediate care of newborn (drying, warming, positioning)
- Airway clearing and stimulation
- Bag-Valve-Mask (BVM) ventilation in neonates (demo)
- Basic steps of neonatal resuscitation
- APGAR score assessment (demo)

➢ Pediatric Basic Life Support (BLS)

- CPR for infants and children
- Compression techniques (one-hand, two-hand, two-finger method)
- Compression–ventilation ratio practice
- Two-rescuer CPR (basic demonstration)

➢ Airway Management

- Airway opening techniques (head tilt–chin lift, jaw thrust)
- Use of airway adjuncts (OPA/NPA – demo)
- Suctioning techniques
- Oxygen administration (mask, nasal cannula)

➢ Respiratory Emergency Management

- Nebulization technique
- Use of inhalers with spacer
- Oxygen therapy for respiratory distress
- Positioning of child for breathing support

➢ IV Access and Fluid Management

- Assisting in pediatric IV cannulation
- Preparation and administration of IV fluids
- Calculation of fluid requirement (basic concept)
- Monitoring IV infusion

➢ Drug Administration (Pediatric Use)

- Identification of pediatric emergency drugs
- Dosage calculation based on weight
- Administration (oral, IV, IM – demo)
- Safe drug handling and documentation

➢ Management of Seizures

- First aid during seizures
- Protection from injury
- Recovery position after seizure
- Monitoring child condition

➢ Management of Dehydration

- Assessment of dehydration signs
- Preparation and administration of ORS
- Assisting in IV fluid therapy

➢ Neonatal Care Procedures

- Maintenance of body temperature (kangaroo care concept)
- Cord care (basic)
- Feeding support (basic awareness)
- Handling premature babies (demo/awareness)

➢ Trauma Management in Children

- Handling pediatric trauma cases
- Immobilization techniques
- Splinting of fractures
- Wound care and dressing

➢ Burn Management

- Assessment of burn injury (basic)
- First aid for burns in children
- Dressing of burn wounds

➢ Poisoning and Toxic Emergency Management

- Identification of poisoning signs
- First aid management
- Assisting in emergency treatment

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE in pediatric care
- Safe disposal of biomedical waste

➢ Patient Handling and Transportation

- Safe handling of neonates and children
- Use of pediatric stretcher/incubator (basic awareness)
- Transfer and positioning techniques

➢ Monitoring and Equipment Use

- Use of pediatric monitoring devices (pulse oximeter, BP cuff)
- Oxygen delivery equipment
- Maintenance and checking

➢ Scenario-Based Training

- Simulation of cases:
  - Neonatal resuscitation
  - Pediatric seizure
  - Severe dehydration
  - Respiratory distress
- Team-based emergency response

OBSTETRIC & TRAUMA EMERGENCIES

THEORY

1. Introduction to Obstetric Emergencies

- Definition and scope
- Importance of maternal emergency care
- Role of emergency & trauma care technician
- Basic female reproductive anatomy (overview)

2. Physiological Changes in Pregnancy

- Normal changes during pregnancy
- Trimester-wise changes
- Implications in emergency care

3. Assessment of Pregnant Patient

- Primary survey (ABCDE approach)
- Obstetric history taking (gravida, para, LMP, EDD)
- Physical examination basics

- Recognition of high-risk pregnancy

4. Normal Labour (Basic Concepts)

- Stages of labour
- Signs of labour
- Mechanism of delivery (overview)
- Role of technician during labour

5. Emergency Childbirth

- Pre-hospital delivery
- Steps of assisting normal delivery
- Care of newborn immediately after birth
- Management of umbilical cord

6. Obstetric Hemorrhage

- Antepartum hemorrhage (APH)
- Postpartum hemorrhage (PPH)
- Causes and risk factors
- Emergency management principles

7. Hypertensive Disorders in Pregnancy

- Pre-eclampsia and eclampsia
- Signs and symptoms
- Emergency management

8. Obstetric Complications

- Ectopic pregnancy
- Placenta previa and placental abruption
- Prolonged/obstructed labour
- Uterine rupture (basic awareness)

9. Trauma in Pregnancy

- Types of trauma (blunt, penetrating)
- Effects of trauma on mother and fetus
- Assessment and stabilization
- Special precautions in pregnant trauma patients

10. Neonatal Emergencies

- Birth asphyxia
- Neonatal resuscitation (basic concept)
- Hypothermia in newborn
- Initial newborn care

11. Abortion and Miscarriage

- Types of abortion (spontaneous, induced)
- Complications of miscarriage
- Emergency care principles

12. Infections in Pregnancy

- Common infections
- Sepsis in pregnancy
- Prevention and basic management

13. Shock in Obstetric Emergencies

- Causes (hemorrhage, sepsis)
- Signs and symptoms
- Management principles

14. Pain Management in Obstetrics

- Labour pain (basic understanding)
- Non-pharmacological methods
- Basic pharmacological concepts

15. Patient Transportation

- Safe transport of pregnant patient
- Positioning (left lateral position)
- Monitoring during transfer

16. Infection Control in Obstetric Care

- Hand hygiene
- Use of PPE
- Prevention of maternal and neonatal infections

17. Equipment Used in Obstetric Emergencies

- Delivery kit components
- Neonatal resuscitation equipment
- Monitoring devices

18. Quality Assurance and Patient Safety

- Safety protocols in obstetric care
- Error prevention
- Continuous monitoring and improvement

PRACTICAL

➢ Assessment of Pregnant Patient

- Primary survey (**ABCDE approach**) in pregnant patient
- Obstetric history taking (Gravida, Para, LMP, EDD)
- Measurement of vital signs
- Identification of high-risk signs (bleeding, hypertension, pain)

➢ Preparation for Emergency Delivery

- Preparation of delivery area (clean and safe environment)
- Identification and arrangement of delivery kit
- Use of sterile gloves and aseptic precautions

➢ Assisting Normal Vaginal Delivery

- Steps of conducting emergency delivery (demo/simulation):
  - Positioning of mother
  - Supporting the head during delivery
  - Checking for cord around neck (nuchal cord)
  - Delivery of shoulders and body
- Clamping and cutting of umbilical cord
- Immediate care of newborn

➢ Newborn Care (Immediately After Birth)

- Drying and warming the newborn
- Clearing airway (mouth and nose suction)
- APGAR score assessment (demo)
- Initiation of breathing (basic stimulation)

➢ Neonatal Resuscitation (Basic Skills)

- Airway positioning of newborn
- Bag-Valve-Mask (BVM) ventilation (demo)
- Monitoring breathing and heart rate
- Maintaining body temperature

➢ Management of Obstetric Hemorrhage

- Identification of bleeding (APH/PPH)
- Estimation of blood loss (basic)
- Applying pressure and supportive care
- Assisting in IV fluid setup

➢ Management of Eclampsia/Seizures

- Recognition of signs (convulsions, hypertension)
- Positioning of patient (left lateral)
- Airway protection
- Monitoring vital signs

➢ Trauma Management in Pregnancy

- Safe handling of pregnant trauma patient
- Immobilization techniques
- Positioning (left lateral tilt)
- Monitoring mother and fetus (basic awareness)

➢ Shock Management

- Identification of shock signs
- Positioning and supportive care
- Assisting in IV fluid administration
- Monitoring vital signs

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE (gloves, mask, gown)
- Aseptic technique during delivery
- Safe disposal of biomedical waste

➢ Patient Transportation

- Safe transfer of pregnant patient
- Use of stretcher/wheelchair
- Monitoring during transport
- Positioning during transfer (left lateral position)

➢ Handling Obstetric Emergencies

- Management of miscarriage (basic care)
- Handling ectopic pregnancy (emergency response awareness)
- Assisting in complicated deliveries (observation/demo)

➢ Equipment Handling

- Identification of obstetric emergency equipment
- Use of delivery kit
- Neonatal resuscitation equipment handling
- Maintenance and checking

➢ Scenario-Based Training

- Simulation of cases:
  - Emergency delivery
  - Postpartum hemorrhage
  - Eclampsia
  - Trauma in pregnancy
- Team-based response drills

CRITICAL CARE & INTENSIVE CARE UNIT TECHNIQUES

THEORY

1. Introduction to Critical Care

- Definition and scope of critical care
- Concept of Intensive Care Unit (ICU)
- Types of ICUs (Medical, Surgical, Neonatal, Cardiac)
- Role of ICU technician
- Ethical issues in critical care

2. ICU Setup and Organization

- Structure and layout of ICU
- ICU equipment and infrastructure
- Infection control in ICU
- ICU protocols and safety measures

3. Patient Assessment in ICU

- Primary and secondary assessment
- Monitoring vital signs (BP, pulse, respiration, temperature)
- Level of consciousness (GCS)
- Intake-output monitoring
- Pain assessment

4. Airway Management in ICU

- Airway anatomy (basic)
- Airway obstruction and management
- Endotracheal intubation (basic concept)
- Tracheostomy care (basic)
- Suctioning techniques

5. Oxygen Therapy and Ventilatory Support

- Types of oxygen delivery systems
- Indications of oxygen therapy
- Mechanical ventilation (basic concepts)
- Modes of ventilation (basic overview)
- Complications of ventilation

6. Cardiovascular Monitoring

- Cardiac monitoring (ECG basics)
- Blood pressure monitoring (invasive and non-invasive)
- Central venous pressure (CVP) monitoring (basic)
- Recognition of arrhythmias (basic)

7. Fluid and Electrolyte Management

- Types of IV fluids
- Fluid balance and electrolyte monitoring
- Acid-base balance (basic concept)
- Management of dehydration and overload

8. Drug Therapy in ICU

- Common ICU drugs (sedatives, analgesics, antibiotics)
- Inotropes and vasopressors
- Drug administration routes in ICU
- Infusion pumps and syringe pumps

9. Infection Control in ICU

- Hospital-acquired infections (HAIs)
- Standard precautions and PPE
- Sterilization and disinfection
- Prevention of ventilator-associated pneumonia (VAP)

10. Nutrition in Critical Care

- Enteral and parenteral nutrition
- Feeding methods (NG tube, PEG)
- Nutritional requirements of critically ill patients

11. Renal Support and Dialysis

- Acute kidney injury (AKI)
- Indications of dialysis
- Hemodialysis (basic concept)
- Care of dialysis patients

12. Neurological Monitoring

- Glasgow Coma Scale (GCS)
- Monitoring intracranial pressure (basic)
- Care of unconscious patient

13. Emergency Procedures in ICU

- Cardiopulmonary resuscitation (CPR)
- Defibrillation (basic concept)
- Central line insertion (assisting role)
- Catheterization (basic awareness)

14. Equipment Used in ICU

- Ventilator
- Cardiac monitor
- Infusion pump

- Defibrillator
- Suction machine
- Pulse oximeter

15. Patient Care in ICU

- Hygiene and comfort care
- Positioning of patient
- Pressure sore prevention
- Bed sore management

16. Special Care Situations

- Care of unconscious patients
- Care of ventilated patients
- Post-operative ICU care
- Multi-organ failure

17. Ethical and Legal Aspects

- Consent in critical care
- End-of-life care (basic awareness)
- Patient rights and confidentiality

18. Patient Safety in ICU

- Prevention of medical errors
- Safe handling of equipment
- Fall prevention
- Medication safety

19. Quality Assurance in ICU

- Infection control audits
- Equipment maintenance
- Continuous quality improvement
- Accreditation standards

PRACTICAL

- **ICU Orientation and Setup**

- Identification of ICU layout and zones
- Familiarization with ICU equipment
- Understanding ICU safety protocols

- Maintenance of cleanliness and aseptic environment

➢ Patient Assessment and Monitoring

- Measurement and recording of vital signs (BP, pulse, RR, temperature)
- Use of pulse oximeter (SpO_2 monitoring)
- Cardiac monitor setup (basic ECG monitoring)
- Glasgow Coma Scale (GCS) assessment (basic)
- Intake-output chart maintenance

➢ Airway Management Skills

- Airway opening techniques
- Suctioning of airway (oral/nasal)
- Assisting in endotracheal intubation
- Tracheostomy care (cleaning and suctioning – demo)

➢ Oxygen Therapy and Ventilator Care

- Administration of oxygen (mask, nasal cannula)
- Setup and basic handling of ventilator (demo)
- Monitoring ventilated patients
- Care of oxygen delivery devices

➢ IV Therapy and Fluid Management

- Assisting in IV cannulation
- Preparation and administration of IV fluids
- Use of infusion pump and syringe pump
- Monitoring IV infusion and complications

➢ Drug Administration in ICU

- Preparation of emergency and ICU drugs
- Administration via IV/IM/oral routes (demo)
- Dosage calculation practice
- Documentation of drug administration

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE in ICU
- Aseptic techniques during procedures
- Biomedical waste segregation and disposal

➢ Wound Care and Pressure Ulcer Prevention

- Dressing of wounds
- Identification of pressure sores
- Positioning and repositioning of patients
- Skin care and hygiene

➢ Nutrition Support

- Assisting in enteral feeding (NG tube feeding)
- Care of feeding tubes
- Monitoring nutritional intake

➢ Renal Care and Dialysis (Basic)

- Assisting in dialysis procedures (observation/demo)
- Care of catheter sites
- Monitoring patient during dialysis

➢ Emergency Procedures in ICU

- Assisting in CPR
- Use of defibrillator (demo)
- Assisting in central line insertion (basic awareness)
- Catheterization (assisting role)

➢ Patient Care and Comfort

- Bed making and hygiene care
- Positioning of critically ill patients
- Oral care and eye care
- Prevention of complications (bed sores, infections)

➢ Handling ICU Equipment

- Use of ventilator (basic understanding)
- Cardiac monitor operation
- Infusion pump handling
- Suction machine operation
- Maintenance and troubleshooting

➢ Patient Transportation

- Safe transfer of ICU patients
- Use of portable monitoring devices

- Oxygen support during transport
- Coordination with emergency team

SEMESTER – IV

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DETC401	ADVANCED LIFE SUPPORT (ALS) TECHNIQUES	45 Min	1 Hrs.	50	50
DETC402	EQUIPMENT & INSTRUMENTATIO N IN EMERGENCY	45 Min	1 Hrs.	50	50
DETC403	AMBULANCE OPERATIONS AND PRE-HOSPITAL CARE	45 Min	1 Hrs.	50	50
DETC404	HOSPITAL MANAGEMENT & VENTILATION TECHNIQUE	45 Min	1 Hrs.	50	50

ADVANCED LIFE SUPPORT (ALS) TECHNIQUES

THEORY

1. Introduction to Advanced Life Support (ALS)

- Definition and scope of ALS
- Difference between BLS and ALS
- Importance of ALS in emergency care
- Chain of survival (advanced concepts)
- Role of emergency & trauma care technician in ALS

2. Advanced Patient Assessment

- Primary survey (ABCDE approach)
- Secondary survey
- Detailed patient assessment
- Monitoring vital signs and clinical status
- Recognition of life-threatening conditions

3. Airway Management in ALS

- Advanced airway anatomy (basic)
- Airway obstruction and management
- Endotracheal intubation (basic concept)
- Supraglottic airway devices (LMA, etc.)
- Cricothyrotomy (basic awareness)

4. Advanced Breathing and Ventilation

- Oxygen therapy (advanced use)
- Bag-Valve-Mask (BVM) ventilation
- Mechanical ventilation (basic overview)
- Monitoring oxygenation (SpO_2, ABG basics)
- Respiratory failure management

5. Cardiac Monitoring and ECG Interpretation

- Basics of ECG
- Identification of common arrhythmias:
  - Ventricular fibrillation (VF)
  - Ventricular tachycardia (VT)
  - Asystole
  - Pulseless electrical activity (PEA)
- Importance of rhythm recognition

6. Advanced Cardiac Life Support (ACLS)

- Cardiac arrest algorithms (adult)
- CPR with advanced techniques
- Defibrillation and synchronized cardioversion
- Post-resuscitation care
- Role during resuscitation team

7. Emergency Drugs in ALS

- Common ALS drugs:
  - Adrenaline (epinephrine)
  - Amiodarone
  - Atropine
  - Lidocaine
- Drug indications, dosage (basic), routes
- Drug administration during CPR

8. Vascular Access Techniques

- Intravenous (IV) access
- Intraosseous (IO) access (basic awareness)
- Central line (assisting role)
- Fluid resuscitation principles

9. Management of Cardiac Emergencies

- Acute coronary syndrome (ACS)
- Arrhythmias management
- Heart failure (acute)
- Hypertensive emergencies

10. Management of Respiratory Emergencies

- Acute respiratory failure
- Severe asthma attack
- Pulmonary edema
- Airway obstruction

11. Neurological Emergencies

- Stroke management (basic overview)
- Seizure management
- Coma and unconsciousness
- Head injury (basic ALS approach)

12. Trauma Life Support

- Advanced trauma assessment
- Airway and breathing in trauma
- Hemorrhage control (advanced methods)
- Shock management

13. Pediatric Advanced Life Support (PALS)

- Pediatric assessment
- Pediatric cardiac arrest management
- Pediatric airway management
- Pediatric drug administration (basic awareness)

14. Special Resuscitation Situations

- Drowning
- Electrocution
- Drug overdose
- Pregnancy-related cardiac arrest

15. Post-Resuscitation Care

- Stabilization after ROSC (Return of Spontaneous Circulation)
- Monitoring and supportive care
- Prevention of complications
- Transfer to ICU

16. Equipment Used in ALS

- Defibrillator
- Cardiac monitor
- Ventilator (basic awareness)
- Infusion pumps
- Airway devices

17. Infection Control in ALS

- Use of PPE
- Safe handling of equipment
- Prevention of cross infection

PRACTICAL

➢ Advanced Patient Assessment

- Demonstration of **Primary Survey (ABCDE approach)**
- Secondary assessment (detailed examination)
- Monitoring vital signs and patient status
- Recognition of life-threatening conditions

➢ Advanced Airway Management

- Airway opening techniques
- Use of airway adjuncts (OPA, NPA)
- Assisting in endotracheal intubation
- Use of supraglottic airway devices (LMA – demo)
- Airway suctioning techniques

➢ Advanced Ventilation Skills

- Bag-Valve-Mask (BVM) ventilation (one and two rescuer)
- Oxygen therapy administration (advanced devices)
- Assisting in mechanical ventilation (basic)
- Monitoring oxygen saturation (SpO_2)

➢ Cardiac Monitoring and ECG

- Setup and use of cardiac monitor
- Identification of basic ECG rhythms (demo-based learning)
- Monitoring patient during cardiac emergencies

➢ Cardiopulmonary Resuscitation (Advanced CPR)

- High-quality CPR techniques
- Team-based resuscitation
- Compression–ventilation coordination
- Switching roles during CPR

➢ Defibrillation and Cardioversion

- Use of defibrillator (manual/AED – demo)
- Pad placement and safety precautions
- Synchronized cardioversion (basic awareness)

➢ Emergency Drug Administration

- Preparation of ALS drugs (adrenaline, amiodarone, atropine)
- IV/IM drug administration (demo)
- Drug administration during CPR
- Dosage calculation practice

➢ Vascular Access Techniques

- Assisting in IV cannulation
- Intraosseous (IO) access (demo/awareness)
- Preparation of IV fluids
- Monitoring infusion

➢ Management of Cardiac Emergencies

- Assisting in acute coronary syndrome care
- Management of arrhythmias (basic practical approach)
- Monitoring during cardiac events

➢ Management of Respiratory Emergencies

- Assisting in severe asthma management
- Oxygen therapy in respiratory failure
- Patient positioning for breathing support

➢ Neurological Emergency Management

- Assessment of consciousness (GCS/AVPU)
- First aid for seizures
- Care of unconscious patient
- Recovery position

➢ Trauma Management (Advanced Support)

- Airway and breathing support in trauma
- Hemorrhage control techniques
- Assisting in shock management
- Immobilization techniques

➢ Pediatric Advanced Life Support (PALS) Skills

- Pediatric CPR (infant and child)
- Airway management in children
- Pediatric drug calculation (basic practice)

➢ Post-Resuscitation Care

- Monitoring after return of spontaneous circulation (ROSC)
- Oxygen therapy and airway care
- Patient stabilization for ICU transfer

➢ Equipment Handling

- Use of defibrillator
- Cardiac monitor operation
- Ventilator (basic handling awareness)
- Infusion pump usage

➢ Infection Control Practices

- Hand hygiene
- Use of PPE during ALS procedures
- Safe disposal of biomedical waste

EQUIPMENT & INSTRUMENTATION IN EMERGENCY

THEORY

1. Introduction to Emergency Equipment

- Definition and importance of medical equipment in emergency care
- Classification of equipment (diagnostic, therapeutic, monitoring)
- Role of emergency care technician in equipment handling
- Safety principles in equipment use

2. Basic Monitoring Equipment

- Thermometer (types and use)
- Blood pressure apparatus (manual and digital)
- Pulse oximeter (SpO_2 monitoring)
- Glucometer (blood glucose monitoring)
- Cardiac monitor (basic overview)

3. Airway and Breathing Equipment

- Oxygen cylinders and central oxygen supply
- Oxygen delivery devices:
  - Nasal cannula
  - Face mask
  - Non-rebreather mask
- Bag-Valve-Mask (BVM)
- Suction apparatus
- Nebulizer

4. Ventilatory Support Equipment

- Mechanical ventilator (basic concept)
- Types of ventilators
- Components of ventilator
- Indications and complications

5. Cardiac Equipment

- Defibrillator (manual and AED)
- ECG machine
- Cardiac monitor

- Pacemaker (basic awareness)

6. Intravenous and Infusion Equipment

- IV cannula and catheters
- IV fluid administration sets
- Infusion pumps and syringe pumps
- Blood transfusion sets

7. Emergency and Resuscitation Equipment

- Crash cart components
- Emergency drug kit
- Laryngoscope (basic concept)
- Endotracheal tubes
- Airway adjuncts (OPA, NPA)

8. Diagnostic Equipment in Emergency

- X-ray (basic awareness)
- Ultrasound (basic concept)
- CT scan (overview)
- Point-of-care testing devices

9. Surgical Instruments in Emergency

- Basic surgical instrument sets
- Dressing instruments (forceps, scissors)
- Suturing instruments (basic awareness)
- Sterilization of instruments

10. Orthopedic Equipment

- Splints and braces
- Traction devices (basic awareness)
- Cervical collars
- Spine boards

11. Obstetric and Neonatal Equipment

- Delivery kit components
- Neonatal resuscitation equipment
- Incubator (basic concept)
- Infant warmer

12. Infection Control Equipment

- Autoclave
- Sterilizers and disinfectants
- PPE kits (gloves, masks, gowns)
- Biomedical waste containers

13. Transport and Ambulance Equipment

- Stretcher and wheelchair
- Ambulance equipment setup
- Portable oxygen and monitoring devices
- Emergency kits in ambulance

14. Maintenance and Safety of Equipment

- Cleaning and disinfection
- Calibration of equipment (basic awareness)
- Storage and handling
- Troubleshooting common problems

15. Electrical Safety in Medical Equipment

- Basic electrical safety principles
- Handling electrical devices safely
- Prevention of electrical hazards

16. Legal and Ethical Aspects

- Responsibility in equipment handling
- Reporting errors and accidents
- Patient safety considerations

17. Quality Assurance

- Regular equipment checks
- Preventive maintenance
- Standard operating procedures (SOPs)
- Accreditation standards (basic awareness)

18. Role of Technician in Emergency Equipment Handling

- Preparation of equipment before procedures
- Assisting doctors and nurses
- Ensuring readiness during emergencies

- Post-use care and maintenance

PRACTICAL

➢ Identification of Emergency Equipment

- Identification and naming of common emergency equipment
- Understanding purpose and indications of each device
- Classification: monitoring, therapeutic, diagnostic equipment

➢ Basic Monitoring Equipment Handling

- Use of thermometer (oral/axillary/digital)
- Measurement of blood pressure (manual and digital BP apparatus)
- Use of pulse oximeter (SpO_2 monitoring)
- Glucometer use (blood glucose testing)
- Recording and interpretation of basic readings

➢ Airway and Breathing Equipment

- Oxygen cylinder handling and safety precautions
- Use of oxygen delivery devices (mask, nasal cannula)
- Bag-Valve-Mask (BVM) ventilation (demo)
- Use of suction machine
- Nebulizer setup and use

➢ Ventilator and Respiratory Support Equipment

- Identification of ventilator parts (demo)
- Basic ventilator setup (observation)
- Monitoring ventilated patients (basic parameters)

➢ Cardiac Equipment Handling

- Use of defibrillator (demo)
- ECG machine setup (basic use)
- Cardiac monitor operation
- Recognition of alarms and basic troubleshooting

➢ Intravenous and Infusion Equipment

- Identification of IV cannula and sets
- Preparation of IV fluid setup
- Use of infusion pump and syringe pump
- Monitoring IV infusion

➢ Emergency and Resuscitation Equipment

- Crash cart identification and arrangement
- Emergency drug tray setup
- Use of laryngoscope (demo)
- Identification of endotracheal tubes and airway adjuncts

➢ Surgical Instruments Handling

- Identification of basic surgical instruments
- Handling of dressing instruments (forceps, scissors)
- Sterilization and storage techniques

➢ Orthopedic Equipment Handling

- Application of splints
- Use of cervical collar
- Spine board handling
- Immobilization techniques

➢ Obstetric and Neonatal Equipment

- Identification of delivery kit
- Neonatal resuscitation equipment (demo)
- Use of infant warmer (basic awareness)

➢ Infection Control Equipment

- Use of PPE (gloves, masks, gowns)
- Operation of autoclave (demo/observation)
- Biomedical waste segregation using color-coded bins

➢ Transport and Ambulance Equipment

- Use of stretcher and wheelchair
- Safe patient transfer techniques
- Use of portable oxygen and monitoring devices
- Ambulance equipment setup

➢ Equipment Cleaning and Maintenance

- Cleaning and disinfection of equipment
- Safe storage practices
- Identification of faulty equipment
- Basic troubleshooting

➢ Electrical Safety Practices

- Safe handling of electrical equipment
- Checking connections and power supply
- Prevention of electrical hazards

GENERAL PATHOLOGY & MICROBIOLOGY

THEORY

1. Introduction to Pathology

- Definition and scope of pathology
- Branches of pathology (general and systemic)
- Importance of pathology in emergency care
- Basic concepts of disease

2. Cell Injury and Adaptation

- Causes of cell injury
- Types of cell injury (reversible and irreversible)
- Cellular adaptations:
  - Atrophy
  - Hypertrophy
  - Hyperplasia
  - Metaplasia

3. Inflammation and Repair

- Definition and types of inflammation (acute, chronic)
- Signs of inflammation
- Process of inflammation
- Healing and repair of tissues
- Factors affecting wound healing

4. Hemodynamic Disorders

- Edema
- Hemorrhage
- Thrombosis
- Embolism
- Infarction
- Shock (pathophysiology basics)

5. Infection and Immunity

- Definition of infection
- Types of infections
- Immune system (basic overview)
- Antigen and antibody
- Types of immunity (innate and acquired)

6. Neoplasia (Basic Oncology)

- Definition of tumor
- Benign vs malignant tumors
- Characteristics of cancer
- Spread of tumors (metastasis – basic concept)

7. Hematology

- Composition and functions of blood
- Hemoglobin and RBC, WBC, platelets
- Common blood disorders:
  - Anemia
  - Leukemia (basic awareness)
  - Bleeding disorders

8. Blood Grouping and Transfusion

- ABO blood groups
- Rh factor
- Cross-matching (basic concept)
- Blood transfusion and reactions (basic awareness)

9. Introduction to Microbiology

- Definition and scope
- Types of microorganisms:
  - Bacteria
  - Viruses
  - Fungi
  - Parasites
- Importance in healthcare

10. Bacteriology

- Structure of bacteria
- Classification of bacteria

- Growth and reproduction
- Common pathogenic bacteria

11. Virology

- Structure and types of viruses
- Modes of transmission
- Common viral infections

12. Mycology

- Fungi: structure and types
- Common fungal infections

13. Parasitology

- Types of parasites
- Modes of transmission
- Common parasitic infections

14. Sterilization and Disinfection

- Definitions: sterilization, disinfection, antisepsis
- Methods of sterilization (heat, chemical)
- Use of disinfectants

15. Hospital-Acquired Infections

- Definition of HAIs
- Common infections in hospital
- Prevention and control measures

16. Specimen Collection and Handling

- Types of specimens (blood, urine, sputum, etc.)
- Methods of collection
- Transport and storage of specimens
- Safety precautions

17. Antibiotics and Antimicrobial Resistance

- Basic classification of antibiotics
- Use in infections
- Concept of antibiotic resistance
- Rational use of antibiotics

18. Infection Control Practices

- Hand hygiene
- Use of PPE
- Prevention of cross infection

19. Laboratory Investigations

- Complete blood count (CBC)
- Blood glucose test
- Urine examination
- Basic microbiological tests (overview)

20. Role of Technician in Pathology & Microbiology

- Assisting in sample collection
- Handling laboratory equipment
- Maintaining hygiene and safety
- Documentation and reporting

21. Safety and Biohazard Management

- Biological hazards
- Safe handling of infectious materials
- Waste disposal
- Needle-stick injury prevention

22. Quality Control and Assurance

- Importance of quality control in lab
- Standard precautions
- Record keeping

PRACTICAL

➢ Laboratory Orientation

- Introduction to pathology & microbiology laboratory
- Identification of lab sections and equipment
- Safety rules and precautions in laboratory
- Use of lab coats, gloves, and PPE

➢ Basic Laboratory Equipment Handling

- Identification and use of:

  - Microscope
  - Centrifuge
  - Incubator
  - Water bath
- Care and maintenance of equipment

➢ Microscopy Techniques

- Parts of microscope and handling
- Preparation of slides (basic awareness)
- Observation of stained slides (demo):
  - Blood smear
  - Bacteria (basic identification)
- Focusing and viewing techniques

➢ Hematology Practical

- Collection of blood samples (capillary/venous – demo)
- Hemoglobin estimation (basic method)
- Preparation of blood smear (demo)
- Identification of RBC, WBC, platelets (microscopy)
- Basic CBC understanding (report reading)

➢ Blood Grouping and Typing

- Determination of ABO blood group (demo)
- Rh typing (basic)
- Cross-matching (basic awareness)

➢ Urine Examination

- Collection of urine sample
- Physical examination (color, odor, volume)
- Chemical tests (sugar, protein – demo)
- Microscopic examination (basic awareness)

➢ Microbiology Techniques

- Preparation of culture media (demo/observation)
- Inoculation techniques (basic awareness)
- Staining methods (Gram staining – demo)
- Identification of bacteria (basic observation)

➢ Sterilization and Disinfection

- Use of autoclave (demo/observation)
- Preparation of disinfectant solutions
- Sterilization of instruments
- Maintenance of aseptic conditions

➢ Specimen Collection and Handling

- Collection techniques for:
  - Blood
  - Urine
  - Sputum
  - Swabs
- Labeling and transport of specimens
- Safety precautions

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE
- Safe handling of biological samples
- Biomedical waste segregation

➢ Antibiotic Sensitivity Testing

- Concept of antibiotic sensitivity
- Observation of culture plates (demo)
- Basic interpretation of results

➢ Recording and Reporting

- Maintenance of laboratory records
- Preparation of basic reports
- Interpretation of simple lab results

➢ Safety and Biohazard Management

- Handling infectious materials safely
- Needle-stick injury prevention
- Spill management in laboratory

➢ Scenario-Based Training

- Simulation of sample collection

- Infection control practices
- Emergency handling of biohazards

HOSPITAL MANAGEMENT & VENTILATION TECHNIQUE

THEORY

1. Introduction to Hospital Management

- Definition and scope of hospital management
- Types of hospitals (government, private, specialty)
- Structure and organization of hospital
- Role of healthcare team members
- Role of emergency & trauma care technician

2. Hospital Departments and Functions

- Outpatient Department (OPD)
- Emergency Department (ED)
- Intensive Care Unit (ICU)
- Operation Theatre (OT)
- Laboratory and Radiology
- Support services (pharmacy, CSSD, housekeeping)

3. Principles of Hospital Administration

- Planning and organization
- Staffing and human resource management
- Coordination and supervision
- Communication in hospital setup

4. Hospital Policies and Protocols

- Standard operating procedures (SOPs)
- Patient safety protocols
- Infection control policies
- Emergency response protocols

5. Patient Care Management

- Admission and discharge procedures
- Patient rights and responsibilities

- Patient safety and comfort
- Communication with patients and relatives

6. Medical Records and Documentation

- Types of hospital records
- Importance of documentation
- Electronic health records (EHR) – basic awareness
- Confidentiality and legal aspects

7. Inventory and Equipment Management

- Procurement and storage of medical supplies
- Inventory control techniques
- Maintenance of equipment
- Biomedical waste management

8. Infection Control in Hospital

- Standard precautions
- Hospital-acquired infections (HAIs)
- Sterilization and disinfection
- Role of infection control committee

9. Quality Assurance and Accreditation

- Quality standards in healthcare
- Accreditation bodies (basic awareness)
- Audit and quality improvement
- Patient safety indicators

10. Disaster and Emergency Management

- Hospital disaster preparedness
- Emergency response planning
- Mass casualty management
- Role during disasters

VENTILATION TECHNIQUE

11. Introduction to Ventilation

- Definition of ventilation
- Types: spontaneous and mechanical ventilation
- Indications for ventilatory support

12. Respiratory Physiology

- Mechanics of breathing
- Gas exchange
- Oxygenation and ventilation concepts

13. Oxygen Therapy

- Types of oxygen delivery systems
- Indications and contraindications
- Complications of oxygen therapy

14. Mechanical Ventilation

- Definition and purpose
- Types of ventilators
- Components of ventilator
- Basic ventilator settings (tidal volume, rate, FiO_2)

15. Modes of Ventilation

- Volume-controlled ventilation
- Pressure-controlled ventilation
- Assist-control mode
- SIMV (basic concept)

16. Monitoring of Ventilated Patients

- Vital signs monitoring
- Pulse oximetry (SpO_2)
- Arterial blood gases (ABG) – basic concept
- Recognizing ventilator alarms

17. Airway Management in Ventilation

- Endotracheal intubation (basic concept)
- Tracheostomy care (basic)
- Suctioning techniques

18. Complications of Mechanical Ventilation

- Barotrauma
- Ventilator-associated pneumonia (VAP)
- Oxygen toxicity
- Weaning difficulties

19. Weaning from Ventilator

- Criteria for weaning
- Methods of weaning (basic)
- Monitoring during weaning

20. Infection Control in Ventilation

- Prevention of ventilator-associated infections
- Sterilization of equipment
- Use of PPE

21. Equipment Used in Ventilation

- Ventilator
- Oxygen cylinder and pipeline
- Humidifier
- Suction machine
- Monitoring devices

22. Role of Technician in Ventilation

- Assisting in ventilator setup
- Monitoring patient condition
- Handling ventilator equipment
- Reporting abnormalities

PRACTICAL

PART A: HOSPITAL MANAGEMENT

➢ Hospital Orientation

- Identification of hospital departments (OPD, Emergency, ICU, OT)
- Understanding hospital layout and patient flow
- Roles of different healthcare staff

➢ Patient Handling and Care

- Patient admission and discharge procedures (demo)
- Safe patient handling techniques
- Bed making (occupied and unoccupied bed)
- Patient hygiene and comfort care

➢ Medical Records and Documentation

- Filling patient records and case sheets
- Maintaining admission/discharge records
- Basic use of hospital registers
- Confidentiality practices

➢ Infection Control Practices

- Hand hygiene techniques
- Use of PPE (gloves, masks, gowns)
- Biomedical waste segregation
- Cleaning and disinfection practices

➢ Inventory and Equipment Management

- Identification of hospital supplies
- Stock checking and inventory maintenance
- Storage of medical equipment
- Reporting damaged or missing items

7. Emergency and Disaster Management

- Participation in mock drills
- Triage demonstration
- Emergency response procedures
- Role during mass casualty incidents

➢ Patient Transportation

- Safe transfer of patients (bed to stretcher)
- Use of wheelchair and stretcher
- Monitoring patient during transport

PART B: VENTILATION TECHNIQUE

➢ Oxygen Therapy

- Setup and use of oxygen cylinder
- Use of oxygen delivery devices (mask, nasal cannula)
- Monitoring oxygen flow rate
- Safety precautions

➢ Airway Management

- Airway opening techniques
- Suctioning (oral/nasal)
- Assisting in endotracheal intubation
- Tracheostomy care (demo)

➢ Ventilator Handling

- Identification of ventilator parts
- Basic ventilator setup (demo/observation)
- Understanding control panel and alarms
- Monitoring ventilated patients

➢ Bag-Valve-Mask (BVM) Ventilation

- Assembly of BVM
- Providing ventilation (adult and pediatric – demo)
- Checking chest rise

➢ Monitoring of Ventilated Patients

- Monitoring vital signs
- Use of pulse oximeter (SpO_2)
- Observation of respiratory parameters
- Identifying ventilator alarms

➢ Infection Control in Ventilation

- Cleaning and sterilization of respiratory equipment
- Use of PPE during procedures
- Prevention of ventilator-associated infections

➢ Patient Care on Ventilator

- Positioning of ventilated patient
- Oral and airway care
- Prevention of bed sores
- Monitoring complications

➢ Emergency Management

- Assisting during respiratory failure
- Handling ventilator disconnections (basic response)
- Assisting in CPR with ventilator support

➢ Equipment Maintenance

- Cleaning and storage of ventilator accessories
- Checking oxygen supply and connections
- Basic troubleshooting

LIST OF HOLIDAYS

TOTAL DAY IN 1 YEAR	**365/366**
SUNDAY	52 DAYS
SUMMER VACATION	10 DAYS
WINTER VACATION	10 DAYS
GAZETTED HOLIDAYS	23 DAYS
OTHER HOLIDAYS	20 DAYS
TOTAL HOLIDAYS	115 DAYS
TOTAL WORKING DAYS	365-115=250

TOTAL HOURS

THEORY CLASS PER DAY	**3 HOURS**
PRACTICAL CLASS PER DAY	4 HOURS
TOTAL HOURS PER DAY	7 HOURS
TOTAL HOURS IN 1 YEAR	250*7=1750
TOTAL HOURS IN 6 MONTHS	875 HOURS

Chairman

Paramedical Education & Training Council