**ALLIED III**

**BIOINSTRUMENTATION**

| Semester | Subject code | Category | Lecture | | Theory | | Practical | | Credit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total hrs | Hrs/ week | Total hrs | Hrs / week | Total hrs | Hrs/ week | |
| IV | | Allied | 60 | 4 | 60 | 4 | 0 | 0 | 4 |

**COURSE OBJECTIVES**

To enable the students to understand the basics of Bioinstrumentation

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to know the basics in Bioinstrumentation.

| CO Number | CO Statement | Knowledge Level (K1-K4) |
|---|---|---|
| **CO1** | To remember about the basic principles of centrifugation methods | **K1** |
| **CO2** | To understand concept of Spectroscopy | **K2** |
| **CO3** | To understand the principles of Chromatographic techniques | **K2** |
| **CO4** | To understand the Electrophoretic techniques | **K2** |
| **CO5** | To analyze about the radio isotopes ad its applications | **K4** |

**MAPPING WITH PROGRAMME OUTCOMES:**

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

**S- Strong; M- Medium; L- Low**

**Unit-I Centrifugation methods 12 hrs**

Basic principles of sedimentation, centrifugal force, sved berg constant. Types of centrifuges. Application in molecular weight determination of proteins and nucleic acids.

**Unit-II Spectroscopy 12 hrs**

Calorimetric, spectrophotometer-UV, Fluorescence spectroscopy, spectrofluorimetry, turbidometry, nephelometry, illuminometer – principle, operation and maintenance.

**Unit-III Chromatographic techniques 12 hrs**

General principles of chromatography; adsorption, partition, gas, ion-exchange, gel filtration, affinity, HPLC.

**Unit-IV Electrophoretic techniques 12 hrs**

Electrophoretic techniques: Proteins - SDS-PAGE, Nucleic acids - Gel Electrophoresis.

**Unit-V Radioisotope techniques 12 hrs**

Radioisotope techniques: nature of radioactivity, detection, measurements, counters, safety aspects, applications

**DISTRIBUTION OF MARKS:** Theory - 100% and Problems – Nil

**TEACHING METHODOLOGY:**

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

**TEXT BOOKS:**

| **Sl no:** | **Book Name** | **Author** | **Publisher** | **Year of Publication** |
|---|---|---|---|---|
| 01 | Bioinstrumentation | L. Veerakumari | MJP Publisher | 2017 |
| 02 | Fundamentals of Bioanalytical Techniques and Instrumentation | Sabari Ghosal , Anupama Sharma Avasthi | PHI Learning | 2018 |
| 03 | Modern Physics: Physics of Modern Science | Priyanka Jangid | Kindle Edition | 2019 |

**REFERENCE BOOKS:**

| **Sl no:** | **Book Name** | **Author** | **Publisher** | **Year of Publication** |
|---|---|---|---|---|
| 01 | Bioinstrumentation | John G. Webster | John Wiley & Sons | 2008 |
| 02 | Bioinstrumentation and Biosensors | Donald L. Wise | CRC Press; 1 edition | 1991 |
| 03 | Principles of Applied Biomedical | L. A. Geddes, L. E. Baker | John Wiley & Sons | 1991 |

| | | | | |
|---|---|---|---|---|
| | Instrumentation | | | |
| 04 | Instrumental Methods of Chemical Analysis | Chatwal, G. R and S. K. Anand. | Himalaya Publishing House | 2011 |
| 05 | Introduction to Biomedical Instrumentation | Mandeep Singh | Paperback publishers | 2014 |
| 06 | Principles and Techniques of Biochemistry and Molecular Biology | Wilson, K. and J. Walker | Cambridge University Press, UK. | 2018 |

**WEB SOURCES**:

*https://www.vidyarthiplus.com*

https://searchworks.stanford.edu ›

*https://biomedikal.in* ›

*https://nptel.ac.in*

**SYLLABUS DESIGNER:**

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2. Dr. A.Vidhya HOD & Assistant Professor