

## **Add-on in Medical Lab Technician**

### **Program Outcome:**

Add-on in Medical Lab Technician is a value added program designed to ensure that students are well prepared to enter the profession at the entry level, and continue learning throughout their careers. The course bridges the gap between the pure life sciences and medical sciences. The students will be able to perform basic laboratory techniques on biological specimens and recognize factors that affect laboratory procedures and results.

### **Program specific outcome**

- A person with Certificate/Diploma in MLT can easily fit in hospitals/ clinics/ nursing homes/ diagnostic labs as a technician.
- They may also go for PG Diploma as well as PG Certificate courses related to the field of MLT such as cytotechnology, immunology, microbiology, immunohematology, phlebotomy, histotechnology and forensic science.

### **Course outcome**

#### **Certificate level**

CO- I: Students will gain knowledge about the various functional components of a laboratory, the basic needs of clinical lab, safety regulations and first aid procedures. The students also will be well versed with reagent preparation, calibrations of glass wares, laboratory calculations, quality control of laboratory findings and methods of specimen collection.

CO-II: Students will have an understanding on the structural organization of human body, structure and functioning of various systems such as digestive, respiratory, cardiovascular, excretory and lymphatic system.

CO-III: Students will understand the function and structural characteristics of biomolecules and comprehend their metabolism, gain knowledge about the normal and abnormal process of the body, biochemical changes in the body under pathological conditions and learn various biochemical techniques used for analyzing the samples.

CO-IV: Students will have knowledge of types of culture media, its preparation and preservation, sterilization methods and staining techniques.

CO-V: Students will gain knowledge about the various components of blood and their function, types and causes of anaemia.

CO-VI: Students will gain knowledge about the physical, chemical and microscopic analysis of various pathological samples such as urine, sputum and stool.

## **Practicals**

Students will be able to calibrate the glass wares and minor equipments, collect blood sample, prepare serum and plasma, perform routine biochemical tests such as CBC, GTT, serum protein, blood urea, creatine, creatinine, bilirubin, cholesterol, uric acid, TAG determination, prepare culture media, sterilize, isolate bacteria from various source and identify through staining techniques, identify abnormal cells in blood smear, perform physical, chemical and microscopic examination of urine, stool and sputum samples.

## **References**

1. Manual for Routine Diagnostic Tests-Vol I, II, III by Kanai. L. Mukherjee
2. Clinical Biochemistry by Varley
3. Handbook of Medical Laboratory Technology by V.H. Talib
4. Practical and Clinical Biochemistry by T.N Pattabhiraman
5. Biochemistry; Voet.D and Voet.J.G
6. Principles of Biochemistry, Lehninger et al.,
7. Principles of Biochemistry, Smith et al.,
8. Text Book of Biochemistry with Clinical correlations; Thomas Devlin
9. The Cell, Cooper, Geoffrey.M
10. Biology of Microorganisms, Brock
11. Microbes in action, A Laboratory Manual of Microbiology Seley et al.,
12. Microbiology, Pelczer, Reid and Krieg
13. Microbiology, Prescott, Hartley and Klein
14. Human Physiology; Stuart Era Fox
15. Review of Medical Physiology, Gannong.W.F
16. Enzyme Kinetics;Irwin H Segel
17. Understanding Enzymes;Palmer
18. Practical Biochemistry; Principles and Techniques; K Wilson and J Walker

# Diploma in Medical Lab Technician Course

UGC sponsored Add on course

## SYLLABUS

Prerequisite: Certificate in Medical Lab Technician Course

Total Hours: 160

(Theory: 75 Hrs & Practicals: 85 Hrs)

Module	Title of the paper	Theory Hrs	Practical Hrs	Total Hrs
I	Haematology-II	10	15	25
II	Clinical Pathology-II	10	25	35
III	Clinical Biochemistry	20	30	50
IV	Physiology-II	15	-	15
V	Medical Microbiology-II	20	15	35

## **Module I**

### **Haematology-II**

Haemoglobinopathies-Normal and abnormal Hb. Sickle cell anemia, Thalassemia.  
Haemostasis and coagulation- An introduction to Haemostasis, Blood coagulation mechanism and Fibrinolysis.  
Haemorrhagic disorders- Investigation in case of Haemorrhagic disorders- Principle involved in the determination of bleeding time, whole blood clotting time, clot retraction and lysis time.  
Routine coagulation tests. Lab diagnosis of bleeding disorder.

## **Module II**

### **Clinical pathology-II**

Gastric analysis-Constituents of gastric juice-free and total acids, fractional test meal, Histamine test, Hollander test (insulin test), tubeless gastric analysis.  
CSF analysis-, Collection, Composition. Physical, chemical, bacteriological and serological examination.  
Semen Analysis-Physical and microscopic examination.

## **Module III**

### **Clinical Biochemistry**

An outline of metabolism of carbohydrates, proteins, lipids and nucleic acids  
Enzymes – definition, characteristics, kinetics and mechanism of enzyme action.  
Coenzymes and isoenzymes.  
Clinical Enzymes-Introduction to diagnostic enzymes. Clinical significance of amylase, acid phosphatase, alkaline phosphatase, Urease, Creatine kinase, AST, ALT, glucosidase, lipase, protease, and glucose-6-phosphate dehydrogenase.  
Serum electrolytes and ions- determination of Na<sup>+</sup>, K<sup>+</sup>, serum chlorides, Ca and P.  
Automation and use of computers in biochemical analysis  
Clinical toxicology- Role of toxicology laboratory, analytical approach in toxicology, heavy metal poisoning, Drug screening techniques.

## **Module IV**

### **Physiology-II**

An overview of the structural organization of

Bones and joints

Nervous system

Endocrine system

Reproductive system

Sense organs-Structure and functions of the principle sense organs.

## **Module V**

### **Medical Microbiology-II**

Mycology- Types and morphology of fungus, mycosis, laboratory diagnosis of mycotic infections.

Virology- classification and characteristics of viruses. Viral culture techniques, Life cycle of HIV, HIV detection tests.

Parasitology- Introduction, classification of parasites, Life cycle, Prevention of parasitic infection.

Laboratory procedures- collection, processing and laboratory diagnosis of parasitic infections of faecal specimens.

### **Practical-II**

Investigation of Haemoglobinopathies

Haemorrhagic disorders- Investigation of Haemorrhagic disorders-Determination of bleeding time, whole blood clotting time, clot retraction and lysis time.

Routine coagulation tests. Lab diagnosis of bleeding disorder.

Semen Analysis-Physical and microscopic examination

Gastric analysis-Constituents of gastric juice, Detection and estimation of free and total acids in gastric juice, fractional test meal, Histamine test, Hollander test (insulin test), tubeless gastric analysis.

Clinical Enzymology- Clinical estimation of amylase, acid phosphatase, alkaline phosphatase, Urease, Creatine kinase, AST, ALT, glucosidase, lipase, protease, and glucose 6 phosphate dehydrogenase.

Serum electrolytes and ions- determination of Na<sup>+</sup>, K<sup>+</sup>, serum chlorides, Ca and P.

Mycology- isolation of fungi from various sources and laboratory diagnosis of mycotic infections.

Automation and use of computers in biochemical analysis

## References

- Manual for Routine Diagnostic Tests-Vol I, II, III by Kanai. L. Mukherjee
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Enzyme Kinetics; Irwin H Segel

Understanding Enzymes; Palmer

Practical Biochemistry; Principles and Techniques; K Wilson and J Walker




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