Diploma in Medical Laboratory Technology (DMLT)

Course Title: **Introduction to Medical Laboratory Science, Laboratory Safety, Ethics and First Aid**

Course Code: DMLT-101

Course Type: Theory + Practical

Credits: 4 (3 Theory + 1 Practical)

Teaching Hours: 60 (Theory) + 30 (Practical)

Course Objectives:

Upon completion of this course, students will be able to:

a) Understand the organization and functioning of a medical laboratory.
b) Recognize laboratory equipment and their applications.
c) Follow laboratory safety practices and biosafety guidelines.
d) Apply professional ethics in laboratory practice.
e) Provide basic first aid during laboratory emergencies.
f) Maintain laboratory records and quality standards.

UNIT I: Introduction to Medical Laboratory Science (12 Hours)

Introduction to Medical Laboratory Technology, Organization of Medical Laboratory, Types of laboratories: Clinical laboratories, Diagnostic laboratories, Research laboratories, Public health laboratories. Layout and design of a laboratory; Different sections of laboratory- Hematology, Clinical Biochemistry, Microbiology, Histopathology, Blood Bank, Cytology, Molecular Diagnostics

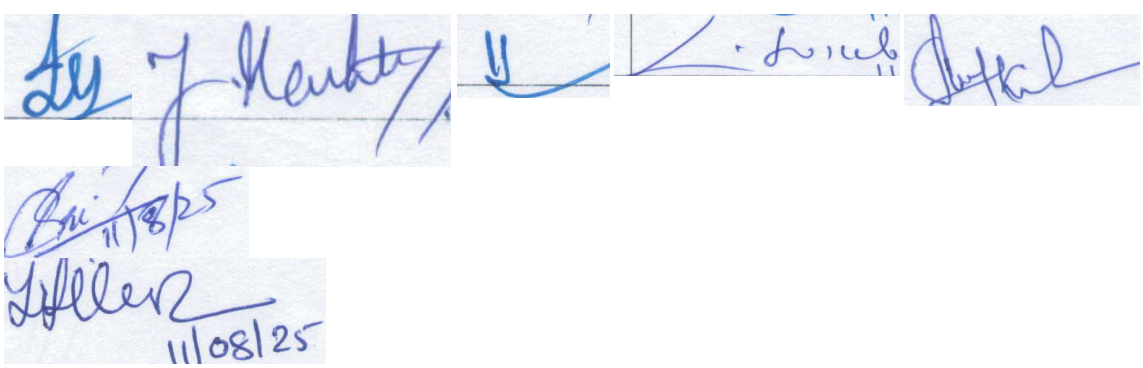
Laboratory Instruments: Microscopes, Centrifuge, Incubators, Hot air oven, Water bath, Autoclave, Colorimeter, Spectrophotometer, Refrigerators and deep freezers

UNIT II: Laboratory Safety and Biosafety (12 Hours)

Laboratory Hazards- biological, chemical, physical, electrical/fire, radiation; Biosafety- Principles and levels of biosafety (BSL-1 to BSL-4), Personal Protective Equipment (PPE)- Gloves, Laboratory coat, Face mask, Face shield, Goggles and Shoe covers. Laboratory Safety Practices-Safe handling of specimens, Spill management,Safe handling of sharps, Chemical storage, Electrical and Fire safety. Biomedical Waste Management-Waste segregation, Color coding, Waste disposal methods, Incineration, Autoclaving.

UNIT III: Laboratory Ethics and Professional Practice (12 Hours)

Medical Ethics-Definition, Principles of ethics, Beneficence, Non-maleficence, Justice and Autonomy. Professional Ethics-Responsibilities of laboratory professionals, Patient rights,



Respect for patients, Patient confidentiality, Medical records-Laboratory information security and data privacy. Quality Assurance- Good Laboratory Practices (GLP), Standard Operating Procedures (SOPs), Internal Quality Control (IQC), External Quality Assurance (EQA), Accreditation (NABL, ISO 15189 – overview)

UNIT IV: First Aid and Emergency Management (12 Hours)

Introduction to First Aid-Definition, Principles, Objectives, First aider responsibilities.
Medical Emergencies-Fainting, Shock, Seizures, Burns, Electric shock, Poisoning,
Allergic reactions. Bleeding and Wounds-Types of wounds, Control of bleeding, Bandaging, Dressing techniques. Fractures and Injuries-Types of fractures, Sprains.
Cardiopulmonary Resuscitation (CPR),

UNIT V: Laboratory Records, Quality Management and Professional Development (12 Hours)

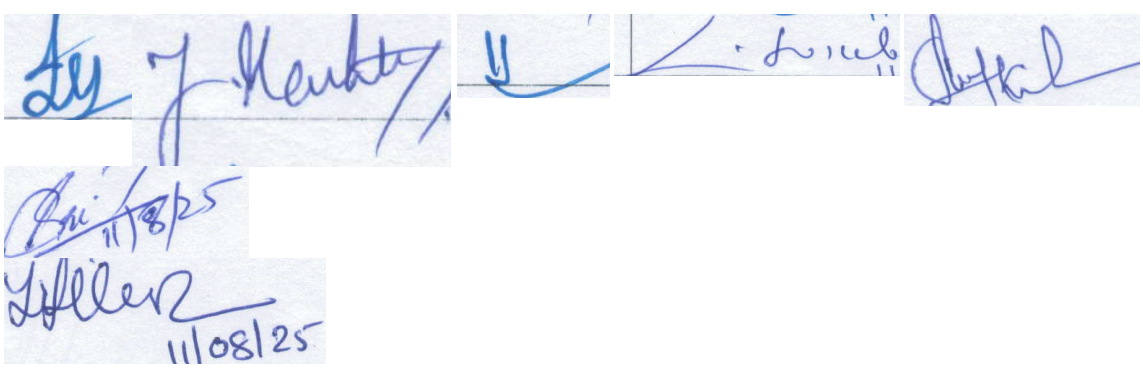
Laboratory Documentation, Laboratory registers, Sample registers, Stock registers,
Equipment maintenance logbooks, Incident reports. Specimen Management- Patient identification, Sample collection, Labelling, Transportation, Storage, Rejection criteria. Laboratory Quality Management- Quality indicators, Equipment calibration, Preventive maintenance, Error prevention

Practicals

1. Haematology Techniques (Hb, ESR, CBC)
2. Clinical Biochemistry (Glucose, Urea, etc.)
3. Clinical Microbiology (Staining, Culturing)
4. Urine and Stool Examination
5. Instrumentation and Maintenance
6. Quality Control and Reporting

Suggested Learning Outcomes

By the end of the course, students should be able to:
Explain the organization and functions of a medical laboratory.
Demonstrate safe laboratory practices and biosafety measures.
Apply ethical principles and maintain confidentiality in laboratory work.
Perform basic first aid procedures and respond appropriately to emergencies.
Maintain laboratory records and follow quality management practices.



This syllabus is aligned with the needs of a Diploma in Medical Laboratory Technology (DMLT) program and is suitable for implementation under state technical education boards and skill-based curricula following NEP 2020 principles.

