DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

COURSE SYLLABUS: DMLT [TECH] COURSE

PRELIMINARY EXAMINATION (BROAD HEADS):

PAPER I : PATHOLOGY -
- i) Clinical Pathology
- ii) Haematology

PAPER II: MICROBIOLOGY-
- i) General Bacteriology
- ii) Systemic Bacteriology
- iii) Immunology & Serology
- iv) Clinical Bacteriology

PAPER III: BIOCHEMISTRY-

FINAL EXAMINATION (BROAD HEADS):

PAPER I : PATHOLOGY -
- i) Histopathology
- ii) Cytopathology
- iii) Blood Banking

PAPER II: MICROBIOLOGY-
- i) Immunology & Serology
- ii) Parasitology
- iii) Mycology
- iv) Animal Care
- v) Clinical Microbiology
- vi) Virology

PAPER III: BIOCHEMISTRY-

DETAILED SYLLABUS - Preliminary Course : 1ST YEAR

PAPER I : PATHOLOGY		
Subject	Sl.No.	Particulars
Clinical Pathology	01	Reception of patients, noting carefully the test advised, phlebotomy and aftercare of patients.
	02	The Microscope – different types, parts of microscope, cleaning & care.
	03	Examination of Urine – Formation of urine Physical examination – Colour, transparency, pH and Sp gravity. Chemical examination - Protein, Sugar, Ketone bodies, Bile pigment/salt, Chyle, Blood. Microscopical examination – Cells (RBC, WBC, Epith), casts, crystals, Detection of microalbumin & 24 hours urine protein estimation.
	04	Examinations of body fluids – CSF, Pleural, peritoneal & pericardial fluid, Bronchoalveolar lavage fluid, hydatid cyst fluid, Joint fluid.
	05	Examination of Semen – physical characters, count, motility, viability and morphology
	06	Transportation of different clinical materials to distant laboratories.
	07	Basic concepts of Jaundice.
Heamatology	01	Composition of blood and its function.
	02	Origin, development & morphology of blood cells.
	03	Common anticoagulants used-composition, amount, mechanism of action and methods of preparation of different types of vials.
	04	Methods of estimation of Haemoglobin.
	05	Methods of total counts of WBC, RBC & Platelets & fluids used.
	06	Methods of determination of PCV.
	07	Calculation of different red cell indices (Haemogram)
	08	Basic principles of semi or automated blood cell counters & HPLC.
	09	Drawing of peripheral blood smear, staining & stain preparation.
	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.
	18	Cylochemical Stain for diagnosis/differential diagnosis of leukemia.
	19	Basic concepts of anaemia, Leukemia and hemorrhagic disorder

PAPER II : MICROBIOLOGY		
Subject	Sl.No.	Particulars
General Bacteriology	01	Physiology and growth requirements.
	02	Sterilisation – principles & different methods adopted.
	03	Preparation of culture media
	04	Bacterial staining – Gram/Ziehl Neelsen/others
	05	Methods of colony count & morphological identification of bacteria by colony characters, staining & motility tests.
	06	Biochemical tests and interpretation.
	07	Final identification of bacteria with High-titre sera
	08	Antibiotic sensitivity tests.
Systemic Bacteriology	01	The microbial world and the structure of microbes.
	02	Collection of specimens for microbiological examination.
	03	Methods of inoculation of culture media from different samples.
	04	Basic concept of individual Bacteria.
	05	Laboratory diagnosis of pyogenic infection.
	06	Laboratory diagnosis of Leprosy.
	07	Laboratory diagnosis of Tuberculosis.
	08	Laboratory diagnosis of URTI.
	09	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	01	Antigens & Antibodies – definition, types, preparation & preservation.
	02	Types of Antigen and Antibody reactions.
Clinical Bacteriology	01	Laboratory diagnosis of UTI, Sore throat, diarrhoea, acute pyogenic meningitis, Food poisoning and others

PAPER IIIA & IIIB : BIOCHEMISTRY

Subject	Sl.No.	Particulars
	01	Laboratory hazards, Laboratory safety procedures, Laboratory waste disposal.
	02	Collection, Separation, preservation and transport of the biological specimens, anticoagulants.
	03	Clinical laboratory instrumentation (Balance, Oven, Water bath)
	04	Concept of solute, solvent & colloidal solution, Normal solution, Molar solution, molal solution, osmol, osmolar solution, standard solution (Primary & Secondary) ionic strength of solution.
	05	Acid, Base, Buffer (Definition, example, pK, pH, Handerson-Hasselbach's equation)
	06	Principles of Photometry, (Lambert-Beer's Law, Flamephotometry, Reflectance Fluorometry.)
	07	Ion selective electrodes. (Nernst equation, pH electrode, Sodium, Potassium electrode, PCO_2 electrode)
	08	Chemistry of Carbohydrates.
	09	Chemistry of Lipids.
	10	Chemistry of Amino Acids and Proteins.
	11	Chemistry of Nucleic acids & nucleotides.
	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)
	14	Detection of Drugs & Toxic substances. (Principles of Chromatography, paper & thin layer Chromatography, their application in detection of drugs & toxic substances)

DETAILED SYLLABUS - Final Course : 2nd YEAR

PAPER I : PATHOLOGY		
Subject	Sl.No.	Particulars
Histopathology & Cytopathology	01	Basic concepts of different mammalian tissues and their histological structure.
	02	Different human organs and their gross and histological structure and functions.
	03	Receiving of biopsy specimens at laboratory (Clinical notes/fixatives).
	04	Fixation of tissue-different fixatives and their mode of action.
	05	Methods of decalcification.
	06	Processing of tissues-protocol for manual & automated tissue processors, paraffin embedding & preparation of blocks, preparation of reagents, different techniques & application and frozen section/cryostat.
	07	Use of Microtomes, selection and maintenance of knives, technique of section cutting & mounting on slides.
	08	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.
	09	Preservation of specimens and mounting of museum specimens.
	10	Preparation of cytosmear and H&E, Papanicolaou & MGG staining of different body fluids.
	11	Fine Needle Aspiration cytology & exfoliative cytology & Buccal Smear examination.
	12	Cytochemistry & immunohistochemistry.
	13	Cytospin and cell block preparation.
Blood Banking	01	Blood Group (ABO & Rh) – methods of grouping & reverse grouping.
	02	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.
	03	Blood transfusion & hazards.
	04	Detect the time when to discard blood in Blood Bank
	05	Computerized record keeping of Blood Bank

PAPER II : MICROBIOLOGY		
Subject	Sl.No.	Particulars
Immunology & Serology	01	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	01	Basic knowledge on Protozoa and helminths.
Mycology	01	General & Systemic Mycology
	02	Demonstration of Fungus in Laboratory.
Animal Care	01	Common laboratory animals – Food, Handling, Housing, Breeding.
	02	Care of normal and experimental animals.
	03	Sacrifice, postmortem and disposal.
Clinical Microbiology	01	Laboratory diagnosis of Malaria, Protozoal dysentery, Kalazar, Hook worm infection, Ascariasis, Filariasis, Taeniasis, hepatitis, Viral diarrhea, HIV/AIDS, Candidiasis, Cryptococcal meningitis.
	02	Biosafety measures.
	03	Examination of stool
	04	Quality Control
Virology	01	General & Systemic Virology

PAPER IIIA & IIIB : BIOCHEMISTRY		
Subject	Sl.No.	Particulars
	01	Definition of Antigen & Antibody, Antigen-Antibody reaction, Detection of Antigen-Antibody Reactions (ELISA, RIA)
	02	Clinical Enzymology. (Definition of enzyme, classification with examples, types of enzyme-substrate reactions, assay of enzymes. End point & Kinetic, clinical importance of enzymes, isoengymes.)
	03	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).
	04	Nutritional disorders & their detection.
	05	Liver Function Tests. (Over view of anatomy & physiology of Liver, bilirubin metabolism, jaundice & its biochemical diagnosis).
	06	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).
	07	Disorders of Cardiovascular system & their laboratory detection. (Disorders of Cholestrol metabolism measurement of plasma lipoproteins, Cardiac enzymes.)
	08	Thyroid Function Tests.
	09	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.)