Annexure - 14

PERIYAR UNIVERSITY

SALEM – 636 011.

PERIYAR INSTITUTE OF DISTANCE EDUCATION [PRIDE]

CERTIFICATE IN RADIO IMAGE TECHNOLOGY
(1Years)

SYLLABUS / REGULATIONS

[Candidates admitted from 2007-2008 onwards]

Certificate in Radio Image Technology

Mode: Through Distance Education and as an off – campus Programme

Eligibility: A Pass in the plus 2 examination Preference will be given to those who have chosen Science subjects.

Duration: One Year under Non – Semesters Pattern

Medium of Introduction: English Only

Course of Study:

First Year

Paper – 01 Biomaterials

Paper – 02 Biomedical Instrumentation – I

Paper – 03 Biomedical Instrumentation - II

Paper – 04 Practical - I

Scheme of Examinations:	**Duration**	**Max. Marks**
1. Biomaterials	3 hrs	100
2. Biomedical Instrumentation – I	3 hrs	100
3. Biomedical Instrumentation -II	3 hrs	100
4. Practical - I	3 hrs	100

Classification of successful candidates, Candidates who obtain 75% of marks, and above in aggregate will be placed in First class with Distinction.

Candidates who secure not less than 60% of the aggregate will be placed in First Class. Candidates who secure between 50% and 59% in aggregate will be placed in second class. Candidates who secure less than 40% and 49% in aggregate will be placed in Third Class.

Question Paper Pattern with out Practical

Time: 3 Hours **Max. Marks: 100**

Section – A: 5x8 = 40 Marks

Answer any five Questions

Each answer not to exceed 2 pages.

Section – B: 6x10: 60 Marks

Answer all Questions

Each answer not to exceed 4 pages.

PAPER – I: BIO MATERIALS

UNIT - I

Carbohydrates: Monosaccharide – definition – classification, structure, properties and biological significance Polysaccharides – Types and bilogical importance.

UNIT - II

Vitamins classification, occurrence, deficiency symptoms, biochemical functions of fat soluble and water soluble vitamins

UNIT - III

Basic rules of a Microbiology laboratory - Basic requirement of Microbiology laboratory – Basic Principles, operating mechanism and application of autoclave, hot air oven, laminar air flow and pH meter.

UNIT - IV

Biotechnology – definition and history Enzyme biotechnology – Enzyme production from microbes, applications – Enzyme immobilization.

UNIT - V

NMR Spectroscopy: Principle – Theory and Experiment, MR parameters, Nuclear over Hauser effect NMR application in chemistry, Bio chemistry and Bio physics – NMR in medicine molecular modeling optimizing the model.

Books of Study:

1. Jain J.L. (2003) Fundamentals of Biochemistry S. Chand and Company Ltd, New Delhi.
2. Satyanarayana. U (2005) Essentials of Biochemistry, Books and Allied (P) Ltd, Kolkata.
3. Veerakumari. L (2005) Biochemistry MJP Publications, A unit of Tamilnadu Book House, Chennai.
4. Satyanarayana. U (2005) Biotechnology 1st Edition, Books and Allied (P) Ltd, Kolkata.
5. Prakash. M and Arora C.K. Laboratory instrumentation Anmol Publication Pvt, Ltd.
6. Vasanta patlabhi and N. Gautham – Biophysics Reprint 2004, Narasa Publiship House, 35-36 Greams Road, Thousand Lights, Chennai.

PAPER – II: BIOMEDICAL INSTRUMENTATION - I

UNIT – I

TRANSDUCERS:

Transducers & transudation principles – Active principles – piezoelectric effect –n Thermoelectric effect – Photoelectric effect – Passive transducers – Passive transducers using inductive, capacitive, active circuits elements – Transducers for biomedical applications.

UNIT – II

BIOELECTRIC POTENTIALS

Sources of bioelectric potentials- Resting and acting potentials – Propagation of action potentials – Bioelectric potentials

UNIT – III

ELECTRODES:

The Electrocardiogram (ECG) – The Electroencephalogram (EEG) – The Electroencephalogram (EMG) – Electrodes – Electrode theory - Biochemical electrodes – Biochemical transducers.

UNIT – IV

CARDIOVASCULAR MEASUREMENTS:

Blood Pressure- Characteristics of blood flow – heart sounds – Electrocardiography – ECG amplifiers – electrodes & leads ECG recorder principles – Measurement of blood flow and cardiac output – Measurement of heart sound – Pacemakers systems – Pacing modes and pulse generators – Power sources of electromagnetic interference.

UNIT – V

BIO SENSORS:

Sensors – Principles – applications – Biosensors – Example – applications.

References: 1. Biomedical Instrumentation Dr. M. Arumugam

PAPER – IV: BIO MEDICAL INSTRUMENTATION - II

UNIT – I

RESPIRATORY SYSTEM:

Tests & Instrumentation for the mechanics of breathing – Lung volumes & capacities – Measurement of gaseous exchanges & diffusion – Ventilator & respirator – Measurement of systemic body temperature – Thermograph – Skin temperature measurements.

UNIT - II

ULTRASONIC IMAGING:

Ultrasonic imaging – Ultrasonic diagnosis – Ultrasonic transducers – Echoencephalography – Ophthalmic scans – Ultrasonic imaging – Neuronal firing measurements – electromyography measurements

UNIT – III

SCANNERS:

Biomedical application – Computer analysis of the Electrocardiogram – Computerized axial tomography (CAT) scanners.

UNIT – IV

MAGNETIC IMAGING:

Magnetic Imaging Principles – Theory – Magnetic Variance imaging.

UNIT – V

Electrophoreses:

Basic Principles and their application - Agarose gel electrophoreses – SDS PAGE – Blotting – southern and western – Auto radiography

Books for study:

1. Leslic Cromwell, Fred J.Weibell, Erich A. Pfeiffer – Biomedical Instrumentation & Measurements – Second Edition (Pearson Education)

2. Asokan P (2001) Analytical Biochemistry. 1st edition, 2nd reprint china publishers, Vellore, Tamilnadu.

Paper – III: Practical – I

1. Blood Grouping
2. Blood Pressure Measurement
3. Blood Analysis: Sugar, Urea, Uric acid, Creatinine, Protein, Cholesterol
4. Estimation of Hemoglobin in Blood
5. Determination RBC, WBC, ESR, PCV
6. Urinary Calculai Analysis