BIOLOGICAL TECHNIQUES

Semester	Subject code	Category	Lecture		Theory		Practical		Credits
			Total hrs	Hrs/ week	Total hrs	Hrs/ week	Total hrs	Hrs/ week	
II	21CPMB2D	Elective-II	75	5	75	5	0	0	3

COURSE OBJECTIVES

To enable the students to understand the basic biological techniques.

COURSE OUTCOMES

On the successful completion of the course, students will be able to understand the basic principles and applications of the techniques used in the laboratory and the analytical techniques in the field of microbiology.

CO Number	CO Statement	Knowledge Level K1 – K4)
CO1	To identify the basics of analytical techniques	**K2**
CO2	To understand the principle and analysis of different components of various mixtures by chromatographic technique	**K2**
CO3	To compute how the molecules are separated by charging (positive and negative electrode)	**K2**
CO4	To experiment the sedimentation of particles depends upon the density of both sample and solution and its application	**K1**
CO5	To execute the extensive use of radio isotopes in diagnosis and therapy of living matter	**K3**

Mapping with Programme Outcomes:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	S
CO2	S	M	M	S	S	M
CO3	S	S	M	S	S	S
CO4	M	M	M	S	S	S
CO5	S	M	S	S	S	S

S- Strong; M- Medium; L- Low

UNIT-I: Basics of analytical techniques **12 Hours**

Normality, molarity, molality, dissolution. pH, buffer – composition of buffer, buffer preparation- Tris –HCl, phosphate buffer.

UNIT-II: Chromatographic Techniques **15 Hours**

Principles & Applications of Chromatographic Techniques: Adsorption - Ion exchange and gel permeation - Affinity chromotography for separation of compounds including GC and HPLC.

UNIT-III: Electrophoresis and detection techniques **15 Hours**

Electrophoresis Techniques - Agarose gel electrophoresis, SDS- PAGE, Iso electric focusing. Flow cytometry, FISH, GISH. Microarray and biosensors.

UNIT-IV: Centrifugation and Spectroscopy **15 Hours**

Centrifugation - Principles, various types including centrifugation. Types of centrifuge, types of rotors. Applications of centrifuge. Spectroscopy – Definition, Principle (Beer - Lambert law)and methods- UV-Visible, Atomic Absorption Spectroscopy, Atomic Emission Spectroscopy, NMR, Fluorimetry, FT-IR.

UNIT-V: Radioisotope techniques **15 Hours**

Principles of radioactivity. Detection and measurement of different types of radioisotopes normally used in biology, incorporation of radioisotopes in biological tissues and cells, molecular imaging of radioactive material. Hazards of radioisotopes, Safety guidelines.

TEXT BOOKS:

S.No	Authors	Title	Publishers	Year Of Publication
1.	Arumugam.	Biomedical Instrumentation,	Anuratha Agencies Publishers	2002.
2.	John G. Webster	Bioinstrumentation	University of Wisconsin, John Wiley & Sons, Inc.	2004
3.	Asokan, P	Analytical Biochemistry	Chinnaa Publications, India.	2001

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year Of Publication
1.	Chatwal, G. R and S. K. Anand	Instrumental Methods of Chemical Analysis	Himalaya Publishing House, Mumbai	2003

2.	Mandeep Singh	Introduction to Biomedical Instrumentation	Paperback publishers, India	2014
3.	Wilson, K. and J. Walker	Principles and Techniques of Biochemistry and Molecular Biology	Cambridge University Press, UK	2010

TEACHING METHODOLOGY:

- Lectures
- Power point presentation
- Charts
- Models
- Group discussion
- Group assignments
- Seminars

SYLLABUS DESIGNER:

- Ms. R.Sangeetha Assistant Professor
- Dr. A.Vidhya HOD & Assistant Professor