

Department of

Revised Syllabus of II Year Advanced Diploma Program (PG)

Title of Program: Bioinstrumentation II

Syllabus Structure (PG)

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks	
2	III	CT III	ADBIT 303	30	2	75	
		CL III	ADBIL303	60	2	150	
	IV	CT IV	ADBIT 404	30	2	75	
		CL IV	ADBIL404	60	2	150	
	Annual	CP II	ADBIP202	60	2	150	
	Industrial and or Incubation and or Research and or Field Training				60	2	-
	Total				270	12	600
Total				510	22	1200	

AD: Advanced Diploma, *: Departmental Code (C: Chemistry, MI: Microbiology, CSE: Computer Science (Entire), etc)

C: Course, T: Theory, L: Lab (Practical), P: Project

Total No. of Papers: 06 (Theory: 02, Practical: 02, Project: 01)

Theory and Practical: Semester, **Project: Annual**

Semester III

CT-III: D *T 303: Title: Bioinstrumentation II

(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

(Minimum 2)

- To make students aware about principle and working of bioinstrumentation
- To increase the understanding about evaluation of qualitative and quantitative study of biomolecules.
- To introduce the techniques of sectioning and analysing of tissue using microtomy

Unit I: Qualitative and quantitative analysis of chromatography

(15)

Chromatographic Fundamentals: Retention, Band Spreading, Resolution, Dynamics of Chromatography. Basic mass transfer equations, Method of moments, Linear dispersion model, Linear staged models for chromatography, Instrument Requirements for Chromatography : System design and Column packing techniques

Unit II: Qualitative and quantitative analysis of chromatography. (15)

Definition, theoretical principles, types of chromatography- Paper chromatography, Thin layer chromatography, Liquid-liquid chromatography, HPLC chromatography, Adsorption, chromatography, column Ion exchange chromatography, Gas chromatography.

Learning Outcomes:

After completion of the unit, Student is able to

1. Students will understand the principle and working of instruments using life sciences.
2. Students will learn about evaluation of qualitative and quantitative study of biomolecules.

Reference Books:

Recommended Books:

1. Principles and techniques of Biochemistry and Molecular biology by Wilson and Walker, Cambridge 6th Ed.
2. Biochemical methods by Sadashivam And Manikam , New age international, 1996.
3. An introduction to practical biochemistry By David T. plummer Mc Graw-Hill.

**CL-III: D* L303: Title: Bioinstrumentation- II
(Contact Hrs: 60 Credits: 02)**

Learning Objectives:

Students will be able to

- To make students aware about principle and working of bioinstrumentation
- To increase the understanding about evaluation of qualitative and quantitative study of biomolecules.
- To introduce the techniques of sectioning and analysing of tissue using microtomy.

List of Practical's (15)

1. Separation of amino acids using paper chromatography and TLC	02
2. Preparation of column	02
3. Demonstration of adsorption chromatography	02
4. Separation of biomolecules using HPLC.	02
5. Separation of biomolecules using gas chromatography	02
6. Purification of protiens using ion exchange chromatogtaphy	02

Learning Outcomes:

After completion of the unit, Student is able to

1. Students will understand the principle and working of instruments using life sciences.
2. Students will learn about evaluation of qualitative and quantitative study of biomolecules.

Reference Books:

1. Principles and techniques of Biochemistry and Molecular biology by Wilson and Walker, Cambridge 6th Ed.
2. Biochemical methods by Sadashivam And Manikam, New age international, 1996.
3. An introduction to practical biochemistry By David T. plummer Mc Graw-Hill.

Semester IV

CT-IV: D *T 404: Title: Bioinstrumentation II

Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

- To make students aware about principle and working of bioinstrumentation
- To increase the understanding about evaluation of qualitative and quantitative study of biomolecules.
- To introduce the techniques of sectioning and analysing of tissue using microtomy

Unit I: Tools and Techniques in Molecular Biology

(15)

Instrumentation in molecular biology, isolation of nucleic acid, plasmid DNA, Blotting techniques, PCR, Types of PCR, Electrophoresis of proteins and nucleic acids - 1D & 2D gels, SDS-PAGE, Agarose gel electrophoresis, Western Blotting, Gel documentation

Unit II : Good Manufacturing Practices

(15)

GMP in manufacturing, processing and packaging of drugs, GMP practices in finished products, organization, personnel, buildings and facilities, equipments, production and packaging, Brief introduction of GLP, Third party GMP certification, Good Manufacturing Practices (GMP) guidelines
2) GMP for raw materials, finished products, organization Good Manufacturing Practices (GMP) guidelines, GMP for raw materials, finished products, organization, personnel, building & facilities, equipment, containers & closures, production & process controls, packaging & labeling, records & reports etc.

Learning Outcomes:

After completion of the unit, Student is able to

1. Students will understand the principle and working of instruments using life sciences.
2. Students will learn about evaluation of qualitative and quantitative study of biomolecules.

Reference Books:

- 1) Chatwal GR (1998), Instrumental Methods of Chemical Analysis, (5 th Ed) Himalaya Publishing House
2. Sharma BK (1994) Instrumental Methods of Chemical Analysis, (5 th Ed) Krishna Prakashan Media Pvt Ltd

3. Willard, Merit Dean & Settle, (1986), Instrumental methods of analysis (6 th Ed) CBS Publishers and Distributers,

CL-IV:D* L404: Title (Practical): Bioinstrumentation II
(Contact Hrs: 60 Credits: 02)

Learning Objectives:

- To make students aware about principle and working of bioinstrumentation
- To increase the understanding about evaluation of qualitative and quantitative study of biomolecules.
- To introduce the techniques of sectioning and analysing of tissue using microtomy

List of Practical's (15)

1. Isolation and separation of DNA. 02
2. Isolation and separation of RNA. 02
3. Analysis of DNA gel electrophoresis using gel documentation system 02
4. Separation of proteins using PAGE 02
5. Southern Blotting 02
06. Western blotting 02

Learning Outcomes:

After completion of the unit, Student is able to

1. Students will understand the principle and working of instruments using life sciences.

Students will learn about evaluation of qualitative and quantitative study of biomolecules

Reference Books:

- 1) Chatwal GR (1998), Instrumental Methods of Chemical Analysis, (5 th Ed) Himalaya Publishing House
2. Sharma BK (1994) Instrumental Methods of Chemical Analysis, (5 th Ed) Krishna Prakashan Media Pvt Ltd
3. Willard, Merit Dean & Settle, (1986), Instrumental methods of analysis (6 th Ed) CBS Publishers and Distributers,

CP-II: D *P202: Project
(Contact Hrs. 60, Credits: 2)

Industrial and or Incubation and or Research and or Field Training
(Contact Hrs. 60, Credits: 2)

BOS Sub-Committee

1. Chairman: - Dr. P.S. Mundada
2. Member :- Dr. S. G. Jadhav

Expert Committee

1. Name of Academic Expert Dr. Uday Sidhu Pawar
2. Name of Industrial Expert Mr. Datta pawar

