



SYLLABUS AND CURRICULUM OF CERTIFICATE IN MEDICAL LABORATORY TECHNOLOGY COURSE

CMLT

CMLT stands for Certificate in Medical Laboratory Technology. It is a Certificate program that trains students in the skills and knowledge necessary to work as medical laboratory technicians, performing diagnostic tests in clinical laboratories. These tests help in the prevention, diagnosis, and treatment of diseases by analyzing bodily fluids, tissues, and other samples.

Course Overview

- **Full Form:** Certificate in Medical Laboratory Technology
- **Duration:** 1 Year + 3 Months (Internship)
- **Eligibility:**
 - 10 pass (Science stream or arts)
 - Minimum 45–50% marks
 - On the basis of 10th (Only Certificate Courses)

Career Opportunities after CMLT

- Laboratory Assistant / Technician
- Pathology Lab Assistant
- Blood Bank Assistant
- Diagnostic Centre Technician
- Hospital Lab Staff
- Private Practice (with further qualification)



SEMESTER – I

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
CMLT101	HUMAN ANATOMY & PHYSIOLOGY	45 Min	1 Hrs.	50	50
CMLT102	FUNDAMENTAL OF MLT	45 Min	1 Hrs.	50	50
CMLT103	CLINICAL PATHOLOGY	45 Min	1 Hrs.	50	50
CMLT104	CLINICAL MICROBIOLOGY	45 Min	1 Hrs.	50	50

Anatomy & Physiology Syllabus

ANATOMY & PHYSIOLOGY is a core subject in Allied Health/Paramedical courses. It covers the structure (anatomy) and function (physiology) of the human body systems.

Theory Syllabus

1. Introduction to Human Body

- Definition and scope of anatomy and physiology
- Structural organization of the human body
- Anatomical terms, positions, and planes

2. Cell and Tissues

- Structure and function of cell organelles
- Cell division (mitosis and meiosis)
- Types of tissues: epithelial, connective, muscular, and nervous

3. Skeletal System

- Types of bones, structure, and functions
- Major bones of the body
- Joints: types and functions

4. Muscular System

- Types of muscles: skeletal, smooth, cardiac
- Structure and function
- Muscle contraction (basic mechanism)

5. Circulatory System

- Structure of heart and blood vessels



- Cardiac cycle and circulation of blood
- Blood: components and functions
- Blood groups and blood coagulation

6. Respiratory System

- Structure of respiratory organs
- Mechanism of breathing
- Exchange of gases
- Respiratory volumes

7. Digestive System

- Organs of the digestive system
- Functions of each part
- Digestion and absorption of nutrients

8. Excretory System

- Structure and function of kidneys, ureters, bladder, urethra
- Formation of urine
- Fluid and electrolyte balance

9. Nervous System

- Central and peripheral nervous system
- Brain and spinal cord
- Neuron structure and nerve impulse
- Autonomic nervous system

10. Endocrine System

- Major endocrine glands (pituitary, thyroid, adrenal, pancreas, etc.)
- Hormones and their functions

11. Reproductive System

- Male and female reproductive organs
- Menstrual cycle, fertilization, pregnancy basics

12. Integumentary System

- Structure and functions of skin
- Appendages of the skin (hair, nails, glands)

13. Lymphatic and Immune System

- Lymph nodes and lymphatic vessels
- Spleen, thymus
- Basics of immunity



Practical Syllabus

- Identification of bones and joints
- Models of major organs (heart, lungs, kidney, brain)
- Charts of different systems
- Microscopic study of tissues
- Blood pressure measurement
- Basic human body measurements (height, weight, pulse)

FUNDAMENTAL OF MLT

This subject introduces students to the basics of laboratory science and clinical procedures.

Theory Syllabus

1. Introduction to Medical Laboratory Science

- Definition, scope, and importance of MLT
- Ethics and responsibilities of an MLT professional
- Laboratory disciplines: Hematology, Biochemistry, Microbiology, Histopathology, Blood Bank, etc.

2. Laboratory Safety & First Aid

- Personal protective equipment (PPE)
- Biosafety levels
- Handling biohazard materials and waste disposal
- Needle stick injury – prevention and first aid
- Fire safety, chemical hazards, and emergency procedures

3. Laboratory Glassware and Equipment

- Classification of glassware (graduated, non-graduated, volumetric)
- Calibration and care of lab glassware
- Introduction to laboratory instruments:
 - Centrifuge
 - Autoclave
 - Incubator
 - Water bath
 - Hot air oven
 - Microscope – parts, use, and maintenance

4. Sterilization and Disinfection

- Definitions: Sterilization, disinfection, antiseptic
- Methods of sterilization:
 - Physical (heat, filtration, radiation)
 - Chemical methods



- Preparation of disinfectant solutions
- Aseptic techniques

5. Basic Laboratory Procedures

- Sample collection:
 - Blood (venipuncture, capillary)
 - Urine, stool, sputum
- Labeling, transport, and storage of specimens
- Anticoagulants – types and uses
- Specimen rejection criteria
- Cleaning and maintenance of laboratory

6. Units of Measurement and Preparation of Reagents

- SI units: Length, volume, weight, temperature
- Solutions:
 - Normal, molar, percent, buffer solutions
 - pH and its measurement
- Dilution techniques
- Common laboratory reagents – preparation and storage

7. Quality Control and Quality Assurance

- Internal and external quality control
- Accuracy, precision, sensitivity, specificity
- Calibration of equipment
- Documentation and record keeping
- Good Laboratory Practices (GLP)

8. Basic Hematology (Introductory)

- Composition and functions of blood
- Blood collection methods and precautions
- Anticoagulants used in hematology
- Introduction to hemoglobin estimation and cell counts

9. Introduction to Clinical Biochemistry (Introductory)

- Blood glucose, urea, creatinine – basic principles
- Sample handling and storage for biochemistry
- Use of colorimeter and autoanalyzer

10. Basic Microbiology (Introductory)

- Microorganisms: Bacteria, viruses, fungi, protozoa
- Microscopy – staining techniques (Gram stain)
- Aseptic culture techniques

11. Basic Histopathology (Introductory)



- Fixation and types of fixatives
- Tissue processing overview
- Embedding, microtomy, and staining basics

Practical Syllabus

- Identification and handling of basic laboratory equipment:
 - Microscope
 - Centrifuge
 - Incubator
 - Autoclave
 - Water bath
 - Hot air oven
- Glassware: Types, uses, and cleaning (Beakers, test tubes, pipettes, burettes, flasks)
- Laboratory Safety and Hygiene
- Sterilization and Disinfection Techniques
- Use and Care of Microscope
- Collection and Handling of Specimens
- Preparation of Reagents and Solutions
- Basic Laboratory Techniques
- Basic Staining Techniques
- Record Keeping and Reporting

CLINICAL PATHOLOGY

Clinical Pathology deals with the analysis of body fluids (blood, urine, stool, sputum, etc.) to diagnose diseases.

Theory Syllabus

1. Introduction to Clinical Pathology

- Definition and scope
- Importance of clinical pathology in diagnosis
- Role of a medical lab technician in clinical pathology

2. Collection and Preservation of Specimens

- Types of biological samples: Blood, urine, stool, sputum, CSF, body fluids
- General principles of sample collection
- Anticoagulants – types, uses, and preparation
- Specimen labeling, transport, and storage
- Precautions and rejection criteria

3. Examination of Blood

- Hemoglobin estimation: Sahli's method, Cyanmethemoglobin method
- Total Leukocyte Count (TLC)
- Differential Leukocyte Count (DLC)



- Red Blood Cell (RBC) count
- Platelet count
- Packed Cell Volume (PCV)/Hematocrit
- ESR (Erythrocyte Sedimentation Rate) – Westergren and Wintrobe methods
- Blood indices: MCV, MCH, MCHC
- Blood smear preparation and staining (Leishman stain)
- Reticulocyte and malarial parasite identification

4. Urine Analysis

Physical Examination

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

Chemical Examination

- Protein (heat and acetic acid test, sulfosalicylic acid)
- Sugar (Benedict's test)
- Ketone bodies (Rothera's test)
- Bile salts and bile pigments
- Blood (benzidine test)
- Urobilinogen

Microscopic Examination

- RBCs, WBCs, epithelial cells, casts, crystals, bacteria, yeast, parasites

5. Stool Examination

- Collection and preservation
- Physical characteristics: Color, consistency, mucus, blood
- Chemical examination: Occult blood
- Microscopic examination:
 - Ova, cysts, trophozoites
 - Worm segments and eggs
 - Undigested food particles, pus cells

6. Sputum Examination

- Collection and preservation
- Gross examination
- Microscopic examination:
 - Staining for AFB (Ziehl-Neelsen stain)
 - Pus cells, epithelial cells, bacteria

7. Body Fluid Examination (Introductory)

- Cerebrospinal fluid (CSF): Collection, appearance, cell count, protein and sugar estimation
- Ascitic, pleural, synovial fluids – basic examination



8. Quality Control in Clinical Pathology

- Pre-analytical, analytical, and post-analytical errors
- Internal and external quality control measures
- Importance of reporting and documentation
- Maintenance of log books and records

Practical Syllabus

- Hemoglobin estimation (Sahli's/Cyanmethemoglobin)
- RBC, WBC, and Platelet counting (manual)
- DLC using Leishman stain
- ESR by Westergren and Wintrobe methods
- Urine analysis (Physical, Chemical, Microscopy)
- Stool examination (routine and ova/cyst identification)
- Sputum smear preparation for AFB
- Microscopic examination of CSF and other fluids

CLINICAL MICROBIOLOGY

Theory Syllabus

1. Introduction to Microbiology

- History and scope of microbiology
- Branches of microbiology
- Structure and classification of microorganisms:
 - Bacteria
 - Viruses
 - Fungi
 - Protozoa

2. Laboratory Organization and Safety

- Layout of a microbiology lab
- Biosafety levels (BSL-1 to BSL-4)
- Aseptic techniques
- Handling of infectious material
- Biomedical waste management
- Personal protective equipment (PPE)

3. Sterilization and Disinfection

- Definition and importance
- Methods of sterilization:
 - **Physical methods:** Dry heat (hot air oven), moist heat (autoclave), filtration, radiation
 - **Chemical methods:** Alcohol, formalin, glutaraldehyde
- Disinfection of surfaces and instruments



- Sterility testing

4. Culture Media and Culture Techniques

- Types of culture media:
 - **Basic media:** Nutrient agar, broth
 - **Enriched media:** Blood agar, chocolate agar
 - **Selective media:** MacConkey, Lowenstein-Jensen (LJ)
 - **Differential media**
 - **Transport media**
- Preparation and sterilization of media
- Culture techniques:
 - Streak plate
 - Pour plate
 - Spread plate
- Anaerobic culture techniques

5. Microscopy and Staining Techniques

- Parts and types of microscopes
- Gram staining
- Acid-fast staining (Ziehl-Neelsen)
- Simple staining
- Negative staining
- Special stains (e.g., spore stain)

6. Bacteriology

- Morphology and classification of bacteria
- Pathogenic bacteria and their diseases:
 - Gram-positive cocci: *Staphylococcus*, *Streptococcus*
 - Gram-negative cocci: *Neisseria*
 - Gram-positive bacilli: *Corynebacterium diphtheriae*, *Clostridium spp.*, *Bacillus spp.*
 - Gram-negative bacilli: *Escherichia coli*, *Salmonella*, *Shigella*, *Klebsiella*, *Pseudomonas*
 - Acid-fast bacilli: *Mycobacterium tuberculosis*
- Collection, transport, and processing of specimens
- Identification methods:
 - Morphology
 - Biochemical reactions
 - Serology

7. Virology (Introductory)

- Structure and classification of viruses
- Common viral infections: Hepatitis, HIV, influenza, herpes, rabies
- Laboratory diagnosis of viral infections:
 - Serological methods (ELISA)
 - Rapid tests
 - PCR (introductory)



8. Mycology (Introductory)

- Classification of fungi: Molds, yeasts, dimorphic fungi
- Fungal infections: Candidiasis, dermatophytosis, aspergillosis
- Lab diagnosis: KOH mount, culture, staining

9. Parasitology (Introductory)

- Classification of parasites
- Medically important protozoa and helminths:
 - Entamoeba histolytica, Giardia lamblia, Plasmodium spp.
 - Ascaris, Hookworm, Taenia, Wuchereria
- Stool examination techniques: Saline and iodine wet mount, concentration methods

10. Immunology and Serology (Basic)

- Antigen and antibody
- Types of immunity: Innate, acquired, active, passive
- Serological tests:
 - Widal test
 - VDRL
 - ELISA
 - CRP, ASO
 - Rapid antigen/antibody tests

11. Antimicrobial Sensitivity Testing (AST)

- Principles of antibiotic susceptibility testing
- Methods:
 - Kirby-Bauer disc diffusion method
 - MIC (introductory)
- Antibiotic resistance and MDR organisms

Practical Syllabus

- Operation of microscope
- Preparation and sterilization of media
- Inoculation techniques (streaking, spreading, pouring)
- Gram staining
- Acid-fast staining
- Motility testing (hanging drop)
- Culture interpretation and colony morphology
- Biochemical tests: Catalase, Coagulase, Indole, Urease, Citrate, TSI, Oxidase
- Stool examination (saline, iodine mount)
- Urine culture and sensitivity
- Widal and VDRL tests
- KOH mount for fungi



SEMESTER – II

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
CMLT201	MEDICAL LAB TECHNOLOGY & INSTRUMENTATION	45 Min	1 Hrs.	50	50
CMLT202	CLINICAL BIOCHEMISTRY	45 Min	1 Hrs.	50	50
CMLT203	BLOOD SAMPLE COLLECTION	45 Min	1 Hrs.	50	50
CMLT204	BLOOD BANKING	45 Min	1 Hrs.	50	50

MEDICAL LAB TECHNOLOGY & INSTRUMENTATION

This subject introduces laboratory instruments, their working principles, handling, and maintenance, which are critical for accurate diagnostic testing.

Theory syllabus

1. Introduction to Medical Laboratory Instruments

- Importance of instrumentation in laboratory diagnosis
- Classification of laboratory instruments
- Basic principles of laboratory devices

2. Weighing and Measuring Devices

- Types of balances: Analytical and digital balances
- Proper use and care of balances
- Measuring instruments: Measuring cylinders, pipettes, burettes, micropipettes

3. Colorimetry and Spectrophotometry

- Principle of colorimetry (Beer-Lambert law)
- Parts and working of a colorimeter
- Principle and components of spectrophotometer
- Applications in clinical biochemistry
- Maintenance and calibration

4. pH Meter

- Principle and working of pH meter
- Calibration and maintenance
- Measurement of pH in biological samples

5. Centrifuge



- Types: Bench-top, high-speed, refrigerated
- Principle of centrifugation
- Applications: Separation of serum, plasma, urine sediment
- Balancing, care, and safety precautions

6. Incubator and Hot Air Oven

- Principle and uses in microbiology and sample incubation
- Temperature regulation and maintenance
- Cleaning and safety precautions

7. Water Bath and Heating Devices

- Use in serology, biochemistry, microbiology
- Types: Simple water bath, serological water bath
- Thermostatic control, precautions

8. Autoclave and Sterilizers

- Principle of steam sterilization
- Operation of autoclave: Temperature, pressure, time
- Validation and safety precautions
- Hot air oven: Uses in dry sterilization

9. Microscopes

- Types: Light microscope, compound microscope, fluorescence microscope (introductory)
- Parts and functions
- Handling, cleaning, and maintenance

10. Electrolyte Analyzers and Semi-Auto Analyzers

- Principle and function
- Sample handling and result interpretation
- Common troubleshooting

11. Blood Cell Counters (Hematology Analyzers)

- Principle of automated cell counting
- Types: 3-part and 5-part analyzers
- Sample loading, maintenance, and result interpretation

12. Quality Control in Instrumentation

- Importance of calibration and QC in lab instruments
- Preventive maintenance
- Logbook maintenance and documentation
- Equipment validation



Practical Syllabus

➤ **Handling and Operation of Instruments**

- Weighing using analytical and digital balances
- Measurement using pipettes and burettes
- Use of micropipettes with calibration

➤ **Colorimeter and Spectrophotometer**

- Operating a colorimeter for blood glucose, protein estimation
- Use of spectrophotometer (demo/practice if available)

➤ **pH Meter**

- Calibration using buffer solutions
- Measurement of sample pH

➤ **Centrifuge**

- Balancing tubes
- Operation for serum/plasma separation

➤ **Autoclave and Hot Air Oven**

- Operation steps, safety checks
- Use of indicator tape and validation

➤ **Incubator and Water Bath**

- Setting and checking temperature
- Applications in culture incubation

➤ **Microscopy**

- Parts identification
- Cleaning and focusing slides under different magnifications

➤ **Semi-Auto Analyzer / Cell Counter (if available)**

- Sample preparation
- Loading and interpretation of results

➤ **Maintenance Logs**

- Daily/weekly maintenance checklist for lab instruments
- Sample instrument logbook entry

CLINICAL BIOCHEMISTRY



Theory syllabus

1. Introduction to Clinical Biochemistry

- Definition and scope
- Role of biochemistry in disease diagnosis
- Safety rules in a biochemistry laboratory
- Sample collection, preservation, and processing
- Pre-analytical, analytical, post-analytical phases

2. Carbohydrate Metabolism and Analysis

- Digestion and absorption of carbohydrates
- Blood glucose regulation (insulin, glucagon)
- Disorders: Diabetes mellitus, hypoglycemia
- Estimation of:
 - Fasting and postprandial blood glucose
 - Glycosylated hemoglobin (HbA1c)
 - Glucose tolerance test (GTT)

3. Protein and Amino Acid Metabolism

- Structure, types, and functions of proteins
- Protein digestion and absorption
- Disorders: Proteinuria, hypo/hyperproteinemia
- Estimation of:
 - Total protein
 - Albumin and A/G ratio
 - Urea and uric acid
 - Creatinine

4. Lipid Metabolism and Analysis

- Digestion and absorption of fats
- Lipoproteins: LDL, HDL, VLDL
- Lipid profile:
 - Total cholesterol
 - Triglycerides
 - HDL/LDL estimation
- Atherosclerosis and hyperlipidemia

5. Liver Function Tests (LFT)

- Bilirubin metabolism
- Estimation of:
 - Total and direct bilirubin
 - ALT (SGPT), AST (SGOT)
 - Alkaline phosphatase
 - Serum proteins (albumin, globulin)
- Clinical interpretation in hepatitis, cirrhosis



6. Kidney Function Tests (KFT)

- Role of kidneys in waste excretion
- Estimation of:
 - Blood urea
 - Serum creatinine
 - Uric acid
 - Electrolytes (Na^+ , K^+ , Cl^- – introductory)
- Clearance tests (introductory)

7. Acid-Base Balance and Electrolytes

- pH, buffer systems
- Acid-base disorders: Acidosis, alkalosis (introductory)
- Sodium, potassium, chloride – roles and estimation (basic)

8. Enzymes in Clinical Diagnosis

- Definition and classification
- Diagnostic enzymes:
 - AST, ALT
 - Amylase, lipase
 - ALP, ACP, LDH, CK
- Clinical interpretation in myocardial infarction, pancreatitis, liver disease

9. Endocrine Function Tests (Introductory)

- Hormones: Types and functions
- Thyroid function tests: T3, T4, TSH
- Blood glucose as part of endocrine test (insulin function)

10. Automation in Clinical Biochemistry

- Semi-auto and fully automated analyzers
- Use of photometry and spectrophotometry
- Quality control: Internal and external
- Calibration and maintenance of instruments

Practical Syllabus

➤ Sample Collection and Processing

- Blood and urine sample handling
- Serum and plasma separation
- Use of anticoagulants

➤ Estimation Techniques

- Blood glucose (Glucose oxidase/peroxidase method)
- Urea (diacetyl monoxime or enzymatic method)
- Creatinine (Jaffe's method)



- Total protein (Biuret method)
- Albumin (BCG method)
- Cholesterol (CHOD-PAP method)
- Triglycerides
- Liver function tests (ALT, AST, bilirubin)

➤ **Instrumentation**

- Use of colorimeter and semi-auto analyzer
- Use of centrifuge, pipette, and pH meter
- Calibration of instruments

➤ **Quality Control**

- Preparation of standard curves
- Use of controls and reagents
- Interpretation and recording of results

➤ **Urine Biochemistry (Qualitative)**

- Protein (heat and acetic acid, sulfosalicylic acid)
- Glucose (Benedict's test)
- Ketone bodies (Rothera's test)
- Bile salts and pigments

BLOOD SAMPLE COLLECTION

It includes theoretical knowledge and practical procedures essential for safe and effective phlebotomy.

Theory syllabus

1. Introduction to Blood Collection

- Purpose and importance of blood collection
- Types of blood samples:
 - **Venous blood** (most common)
 - **Capillary blood** (finger/heel prick)
 - **Arterial blood** (for blood gas analysis – advanced)

2. Methods of Blood Collection

- **Venipuncture** (common for laboratory tests)
- **Capillary puncture** (in infants, glucose testing, etc.)
- Arterial puncture (only in special settings)

3. Equipment for Blood Collection

- Tourniquet



- Sterile needles and syringes
- Vacutainer tubes (EDTA, Citrate, Heparin, Fluoride, Plain, Gel tubes)
- Butterfly needle (for difficult veins)
- Alcohol swab, sterile gauze, cotton, and bandages
- Needle disposal container (sharp bin)

4. Anticoagulants and Their Use

Anticoagulant	Tube Color	Use
EDTA	Lavender	CBC, hematology tests
Sodium Citrate	Light Blue	Coagulation tests (PT, APTT)
Fluoride Oxalate	Grey	Blood glucose
Heparin	Green	Biochemistry
No Additive	Red	Serum-based tests

5. Site Selection for Venipuncture

- Preferred vein: **Median cubital vein**
- Alternatives: Cephalic vein, basilic vein
- Avoid: Infected/injured sites, IV sites, scar tissue

6. Procedure for Venipuncture

1. Verify patient identity and fasting status
2. Assemble all required equipment
3. Apply tourniquet 3–4 inches above puncture site
4. Clean site with 70% alcohol in circular motion
5. Allow to dry, insert needle at 15–30° angle
6. Collect required amount of blood in appropriate tubes
7. Release tourniquet before removing needle
8. Apply gauze and ask patient to press
9. Label all tubes properly before leaving bedside
10. Dispose of sharps and gloves safely

7. Capillary Blood Collection

- Site: Finger (adults), heel (infants)
- Use of lancets, micropipettes, or capillary tubes
- Used for: Glucose, malaria, hemoglobin tests

8. Precautions During Blood Collection

- Never draw blood above an IV line



- Avoid excessive probing or blind puncture
- Never reuse needles or syringes
- Maintain aseptic technique
- Always label samples immediately

9. Complications and Errors

- Hematoma formation
- Fainting/syncope
- Hemolysis of sample
- Clotted sample due to delay in mixing
- Wrong tube or improper filling

10. Transport and Storage of Blood Samples

- Serum/plasma separation within 1–2 hours
- Maintain cold chain if required
- Avoid exposure to direct sunlight or heat
- Label with time and date of collection

Practical Syllabus

➤ Hands-on Training

- Demonstration of venipuncture (on manikins or simulation arms)
- Practice of capillary blood collection (finger prick)
- Sample collection in vacutainers and syringes

➤ Tube Identification and Use

- Color-coded tube identification
- Correct order of draw (to avoid cross-contamination of additives)

➤ Labeling and Documentation

- Writing patient name, date, time, and test name on sample
- Use of barcode systems (where applicable)

➤ Safety and Hygiene Practices

- Donning and doffing gloves
- Use of hand sanitizer and handwashing
- Disposal of used needles in sharp containers

BLOOD BANKING

This subject deals with the collection, testing, storage, and transfusion of blood and its components, ensuring safe blood transfusion practices.



Theory syllabus

1. Introduction to Blood Banking

- Definition and history of blood banking
- Structure and functions of a blood bank
- Role of blood bank in healthcare
- Blood bank organization and licensing norms (NACO, FDA)

2. Basic Hematology for Blood Banking

- Composition and functions of blood
- Structure and functions of RBCs, WBCs, platelets
- Plasma and serum: Difference and clinical use

3. Blood Groups and Typing

- ABO blood group system
- Rh blood group system
- Other blood group systems (Kell, Duffy – overview)
- Forward and reverse grouping
- Weak D (Du) testing
- Bombay blood group (introductory)

4. Collection of Blood from Donors

- Donor selection criteria (age, weight, hemoglobin, etc.)
- Blood donation process
- Blood collection bags and anticoagulants (CPDA, EDTA, ACD)
- Volume of collection and labeling
- Donor reactions and management

5. Compatibility Testing (Crossmatching)

- Major and minor crossmatch
- Direct and indirect antiglobulin tests (Coombs test)
- Causes of incompatibility
- Interpretation and troubleshooting

6. Component Separation and Storage

- Types of blood components:
 - Packed RBCs
 - Platelet concentrate
 - Fresh Frozen Plasma (FFP)
 - Cryoprecipitate
- Centrifugation techniques
- Storage conditions and shelf-life for each component

7. Transfusion Transmitted Infections (TTI)



- Mandatory screening tests:
 - HIV 1 & 2
 - Hepatitis B & C
 - Syphilis
 - Malaria (where applicable)
- ELISA, rapid tests, chemiluminescence (introductory)
- Interpretation and reporting of TTI results

8. Storage and Preservation of Blood

- Blood bank refrigerator (2–6°C)
- Deep freezers for FFP
- Platelet agitator/incubator
- Temperature monitoring and recording
- Cold chain maintenance

9. Adverse Reactions to Transfusion

- Hemolytic transfusion reactions
- Allergic and febrile reactions
- Anaphylactic reactions
- Post-transfusion infection
- Management and reporting of reactions

10. Quality Control and Documentation

- Quality assurance in blood bank operations
- Calibration and maintenance of blood bank equipment
- Standard operating procedures (SOPs)
- Record keeping: Donor records, blood issue register, stock register
- NABH/NACO/WHO guidelines (introductory)

Practical Syllabus

➤ Blood Grouping

- Forward and reverse ABO grouping
- Rh (D) typing and weak D testing

➤ Crossmatching

- Major and minor crossmatch procedures
- Coombs test (Direct & Indirect)

➤ Donor Room Practices

- Demonstration of donor screening
- Preparation of blood bag and labeling
- Sample collection for testing

➤ TTI Screening (Demonstration/Hands-on)



- Rapid test and ELISA (if available)
- Sample processing and interpretation
- **Component Preparation (Demo or Practice)**
 - Use of centrifuge for blood separation
 - Labeling and storage of components
- **Equipment Use**
 - Blood bank refrigerator, platelet incubator
 - Use and maintenance of temperature logbooks
- **Record Keeping**
 - Donor and recipient records
 - Blood issue and transfusion reaction forms

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