Annexure - 17

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)

DIPLOMA IN MEDICAL LAB TECH (DMLT)

TWO YEAR PROGRAMME (Non Semester)

Regulations

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

S.No	PAPER	TITLE OF THE PAPER	EXAM DURATION	MAX. MARKS
		FIRST YEAR		
1	PAPER I	BASIC BIOCHEMISTRY & PHYSIOLOGY	3	100
2	PAPER II	HAEMATOLOGY AND CLINICAL PATHOLOGY	3	100
3	PAPER III	IMMUNOLOGY & SEROLOGY	3	100
4	PAPER IV	PRACTICAL I	3	100

		SECOND YEAR		
5	PAPER V	CLINICAL PHARMACOLOGY	3	100
6	PAPER VI	INSTRUMENTATION AND TECHNIQUES	3	100
7	PAPER VII	LABORATORY MANAGEMENT AND ETHICS	3	100
8	PAPER VIII	PROJECT	--	200
			TOTAL	900

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

S.No	PAPER CODE	TITLE OF THE PAPER	EXAM DURATION	MAX. MARKS
		FIRST YEAR		
1	DMLT 01	BASIC BIOCHEMISTRY & PHYSIOLOGY	3	100
2	DMLT 02	HAEMATOLOGY AND CLINICAL PATHOLOGY	3	100
3	DMLT 03	IMMUNOLOGY & SEROLOGY	3	100
4	DMLT P01	PRACTICAL I	3	100
		SECOND YEAR		
5	DMLT 04	CLINICAL PHARMACOLOGY	3	100
6	DMLT 05	INSTRUMENTATION AND TECHNIQUES	3	100

7	DMLT 06	LABORATORY MANAGEMENT AND ETHICS	3	100
8		PROJECT	-	200
TOTAL				900

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:

Acid Base Regulation. Structure and classification of Carbohydrates: monosaccharide, disaccharides and polysaccharides. Chemistry, calcification, properties and metabolism of Lipids, Amino acids and Proteins. Classification of Vitamins & Mineral Metabolism.

Unit – II:

Chromatographic Techniques - Principles and Applications of Paper, TLC, Adsorption, Ion exchanges, Gel filtration, Affinity, GLC, Chromato focusing, 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 extra celluar fluid – composition; Homeostasils; Transport through the cell membrane.

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

Unit – IV:

Blood - Composition, cells, plasma proteins and lipoproteins. Erythrocytes - structure and function WBC - types, differential count, functions. Platelets and function. Buffer systems, homeostasis, blood clotting, digestion of clot, anticoagulants, blood volume, blood pressure and their regulation, plasma lipoproteins and their function HDL, LDL, VLDL, chylomicrons. CSF - composition and function.

Unit – V:

Respiratory System - Lungs, structure and functions. Excretory System - Ultra structure of the nephron. Glomerular filtration. Hepatobiliary System - Anatomy of the liver, blood supply, cells - hepatocytes, endothelial cells and Kupffer cells. Gastrointestinal System - GI tract, digestion and absorption of carbohydrates proteins and lipids. Endocrine System - Endocrine organs in man.

REFERENCES:

1. Zubay,G.L. Biochemistry, W.M.C..Brown Publishers, New York 1998.
2. Deb,A.C., Fundamentals of biochemistry, Books and allied(P)Ltd, 2002.
3. Satyanarayanan,U. Essentials of biochemistry, Books and allied(P) Ltd.2002.
4. Campbell, P.N and A.D .Smith, Biochemistry Illustrated, 4th ed, Churchill Livingstone.
5. Guyton A.C and J E Hall, A text book of medical physiology,W.Bsaunders,1996.
6. Vijaykumar, Ramzi.S. Cotran, Stanley L. Robbins, Basic pathology,7th edition, Saunders publications,2003.
7. Braunwald, Fauci, kasper, hauser, lorgo, Principles of internal medicine, Volume-1,15th edition, McGraw Hill, 2001.
8. Lehningers Principles of Biochemistry (2000) by Nelson, David L. and Cox, M.M. Macmillan/ worth,. Ny.

PAPER – II: HAEMATOLOGY AND CLINICAL PATHOLOGY

(PAPER CODE: DMLT02)

Unit – I:

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

Unit – II: Erythrocytes and Leucocytes

Erythropoiesis: structure & function of RBCs: formation of hemoglobin: destruction & fate of RBCs: anemias: polycythemias: General characteristics: genesis & life span of WBCs: classification & functions of each type of WBC: leukopenia: leukemias.

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:

1. Kanai L. Mukherjee, Medical Laboratory Technology Vol. I.Tata McGraw Hill 1996, New Delhi.

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

3. Sabitri Sanyal, Clinical pathology, B.I.Churchill Livingstone(P)Ltd, New Delhi.2000.

4. Judith Ann Lewis, Illustrated guide to diagnostic tests-students version, Springhouse Corporation, Pennsylvenia, 1994.

PAPER – III: IMMUNOLOGY & SEROLOGY

(PAPER CODE: DMLT03)

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

1. Henry., Bernard, J., Sanford, T and Davidson, 2002. Clinical diagnosis and Management by laboratory methods. W.B. Saunders, New York.
2. Gradwohls, 2000. Clinical Laboratory Methods and Diagnosis. (ed) Ales C. Sonnenwirth and Leonard jarret, M.D. B.I. Publications, New Delhi.
3. Richard, R, 1989. Clinical Laboratory Medicine, Medical Publi, Chicago.
4. Williams and J. William, 1990. Haematology. Mc Graw Hill, New York.
5. Ivon M.Roitt, 1998. Essentials of Immunology, Blackwell Scientific publications, Oxford.
6. Peckman,M and D.Vergain, 1997. Basic and Clinical Immunology Churchill Livingstone.N.Y.
7. Playfair,J.H.L, 2001. Immunology at a glance 7th ed. Blackwell Scientific Publications, Oxford.
8. Stewart,S, 2001. Immunology, Immunopathology and Immunity, 6th ed. ASM Press Washington D.C.

PRACTICAL – I: CLINICAL BIOCHEMISTRY

(PAPER CODE: DMLTP01)

Unit – I:

Specimen collection: Whole blood, plasma, serum, urine, C.S.F & other body fluids, preservation of specimens, anticoagulants. Quality Control: Role of quality control and its importance. Accuracy, Reliability, Precision. Internal and external quality control measure, preparation of reagents, standardization of methods, safety measures and precautions.

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:

1. Zubay,G.L. Biochemistry, W.M.C..Brown Publishers, New York 1998.
2. Deb,A.C., Fundamentals of biochemistry, Books and allied(P)Ltd, 2002.
3. Satyanarayanan,U. Essentials of biochemistry, Books and allied(P) Ltd.2002.
4. Campbell, P.N and A.D .Smith, Biochemistry Illustrated, 4th ed, Churchill Livingstone.

PAPER – V: CLINICAL PHARMACOLOGY

(PAPER CODE: DMLT04)

Unit – I: General Pharmacology

General principles of Pharmacology; Drug receptors & pharmacodynamics; Pharmacokinetics; Drug biotransformatin; 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; Analeptics; 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:

1. Jayashree Ghosh, A textbook of pharmaceutical chemistry, New Delhi: S. Chand & Company,1999.
2. S.N.Pandeya and J.R.Dimmock, An introduction to drug design, New Delhi: New age international.1997.
3. P. Parimoo, A Textbook of medical chemistry, New Delhi: CBS publishers.1995.
4. G.Patrick, medical chemistry, New Delhi: Viva Books,2002.
5. S.Ramakrishnan, K.G.Prasannan and R.Rajan, Textbook of medical biochemistry, Hyderabad: Orient Longman.3rd Edition,2001.
6. G.M.Brenner, Pharmacology, W.B.Sounders. Co 2000.
7. F.S.K.Barar, Essential of pharmacotherapeutics, New Delhi: S. Chand and Company 2000.
8. N.J.Ellenhorn, Medical Toxicology, Williams and Wilkins1997

PAPER – VI: INSTRUMENTATION AND TECHNIQUES

(PAPER CODE: DMLT05)

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 gradiant 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

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-Blekwell 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.

PAPER – VII: LABORATORY MANAGEMENT AND ETHICS

(PAPER CODE: DMLT06)

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:

1. Ethical guidelines for biomedical research and human subjects, ICMR New Delhi, 2000.
2. CPCSEA Guidelines for Laboratory animal (CPCSEA) – No:13 Scaward road, Valmiki Nagar, Chennai-41.
3. Mc Burney, D.H 2002 Research methods Thomson Wadsivath, New York
4. Mason, E.J,. And Bramble, W.J.1978- Understanding and conducting research, Mc Graw Hill, New Delhi.
5. S. Palanichamy and M. Manoharan 1991, statistical methods for Biologists. Palani Paramount Publication, Palani, India.