

# **Certificate Course in Medical Laboratory Technician**

## **Objectives**

1. To fulfill the manpower need of pathological laboratories and blood bank
2. To carry out routine laboratory tests such as blood count, stool, sputum examination, bacteriological, serological and biochemical tests.
3. To carry out medical laboratory work in various Departments of medical and sciences colleges.

**Course Duration: - 1 Year Teaching, 6 Months Training.**

**Eligibility for Admissions: - 10<sup>th</sup> Standard pass**

**Course fees per Student: - Rs.5000 /-**

## **Job opportunities**

1. Blood Bank Assistant
2. Laboratory assistant in pathological Laboratory

**Medium Of Instruction – English**

**ANY SCIENCE COLLEGE CAN APPLY FOR THE AFFILIATION OF THIS COURSE; ANY OTHER INSTITUTIONS WITH NO HOSPITAL FACILITIES NEED NOT APPLY.**

## **Essential Requirement**

1. Lecture hall with all essential facilities.
2. Biochemical OR Microbiology Laboratory in undergraduate or Pharmacy College.
3. Collaboration with minimum 5 Pathological laboratories for practical experience.  
**(At Least one of them should be computerized pathological laboratory)**

**Staff Qualifications:**

**One Lecture with M. Sc. Biochemistry/Microbiology with D.M.L.T. visiting Lecturer with MBBS, DCP or MD Pathology.**

**Non – teaching Staff: Demonstrator: B.Sc. with DMLT or CMLT.**

**Course Evaluation**

Theory 400 Marks  
(80 Marks and 20 Internal Marks)

Practical 100 Marks  
(One experiment per paper each with 20 Marks,  
Journal each with 10 marks, Viva 10 Mark)

Total -----  
500 Marks  
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## **Paper – 1 – Microbiology & Serology:**

1. Types of Micro-Organisms, general characteristics of Bacteria, Fungi and Viruses. Sterilization and disinfection procedures. Types of stains and staining procedures. Study of some common pathogens like mycobacteria, Pseudomonas, Study of some common pathogens like mycobacteria, Pseudomonas, Salmonella, Shiigella, vibrio, etc.
2. Diagnostic bacteriology – culture media, systematic grouping of pathogenic bacteria, identification of infections agents, diagnosis of anaerobic infections, identifying characteristics of common pathogenic bacteria Specimen collection, handing, transport, labeling and identification. Aseptic transfer and disposal.
3. Introduction to parasitic fungi, specimen collection, lab diagnosis of mycotic infections, identification of parasites from blood and stool.
4. Immunity, antigen-antibody reactions, allergy and autoimmunity.
5. Serodiagnosis – collection and preparation of sample, Vidal test, VDRL, VRP,ASO,RA, Weilfelix, pregnancy and HIV tests.
6. Culture and sensitivity testing – Types of antibiotics, general mechanism of action, Preparation of antibiotic discs, minimum inhibiting concentrations, media and methods for CST.
7. Blood collection, use of anticoagulants, transportation, of blood after collection, hem agglutination reactions, ABO and RH blood grouping Coombs test, cross matching, Preparation of lab reagents in blood banks. Safety regulations in blood banks.
8. Blood transfusion methods, transfusion reactions, hemolytic diseases of newborn.

## **Paper – II – Clinical Pathology and Histology:**

1. Components of blood and their functions hematopoietic system of body, specimen collection for hematological studies.
2. Determination of hemoglobin content, Total RBC, WBC and platelet count, ESR, calculation of red blood cell indices, MCV, MCH etc. Examination of blood for parasites. Peripheral Blood Smear examination, identification of anemia's.
3. Fibrinolysis, bleeding time, clotting time, PT, etc.
4. Routine examination of urine, physical, chemical and microscopic examination of urine, rapid chemical tests for urine.
5. Microscopic examination of semen, specimen collection, lab investigations, examination for presence of semen, sperm motility and sperm count.
6. Collection of faecal specimen physical, chemical and microscopic examination of stool.
7. CSF examination, serous fluid, gastric juice, etc.
8. Clinical significance of his to-pathology, study of common instruments in histology and their operation, tissue processing, staining and fundamentals of microscopy.

## **Paper – III – Clinical Biochemistry:**

1. **Carbohydrates:** Properties and general classification. Test for glucose and other reducing sugar from urine and blood Interpretation of results with general idea of causative factors. Glucose tolerance test and diabetes mellitus.
2. **Proteins :** General properties and functions of proteins. Role of proteins in plasma. Determination of plasma and serum proteins. Determination of proteins in Urine and CSF. Interpretation of results Albumin / globulin ratio.
3. **Enzymes :** Characteristics and functions of enzymes. Clinical significance of enzymes in liver, pancreas, heart, bone and prostate – SGPT/SGOT ,alkaline and acid phosphates. Lactate dehydrogenase, creatine phosphokinase, amylase. Normal values and changes in pathological conditions.
4. **Lipids :** General properties, functions and classification of lipids. Determination of total lipids, phospholipids, triglycerides, and cholesterol in blood. Determination of lip-protein fraction and interpretation of lipid profile.
5. **Organ Functions :**
  - a ) **Liver :** Evaluation of hepatic function, bile, liver, function tests and interpretation of conjugated and unconjugated bilirubin.
  - b) **Kidney :** Evaluation of kidney function tests, determination of glomerular filtration rate, Inulin and creatinine, clearance Interpretation of urea, uric acid and creatinine content in blood and urine.
  - C) **Hormones :** General classification, hyper and hypo action Determination of urinary keto steroids, T3 and T4 assay, Glucose tolerance test.
- 6 **Analytical Biochemistry :** Principles of colourimetry, flame photometry. Chromatography, electrophoresis and immunochemical techniques. Use of microscope, Fundamentals of automation in clinical laboratories.

## **Paper IV**

### **Laboratory Management**

1. Safety regulation.
2. Good Lab Practices
3. Quality control methods and maintenance of laboratory records.
4. First aid.
5. Correct practices for handling and disposal of biological
6. Ueqing & Maintaining of Lab material & Insfements.
7. Lab Standard.

#### **Practical – I –Microbiology and Serology :**

1. Introduction to common laboratory instruments – colorimeter, Spectrophotometer, centrifuge, pH meter, microscope, autoclave, hot air Oven.
2. Preparation of culture media, stains and biochemical reagents.
3. Monochrome staining
4. Gram staining
5. Acid fast staining
6. Albert's staining
7. Culture and sensitivity testing of pus, urine, stool
8. Microscopic examination of stool
9. Isolation of fungi
10. Detection and cross matching of blood groups.
11. Serodiagnositc test –( to be demonstrated ) Vidal, VDRL, R.A. test, Pregnancy test, HIV test, Tuberculin test, ASO test, CRP test, Australia antigen test.

#### **Practical –II –Clinical Pathology and histology :**

1. Collection of blood.
2. Estimation of Hemoglobin
3. Counting of WBC, RBC, platelets, Differential count
4. Estimation of ESR
5. Peripheral Smear Examination
6. Urine analysis –Physical, chemical and microscopic exam
7. Stool examination
8. Semen analysis
9. Examination of material parasites
10. Detection of bleeding and clotting time
11. Examination of CSF and other body fluids
12. Collection and tissue processing, stain preparation and fixatives
13. Study of frozen section technique

## **Practical – III –Clinical Biochemistry & Laboratory Management**

1. Basic working and maintenance of colorimeter, spectrophotometer, pH meter, disc gel and slab gel electrophoresis.
2. Preparation of serum and plasma
3. Methods for preparation of protein free filtrate – use of TCA, denaturing agents.
4. Determination of blood analytes – glucose, Cholesterol, lipids, serum Proteins, Albumin / globulin ratio, urea, creatinine, separation of serum Proteins by electrophoresis, Abnormal constituents, bilirubin-conjugated and unconjugated, lipid profile (demonstration).
5. Urine analysis – Sugars, urea, creatinine, proteins, clearance test.
6. Determination of urinary keto steroids, T3 and T4 (Demonstration of RIA)
7. Estimation of serum enzymes – Acid and alkaline phosphates, SGPT, SGOT, amylase, lipase, LDH, CPK,
8. Preparation of chromic acid and cleaning of glassware.
9. Record writing and methodology of reporting.

### **Reference Books:**

1. Medical Lab Technology – A procedure manual for routine diagnostic tests. Vol. I, II,III, Kanai L. Mukherjee – Tata Mc Graw – Hill publishing company Ltd. 4/12. Asaf Ail Raod, New Delhi – 110002.
2. Methods and interpretations Medical Lab Technology Dr. Ramnik Sood (MD) jaypee Bemard Hnry (MD)- Published Pvt. Ltd. New Delhi.
3. Clinical Diagnosis and Management : by Laboratory Method. 17<sup>th</sup> edition, John Bernard Henry ( MD) published by Virendra Kumar Arya for All India Traveller Book Seller, Delhi.
4. Practical Clinical Biochemistry – Harold Varley, CBS Publishers and Distributors, New Delhi.
5. Hematology for students and Practitioners, ( Including Practical hematology ) – Dr. Ramnik Sood, Jaypee Brothers.
6. A Text Book of Biochemistry ( for medical students ) – A .V.S.S. Rama Rao, L.K.and S. Publishers, Visakhapatnam.
7. A Manual of Laboratory Diagnostic Tests, Frances Fictibach, Lippincoff.
8. Manual of Laboratory. Tests. June H Cella, Jugnita Watson, Virendra Kumar Arya, New Delhi.
9. Clinical Pathology and Bacteriology, K.N. Sachdev, Jaypee Bors.