PERIYAR UNIVERSITY

SALEM – 636 011

PERIYAR INSTITUTE OF DISTANCE EDUCATION

(PRIDE)

DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY (2 YEAR)

NON-SEMESTER

REGULATION AND SYLLABUS

(Effective from the academic year 2007 – 2008 and thereafter)
1. CONDITIONS OF ADMISSION

A candidate who has passed 10, +2 accepted by the syndicate as equivalent there to subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the DIPLOMA IN MEDICAL LAB TECH (DMLT) Training examination of this university after a course of study of TWO YEAR.

2. DURATION OF THE COURSE

The course of the DIPLOMA IN MEDICAL LAB TECH (DMLT) shall consist of TWO year.

3. ELIGIBILITY FOR THE DMLT

A candidate shall be eligible for the DIPLOMA IN MEDICAL LAB TECH (DMLT) shall consist of TWO year undergone the prescribed course of study for a period of not less than two 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

<table>
<thead>
<tr>
<th>S.No</th>
<th>PAPER</th>
<th>TITLE OF THE PAPER</th>
<th>EXAM DURATION</th>
<th>MAX. MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PAPER I</td>
<td>BASIC BIOCHEMISTRY &amp; PHYSIOLOGY</td>
<td>3</td>
<td>100</td>
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<tr>
<td>2</td>
<td>PAPER II</td>
<td>HAEMATOLOGY AND CLINICAL PATHOLOGY</td>
<td>3</td>
<td>100</td>
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<tr>
<td>3</td>
<td>PAPER III</td>
<td>IMMUNOLOGY &amp; SEROLOGY</td>
<td>3</td>
<td>100</td>
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<tr>
<td>4</td>
<td>PAPER IV</td>
<td>PRACTICAL I</td>
<td>3</td>
<td>100</td>
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5. **EXAMINATIONS**

The examination 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

<table>
<thead>
<tr>
<th>S.No</th>
<th>PAPER CODE</th>
<th>TITLE OF THE PAPER</th>
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<tbody>
<tr>
<td><strong>FIRST YEAR</strong></td>
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<tr>
<td>1</td>
<td>DMLT 01</td>
<td>BASIC BIOCHEMISTRY &amp; PHYSIOLOGY</td>
<td>3</td>
<td>100</td>
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<tr>
<td>2</td>
<td>DMLT 02</td>
<td>HAEMATOLOGY AND CLINICAL PATHOLOGY</td>
<td>3</td>
<td>100</td>
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<tr>
<td>3</td>
<td>DMLT 03</td>
<td>IMMUNOLOGY &amp; SEROLOGY</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>DMLT P01</td>
<td>PRACTICAL I</td>
<td>3</td>
<td>100</td>
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<tr>
<td><strong>SECOND YEAR</strong></td>
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<tr>
<td>5</td>
<td>DMLT 04</td>
<td>CLINICAL PHARMACOLOGY</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>DMLT 05</td>
<td>INSTRUMENTATION AND TECHNIQUES</td>
<td>3</td>
<td>100</td>
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</tbody>
</table>
7. 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

8. 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 40 marks out of 100 in the University examinations

9. 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.

10. 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 and thereafter.
**PAPER – I: BASIC BIOCHEMISTRY & PHYSIOLOGY**

(PAPER CODE: DMLT01)

**Unit – I:**


**Unit – II:**

Chromatographic Techniques - Principles and Applications of Paper, TLC, Adsorption, Ion exchanges, Gel filtration, Affinity, GLC, Chromatofocusing, HPLC, FPLC. Electrophoretic Techniques - Polyacrylamide gel electrophoresis, SDS-PAGE, Agarose gel Electrophoresis Separation of Proteins, Nucleic acids

**Unit – III:**

Cell - living unit of the body; Body fluid and distribution; The extracellular fluid – composition; Homeostasis; Transport through the cell membrane.

Definition of physiology: tissue; organs and systems; morphology and functions of the cell; types and importance of intercellular junctions; transport mechanism across the cell; chemical messengers; Ion channels in the cell and their physiological importance.

**Unit – IV:**

Unit – V:


REFERENCES:

Unit – I:

Blood — structure and function Haemotopoiesis. Collection of haematological specimens, principles and procedures of staining methods in haematology.

Unit – II: Erythrocytes and Leucocytes


Unit – III:

Blood groups& Hemostasis

Classification: antigenicity: agglutination: blood typing: principles of transfusion medicine, Components of hemostasis: mechanisms of coagulation: coagulation tests: anticoagulants

Unit – IV:

Examiniation of body fluids; Pleural, pericardial, ascetic. Cerebrospinal fluid and semen and sputum examination, and renal & liver function tests.

Unit – V:

Introduction of Pathology

Causes of disease; Cell response to injury; Inflammatory reactions; Tissue response to infection; Wound healing; Healing of fracture; Pyogenic infection; Tuberculosis, Syphilis, Actinomysosis, Leprosy, Fungal & Viral Diseases; Disorders of growth; Neoplasia with important lesions; Cysts and turnouts; Disorders of metabolism; Haemmorhage 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
REFERENCE BOOKS:


2. GradWohl, Clinical Laboratory-methods and diagnosis, Vol-I


Unit - I: Immune components and their functions

Cellular components (B & T lymphocytes, macrophages/ monocytes, neutrophils, eosinophils, killer and natural killer cells); Humoral components (antibodies, complement system, cytokines, interferons and interleukins)

Unit - II: Organization of internal immune system

Lymphoid organs- Primary and secondary lymphoid organs (anatomical locations, structure and role) – bone marrow- thymus, bursa of fabricus-lymph node- spleen payer’s patches and kupffer cells – differentiation of cells into immunological component cells basic structure and their role in immunity.

Unit - III: Immunity against infections

Immunity against viral, bacterial and parasitic infections, immunological basis of hypersensitivity and graft rejections; Major Histocompatibility Complex (MHC), Vaccines, types and their uses – immunization schedule for children – prevention of new born diseases like tetanus, diphtheria, whooping cough, typhoid, cholera, yellow fever and measles – time schedule.

Unit – IV:

Antigens and Antibodies

Determinants of antigenicity, Antigenic specificity, Species species specificity, Iso & Auto specificity, Histocompatibility antigens, Monoclonal antibodies, Structure of antibody molecule, Immunoglobulin classes, Antigens and Antibody reactions in the laboratory.
Unit – V: Serology

General instructions to serology, Agglutination Tests for Serodiagnosis of fever or febrile illness, serological tests for syphilis, Enzyme Linked Immunosorbent Assay (ELISA)

REFERENCE BOOKS


PRACTICAL – I: CLINICAL BIOCHEMISTRY

(PAPER CODE: DMLTP01)

Unit – I:

Unit – II:
Serum enzymes and isoenzymes – their diagnostic value. Analysis and significance of clinically important analytes in blood, urine and CSF. Quality Control in clinical biochemistry.

Unit – III:
Diagnostic and clinically important analysis in blood, urine and CSF: Estimation of Sugar, Urea, Uric acid, Bilirubin, protein (Total fractional), Creatinine, Cholesterol, Amylase, Acid & alkaline phosphatase.

Unit – IV:
Determination of the activity of the following enzymes: Phosphatase, SGOT, SGPT, LDH, CPK.

Estimation of the following analysis from Blood: Total cholesterol, TG, LDL, HDL, VLDL & Estimation of albumin (A/G ratio), Amylase, Acid and alkaline phosphatase

Unit – V:
Determination of Na+ & K+ using flame photometric, Analysis of urinary calculi, Estimation of Cu & Fe by colorimetric method.
REFERENCES:


PAPER – V: CLINICAL PHARMACOLOGY
(PAPER CODE: DMLT04)

Unit – I: General Pharmacology

General principles of Pharmacology; Drug receptors & pharmacodynamics; Pharmacokinetics; Drug biotransformation; Dosage forms and routes of drug administration; adverse drug reactions.

Unit – II: Drugs acting on respiratory, central & peripheral nervous system

Bronchodilators; Antitussive agents; General Anesthetics; Sedatives - Hypnotics and anti anxiety drugs; Analgesics; Narcotic & Non-Narcotic (NSAID); Antiepileptic drugs; Analetics; Cholinergic receptor stimulants; Cholinergic receptor antagonists.

Unit – III:

Anti - infective agents; Sulfonamides & Trimethoprim; Metronidazole & Tinidazole; Antibiotics; Cancer chemotherapy & Local anti-infective agents: Disinfectants and antiseptics including antifungal and antiviral agents. Drugs acting on immune system

Unit – IV: Drugs acting on the endocrine & Gastro intestinal tract system

Hypothalamic and pituitary hormones; Insulin and antidiabetic drugs; Thyroid and anti-thyroid drugs; Parathormone, Calcitonin, Calcium & Vitamin D; Adrenocorticosteroids; Sex hormones. Emetics and Antiemetics; Antidiarrhoeal; Drugs used in constipation.

Unit – V: Miscellaneous agents

Astringents; Mummifying agents; Styptics; Disclosing solutions; Dentifrices & mouth washes; Bleaching agents; Water electrolytes and drugs affecting renal function. Nutritional supplement therapy; Miscellaneous therapeutic gases O2 & CO2. Enzymes in therapy. Chelating agents.
REFERENCE BOOKS:


8. N.J. Ellenhorn, Medical Toxicology, Williams and Wilkins, 1997
Unit - I: Basic principles and concepts

Principles and fundamental Instrumentation in separation techniques, significance of various separation techniques and their applications.

Unit - II: Centrifugation techniques

Basic principles, procedure and working mechanism of centrifugation-different methods of centrifugation techniques(zonal, differential, density gradient and isopyenic centrifugation).

Unit - III: Chromatographic techniques

Principle, working methods and advantages of various chromatographic techniques (Adsorption and partition) – paper chromatography - column, ion exchange, Gas – liquid, affinity, molecular-exclusion, thin layer and HPLC.

Unit - IV: Spectrophotometry and Colorimetry

Spectrophotometry – Basic introductory terms; Principles of Spectrophotometer and colorimeter; Instrumentation; Applications; Estimation of blood glucose by O- Toluidine method.

Unit V: Electrophoretic techniques

Principles and procedures of electrophoresis, gel electrophoresis (vertical, horizontal) - polyacrylamide gel electrophoresis (PAGE)- SDS and isoelectric focussing.
REFERENCES:

1. PA sewell and B clarke(1991), Chromatographic separations, John Wiley & sons


5. Clinical Laboratory Diagnosis – Levinson S A, Mac Fate R.D.

Unit - I:
Identification of areas of research field- problems and needs for experimental approach, Good laboratory practices. Lab. Safety – Prevention of Physical, Chemical & Biological Hazards. First Aid in Lab. Accidents. Legal aspects

Unit - II:
Selection of suitable methodology and statistical techniques for controlled and unbiased experimentation – designing of experiments.

Unit - III:
Ethics in animal experimentation, ethics in food & drug safety, ethical issues in human gene therapy, composition of institution evaluation ethical committee – Beneral ethical issues, ethics in research.

Unit - IV:
Biosafety – Introduction, levels of biosafety, general guidelines & practices; Good laboratory practices; contaminants – types, basic laboratory & maximum contaminant laboratory; Career development in laboratory research.- Impact factors, principle and method of patenting.

Unit - V:
Limitations; Hospital hazards and infections - Nosocomial infections – Safety measures to be carried out in Hospital environment, Hospital waste management.
REFERENCE BOOKS:


2. CPCSEA Guidelines for Laboratory animal (CPCSEA) – No:13 Scaward road, Valmiki Nagar, Chennai-41.

