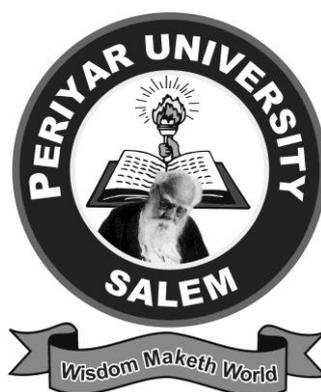


# **PERIYAR UNIVERSITY**

**SALEM – 636 011**



**PERIYAR INSTITUTE OF DISTANCE EDUCATION**

**(PRIDE)**

**CERTIFICATE IN LABORATORY TECHNOLOGY (1 YEAR)**

NON-SEMESTER

**REGULATION AND SYLLABUS**

(Effective from the academic year 2007 – 2008 and thereafter)

**CERTIFICATE COURSE IN LAB-TECH**  
**ONE YEAR PROGRAMME (Non Semester)**  
**REGULATIONS**

**1. CONDITIONS OF ADMISSION:**

A candidate who has passed S.S.L.C are equivalent there to subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the CERTIFICATE COURSE IN MEDICAL LAB-TECH Training examination of this university after a course of study of ONE YEAR.

**2. DURATION OF THE COURSE:**

The course of the CERTIFICATE COURSE IN MEDICAL LAB-TECH shall consist of ONE year.

**3. ELIGIBILITY FOR THE DMLT:**

A candidate shall be eligible for the CERTIFICATE COURSE IN MEDICAL LAB-TECH shall consist of ONE year undergone the prescribed course of study for a period of not less than one year and passed the examinations in all papers

**4. COURSE OF STUDY:**

The course of study shall comprise instructions in books prescribed from time to time

<b>S.No</b>	<b>PAPER CODE</b>	<b>TITLE OF THE PAPER</b>
1	CLT01	GENERAL BIOCHEMISTRY
2	CLT 02	GENERAL MICROBIOLOGYAND CLINICAL PATHOLOG Y
3	CLT03	TOOLS AND TECHNIQUES
4	CLTP01	PRACTICAL – CLINICAL BIOCHEMISTRY

## 5. EXAMINATIONS

The candidate shall be three hours durations to each paper at the end of the year. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

## 6. SCHEME OF EXAMINATIONS

The scheme of Examinations shall be as follows

S.No	PAPER CODE	TITLE OF THE PAPER	EXAM DURATION	MAX. MARKS
1	CLT01	GENERAL BIOCHEMISTRY	3	100
2	CLT 02	GENERAL MICROBIOLOGY AND CLINICAL PATHOLOGY	3	100
3	CLT03	TOOLS AND TECHNIQUES	3	100
4	CLTP01	PRACTICAL – CLINICAL BIOCHEMISTRY		100
MARKS			TOTAL	400

## 8. QUESTION PAPER PATTERN

Time: 3 Hours

Max. Marks: 100

**PART A: 5x5 = 25**  
**Answer all Questions**

Two Questions from each unit with internal choice

**PART B: 5x15 = 75**  
**Answer all Questions**

Two Questions from each unit with internal choice

## **9. PASSING MINIMUM**

A candidate shall be declared to have passed the examinations in a theory of study only if he/She scores not less than 50 marks out of 100 in the University examinations

## **10. CLASSIFICATION OF SUCCESSFUL CANDIDATES**

Candidates who secure not less than 60% of the aggregate marks in the Whole examination shall be declared to have passed the examination in FIRST CLASS. All other successful candidates shall be declared to have passed in SECOND CLASS. Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in FIRST CLASS WITH DISTINCTION provided they pass all the examinations prescribed for the course in the first appearance.

## **11. COMMENCEMENT OF THIS REGULATION**

These regulations shall take effect from the academic year 2007-2008 that is for students who are admitted to the first year of the course during the academic year 2007-2008.

## **PAPER - I: GENERAL BIOCHEMISTRY**

(PAPER CODE: CLT01)

### **Unit - I:**

Approaches to clinical biochemistry; concepts of accuracy, precision, sensitivity and reproducibility, quality control, fixation of normal range. S. I. units.

Collection and processing of samples and anticoagulants, preservatives for blood and urines, transport of biological samples

### **Unit – II:**

Disorders in carbohydrates metabolism: Introduction, blood glucose regulation, hypo and hyperglycemia, renal threshold value. Diabetic Mellitus: types, clinical features, metabolic effects, complication, GTT, galactosaemia, fructosuria, glycogen storage diseases.

### **Unit – III:**

Disorders in protein metabolism: Introduction ,aetiology and clinical features of phenylketonuria, alkaptonuria, cystinuria, albinism and tyrosinemia, clinical significance of Non-protein nitrogen-urea, uric acid and creatinine.

Anaemia: types aetiology and clinical features Metabolism of bilirubin,types of jaundice and its clinical features. Hypertension:types,aetiology,clinical features,prevention and treatment.

### **Unit – IV:**

Disorders in lipid metabolism: Introduction , hypertriacyl glyceridemia, atherosclerosis, aetiology, clinical features and complication. Lipid storage diseases, fatty liver. Disorders in nucleic acid metabolism : Gout, type, aetiology and clinical features.

## **Unit – V:**

Liver function test: Detoxification and excretory function, gastric function test, examination of resting content, fractional test meal analysis and its interpretation. Renal function test: Urea clearance and its interpretation. Enzymology: clinical significance of SGOT, SGPT, ALP, ACP, CPK and LDH.

## **Reference:**

1. Text book of medical biochemistry, M.N. Chatterjee and Rane Sinda,
2. Text book of biochemistry with clinical correlation, Thomas M. Devlin, 3<sup>rd</sup> Edition, A John Wiley Inc. publication, Rs 2158/-
3. Practical clinical biochemistry, Harold Varley, 4<sup>th</sup> edition, CBS publication and Distributors, New Delhi, Rs 170
4. Harper`s biochemistry – Robert. K. Murray, Daryl K. Granner, peter A. Mayes. Victor W. Rodwell, 24<sup>th</sup> edition, Prentice Hall International.
5. Tietz Fundamentals of clinical Chemistry, Carl A. Burtis and E R Ashood, 5<sup>th</sup> Edition, Saunders WB. Co, Rs 3000/-
6. Principles of Internal Medicine, Harrison T.R. Fauci, Braunwald, Isselbacher 14<sup>th</sup> edition, Mc-graw Hill, Newyork. Vol I & II.

## **PAPER – II: GENERAL MICROBIOLOGY & CLINICAL PATHOLOGY**

(PAPER CODE: CLT02)

### **Unit – I:**

History of microbiology, Microscopy, Bio-safety including universal precautions

Physical and biological containment, Morphology of bacteria and other microorganisms, Nomenclature and classification of microorganisms,

### **Unit – II:**

Sterilization : Methods of sterilization and their uses. Chemical, dry heat, steam sterilization, Tyndalisation, filtration, sterilization by ultra-violet light. Care and use of microscope. Dark ground illumination, fluorescence and microscopy. Common bacteriological staining techniques.

Cultural Methods: Preparation and sterilization of media. Inoculation and examination of inoculated plates. Antibiotic sensitivity testing, basic techniques of plating and preparation of antibiotic discs.

### **Unit – III:**

Parasitological techniques and elementary knowledge of life cycle and lab. diagnosis of common parasites. Introduction to virology techniques. Miscellaneous : Methods of preservation of cultures, maintenance of stock cultures, disposal of infected material and culture media

### **Unit – IV:**

Causes of disease; Cell response to injury; Inflammatory reactions; Tissue response to infection; Wound healing; Healing of fracture; Pyogenic infection; Tuberculosis, Syphilis, Actinomycosis, Leprosy, Fungal & Viral Diseases; Disorders of growth; Neoplasia with important lesions; Cysts and turnouts; Disorders of metabolism; Haemorrhage and shock; Disorders of Nutrition; Endocrine disturbances relevant to Dentistry; Disorders of

calcium metabolism; Thrombosis and embolism; Edema; Infarction; Elements of Hematology; Pigments; Calculi; Effects of radiation

**Unit – V:**

Gynaecological malignancies- ovarian cancer, uterine cancer, cervical cancer, gestational trophoblastic neoplasia. Sexually transmitted diseases- syphilis, gonorrhoea, trichomoniasis, human papilloma virus infection. Diseases during pregnancy-placental inflammations and infections, ectopic pregnancy, gestational trophoblastic diseases, eclampsia.

**REFERENCE BOOKS:**

1. Monica Cheesebrough, 1987. Medical Laboratory Manual for Tropical Countries, Vol 1& 2. Butterworth.
2. Collect, J.C., Duguids, J.P., Fracer, A.C., Marimon. B.P., Mackie and Mc Cartney, 1996. Practical Medical Microbiology, Churchill Livingstone, U.S.A.
3. Gunesekaran, P, 1996. Laboratory Manuel in Microbiology, New Age international, India.
4. Vijaykumar, Ramzi.S. Cotran, Stanley L. Robbins, Basic pathology, 7th edition, Saunders publications, 2003.

## **PAPER – III: TOOLS AND TECHNIQUES**

(PAPER CODE: CLT03)

### **Unit – I:**

General principles of biochemical investigations, in vivo and invitro studies – organ and tissue slice techniques, buffer solution and media for tissue homogenization and separation, methods of cell disruption, basic principles of cell culture, cryopreservation, cell sorting, counting.

### **Unit – II:**

Centrifugation techniques: Basic principles of sedimentation, types of centrifuges- small bench, large capacity, high speed, preparative and analytical centrifuges. Types of rotors- swinging bucket, fixed angle, vertical tube and zonal rotors. Differential and density gradient centrifugation with applications.

### **Unit – III:**

Chromatographic Techniques: General principles, distribution coefficient, adsorption, and partition. Principle, materials, sample preparation, method and applications of paper, column, ionexchange, gelfiltration, affinity, GLC, TLC, HPLC.

### **Unit – IV:**

Electrophoresis techniques : General principles, factors affecting electrophoresis, isoelectric focusing, principles, techniques and applications agarose, PAGE, SDS-PAGE, cellulose acetate, capillary electrophoresis.

Colorimetric and spectroscopic techniques : Beer-Lambert`s law, light adsorption and its transmittance, principles, instrumentation, applications in enzyme assays and kinetic assays, protein and nucleic acid structural studies.

## **Unit – V:**

Radioisotope techniques : Atomic structure, types of radioactive decay-negatron, positron, alpha particle and gamma rays, rate of radioactive decay, units radioactivity, detection and measurement radioactivity- methods based on ionization, excitation Scintillation counting - types and applications. Flame photometer Electron spin resonance, principle instrumentation and applications. Fluorimeter- principle, instrumentation and applications.

### **REFERENCES:**

1. PA Swell and BClarke(1991), Chromatographic separations, John Wiley & sons
2. Keith Wilson and KH goulding(1986). Biologist guide to principles and techniques of practical biochemistry Edward Arnold (Publications)Ltd.
3. J.E.Bailey and D Ollis.Biochemical engineering fundamentals(II edition Mac Graw Hill Book Company
4. Karoki Upadhay and Nath(1993).Biophysical chemistry, revised edition, Himalaya House publications.
5. Old RN and SB Primrose(1994),Principles of gene manipulation-Blekwel scientific publications.
5. Clinical Laboratory Diagnosis – Levinson S A, Mac Fate R.D.
6. Clinical Lab. Methods & Diagnosis Vol. I & II – Alex C,S L Garelt.

## **PRACTICAL – I**

### **(PAPER CODE: CLTP01)**

- I. Preparation of Buffers and Determination of pH.
- II. Qualitative Analysis.
  - a. Analysis of carbohydrates
  - b. Analysis of Aminoacids
  - c. Test for proteins
  - d. Test for lipids – Cholesterol
- III. Biochemical Preparation
  - a. Starch from potato
  - b. Casein from milk
  - c. Lecithin from egg yolk
  - d. DNA from Cauliflower
- IV. Estimations
  - a. Reducing sugar – Benedict`s method
  - b. Amino acid – formal titration
  - c. Determination of acid number
  - d. Determination of Saponification number
  - e. RNA- Colorimetric method
  - f. Ascorbic acid- using 2,6 Dichloro Phenol Indophenol method
- V. Techniques (Group Experiments )
  - a. Separation of sugar & amino acid by Ascending paper chromatography.
  - b. Separation of lipid by thin layer chromatography
  - c. Separation of plant pigments by column chromatography
  - d. Separation of serum proteins by paper electrophoresis.