SEI4ESTER-I

POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNIQUES

PAPER DLTC 01: LABORATORY EQUIPNIENTS AND INSTRUMENTS

Learning Objective: To provide students with theoretical and practical understanding of Laboratory equi pment and techniques

Learning Outcome: The student should be able to understand structure and functions of laboratory equipments and instruments.

THEORY **Duration: 36 Hrs**

Module 1: (Laboratory Equipments & Instruments)

1. Pipettes- Thoma pipettes (RBC, W.B.C.), Sa hli's pipette, Westerg ren's pipette, pastea ur pipette, Graduated pi pettes, Micropipettes etc.
2. Hemocytometer/Improved Neubauer Chamber Fuchs/ Rosenthal Ruling etc.
3. Colorimeter/Spectrophotometer — Princi ple, parts, working
4. Hematology analyzer — 3 part/5 part differential counters (Cell Counter, Semi — automated/fully automated
5. Flow Cytometry and applications
6. Coagulometers
7. Hemoglobin Electrophoresis — Ag ar gel, C.A.M, HPLC, Capillary Electrophoresis method etc
8. Needles: Lumba r Puncture needle, Vi m- Silverman needle, Bone- marrow aspiration biopsy needle, Trep hine biopsy needle etc.
9. Urinometer, Esbach's Albuminometer, Automated Urine Analysers, Di pstick Reader etc.
10. Microscopes: Compound, Dark g round illumination, Phase contrast,Fluorescent Microscopy, Polarizing Microscope
11. Microtome: Ba se Sledge, Rocking type (Cambridge), Rota ry microtome, Sliding microtome etc
12. Autotech nics on Automated tissue processor, princi ple, work ing; pa raffin embeddi ng bath etc.,
13. Refrigerated microtome, Freezing microtome, cryostat etc.
14. Automated Knife Sharpeners
15. Equipments for blood component separation in BB. Refrigerated centrifuge, Plasma **expressers, Refrigerated water bath, Laminar Air flow bench, etc**
16. **Cytocentrifugation & applications**
17. **Quality Control in Pathology lab.**

Module 2 (Chemicale, eolutione, etains etc.,)

1) Preparation of Fixatives: Neutral Formalin, Buffered formalin, Mercuric — Zenker's Solution , Schaudinns Solution, K-dichromate — Orth's Solution, Regaud's Solution, Picric Acid, Bouins Solution; Hollande's Solution. Decalcifv ng fluids: Formic Acid — Gooding and Stewarts fluid, Nitric Acid — Aqueous nitric acid

2) Sta ins: Composition and technique, preparation and application of Iron Hematoxylins Weigen's iron hematoxylin, Heiden hains iron hemato• vlin, Tungsten Hematoxylins, PTAH, Ploybdenum Hematoxylin, Phophomdybdic acid hematoxylin

3) Connective tissue stains: History of connective tissue: composition ; preparation & application of Masson trichrome, Von — Gi eson, Reticulin stain Gomoris Silver methanamine. Elastic tissue stains:Verhoeffs method, Weigerts method

4) Carbohydrate Stains and Glycoconjugates, P.A.S technique, Alcian blue technique, combined Alcian blue—PAS, Mucicarmine, Colloidal iron, High iron diamine.

5) Lipid Stains: Oil Red O, Sudan Black B.

6) Pigments and Minerals: Perl's Prussian blue for ferric iron, Masson — Fontana method for melanin, Von — kossa for Calcium

7) Micro-organisms: Gram's method & Modified methods, Ziehl — Neelsen ((ZN) stains for mycobacteri a, Fluorescent method for mycobacterium, Modified Fite method for Uycobacteria Loprae, Cresyl violet stain for Helicobacter sp., Grocott methanamine Silver for fungi, Mc Canus PAS method for glycogen a fungal wall

8) Amyloid — Congo — Red Technique

9). Enzyme Histochemistry and its diagnostic Applications

10). Immunohistochemical techniques

11). Tissue Nicroarray

12). Molecular Pathology Techniques : in Situ Hybridi zation / F.I.S.H

Module 3: Applied Pathology

1. Laboratory diagnosis of Anemias
2. Laboratory diagnosi s & C.S.F picture in different types of Meningitis
3. Laboratory diagnosi s of Hemorrhagic disorders
4. Laboratory diagnosi s & L.F.T. findings in different types of jaundice.
5. Laboratory diagnosi s/Urine/Blood findings in Ki dney disorders.

6. Automation in Laboratory

7. Administration and medico-legal aspects; Accreditation of Laboratory

PRACTICALS 15 x 3Hrs

1. Demonstration and use of pipettes

2. Demonstration of needles & procedures

3. Demonstration of working of Rotary Microtome; Section cutting.

4. Demonstration of working of Automated cell counters (3 part and 5 part)differential counts

5. Demonstration of Blood component separation in Blood Bank.

6. Demonstration of Lab workup of Hemorrhagic disorders

7. Laboratory diagnosis of Anemias — Charts

8. Laboratory diagnosis of Meningitis — Charts

9. Laboratory diagnosis of Jaundice — Charts

IO. Laboratory diagnosis of Renal diseases — Charts

Text -Book Reference Books

1. John D. Bancroft, Marilyn Gamble, Churchill, Livingstone : Theory and Practice ofHistological techniques, Elsevier Publication

2. C. F. A. Culling : Handbook of Histopathological technique (including Nuseum technique) Butterworth & CO (Publishers) Ltd. London

3. Sood Ramnik: Medical Laboratory Technology, Jaypee Brothers, Pled ical Publishers
(P) Ltd. Delhi

4. John Bernard Henry (Ed): Clinical diagnosis and management by laboratorymethods.

5. Praful Godkar: Textbook of Medical laboratory Technology

6. R. N. Makroo: Compendium of Transfusion Medicine