DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY
SYLLABUS

FIRST YEAR EXAMINATION (BROAD HEADS):

PAPER I: DML101 PATHOLOGY - i) Clinical Pathology ii) Haematology
PAPER II: DML102 MICROBIOLOGY- i) General Bacteriology ii) Systemic Bacteriology iii) Immunology & Serology iv) Clinical Bacteriology
PAPER III: DML103 BIOCHEMISTRY

SECOND YEAR EXAMINATION (BROAD HEADS):

PAPER I: DML201 PATHOLOGY - i) Histopathology ii) Cytopathology iii) Blood Banking
PAPER III: DML203 BIOCHEMISTRY DETAILED
SYLLABUS - 1ST YEAR

PAPER I: DML101 PATHOLOGY

Clinical Pathology
1. Reception of patients, noting carefully the test advised phlebotomy and aftercare of patients.
2. The Microscope – different types, parts of microscope, cleaning & care.
4. Examinations of body fluids – CSF, Pleural, peritoneal & pericardial fluid, Bronchoalveolar lavage fluid, hydatid cyst fluid, Joint fluid.
5. Examination of Semen – physical characters, count, motility, viability and morphology
6. Transportation of different clinical materials to distant laboratories.
7. Basic concepts of Jaundice.

Hematology

1. Composition of blood and its function.
2. Origin, development & morphology of blood cells.
5. Methods of total counts of WBC, RBC & Platelets & fluids used.
6. Methods of determination of PCV.
7. Calculation of different red cell indices (Haemogram)
8. Basic principles of semi or automated blood cell counters & HPLC.
10. Bone marrow aspiration methods and staining & preparation of Tray for Bone marrow aspiration and biopsy.
11. Differential leucocyte count (peripheral smear study)
12. Reticulocyte staining, count and preparation of stain.
13. Erythrocyte sedimentation rate (Procedure & reading only).
14. Basic tests for coagulopathy – BT, CT, P time, APTT.
15. Some special test – LE cell test, RBC Osmotic fragility & Foetal Hb%.
   Heamatology
16. Basics of quality control methods and Laboratory accreditation.
17. Biosafety measures and disposal of laboratory waste.
19. Basic concepts of anaemia, Leukemia and hemorrhagic disorder

PAPER II:  DML102  MICROBIOLOGY

General Bacteriology
1. Physiology and growth requirements.
3. Preparation of culture media
4. Bacterial staining – Gram/Ziehl Neelsen/others
5. Methods of colony count & morphological identification of bacteria by colony characters, staining & motility tests.
7. Final identification of bacteria with High-titre sera
8. Antibiotic sensitivity tests.

Systemic Bacteriology
1. The microbial world and the structure of microbes.
2. Collection of specimens for microbiological examination.
3. Methods of inoculation of culture media from different samples.
4. Basic concept of individual Bacteria.
5. Laboratory diagnosis of pyogenic infection.
6. Laboratory diagnosis of Leprosy.
7. Laboratory diagnosis of Tuberculosis.
8. Laboratory diagnosis of URTI.
9. Laboratory diagnosis of LRTI
10. Laboratory diagnosis of Enteric fever.
11. Laboratory diagnosis of Bacillary dysentery.
12. Laboratory diagnosis of Diarrhoeal diseases.
13. Laboratory diagnosis of Urinary tract infection
14. Laboratory diagnosis of Meningitis.

Immunology & Serology
2. Types of Antigen and Antibody reactions.

**Clinical Bacteriology**
1. Laboratory diagnosis of UTI, Sore throat, diarrhoea, acute pyogenic meningitis, Food poisoning and others

**PAPER III: DML103 BIOCHEMISTRY**

1. Laboratory hazards, Laboratory safety procedures, Laboratory waste disposal.
2. Collection, Separation, preservation and transport of the biological specimens, anticoagulants.
3. Clinical laboratory instrumentation (Balance, Oven, Water bath)
5. Acid, Base, Buffer (Definition, example, pK, pH, Handerson-Hasselbach’s equation)
6. Principles of Photometry, (Lambert-Beer’s Law, Flamephotometry, Reflectance Fluorometry.)
7. Ion selective electrodes. (Nernst equation, pH electrode, Sodium, Potassium electrode, PCO2 electrode)
8. Chemistry of Carbohydrates.
9. Chemistry of Lipids.
12. Radioactivity (Types) of radioactive decay with examples, Radioactive half life, Units of radioactivity application of radioisotope in clinical chemistry)
13. Electrophoresis. (Principle, types, application in clinical biochemistry, Serum & Hemoglobin electrophoresis)
DETAILED SYLLABUS - 2nd YEAR

PAPER I: DML201 PATHOLOGY -

Histopathology & Cytopathology

1. Basic concepts of different mammalian tissues and their histological structure.
2. Different human organs and their gross and histological structure and functions.
3. Receiving of biopsy specimens at laboratory (Clinical notes/fixatives).
4. Fixation of tissue—different fixatives and their mode of action.
5. Methods of decalcification.
7. Use of Microtomes, selection and maintenance of knives, technique of section cutting & mounting on slides.
8. Staining of tissue sections, preparation of different stains, staining methods for Haematoxylin & Eosin, Reticulin, PAS, Van-Gieson, Massion’s trichrome, Lipid & Mucin stains & Perl’s stain.
10. Preparation of cytosmear and H&E, Papanicolaou & MGG staining of different body fluids.
13. Cytospin and cell block preparation.

Blood Banking

2. Basic blood banking procedures – collection of blood, anticoagulants used, cross matching, different screening tests including Coomb’s Test for incomplete antibodies, preparation of different blood components for use and how to serve a requisition. Preparation of red cell suspension.
4. Detect the time when to discard blood in Blood Bank.
PAPER II: DML202 MICROBIOLOGY

Immunology & Serology
1. Diagnostic serological methods - Agglutination & Flocculation, Latex agglutination tests - to be performed by the students, Elisa testing & RIA - principles and demonstration and interpretation of results of - Widal Test, VDRL Test, Aldehyde Test, ASO Titre, Rheumatoid factor, C-reactive protein, HBsAg, Anti HCV, Anti HIV.

Parasitology
1. Basic knowledge on Protozoa and helminths.

Mycology
1. General & Systemic Mycology
2. Demonstration of Fungus in Laboratory.

Animal Care
1. Common laboratory animals – Food, Handling, Housing, Breeding.
2. Care of normal and experimental animals.
3. Sacrifice, postmortem and disposal.

Clinical Microbiology
1. Laboratory diagnosis of Malaria, Protozoal dysentery, Kalazar, Hook worm infection, Ascarisis, Filariasis, Taeniasis, hepatitis, Viral diarrhea, HIV/AIDS, Candidiasis, Cryptococcal meningitis.
2. Biosafety measures.
3. Examination of stool
4. Quality Control

Virology
1. General & Systemic Virology

PAPER III: DML203 BIOCHEMISTRY

1. Definition of Antigen & Antibody, Antigen-Antibody reaction, Detection of Antigen-Antibody Reactions (ELISA, RIA)
2. Clinical Enzymology. (Definition of enzyme, classification with examples, types of enzyme-substrate reactions, assay of enzymes. End point & Kinetic, clinical importance of enzymes, isoengymes.)
3. Disorders of Carbohydrate metabolism & their detection. (Method of measurement of glucose in plasma & urine, ADA classification of Diabetes
Mellitus, Glucose Tolerance Test, Detection of gestational diabetes, Glycosylated hemoglobin, self monitoring of blood glucose).

4 Nutritional disorders & their detection.

5 Liver Function Tests. (Over view of anatomy & physiology of Liver, bilirubin metabolism, jaundice & its biochemical diagnosis).

6 Renal Function Tests. (Overview of anatomy & physiology of Kidney, Clearance Tests, other biochemical tests for detection of the renal function i.e. Serum creatinine, urea, sodium, potassium, urinary micro albumin and 24 hours protein estimation in urine, urinary osmolarity).

7 Disorders of Cardiovascular system & their laboratory detection. (Disorders of Cholestrol metabolism measurement of plasma lipoproteins, Cardiac enzymes.)

8 Thyroid Function Tests.

9 Pancreatic & Gastrointestinal Function Tests. (Faecal fat, Hyperamylasemia, D-Xylose absorption Test)

10 Disorders of joints & their detection.

11 Basic concept of laboratory automation. (Configuration of clinical laboratory analyzers).

12 Basic concept of laboratory statistics. (Reference value, mean, median, mode, standard deviation, coefficient of variation.)

13 Basic concept of quality control in clinical biochemistry laboratory. (Control material, Leavy Jennings Plot.)