



AMITY UNIVERSITY
 ———— UTTAR PRADESH ————

FORMAT FOR COURSE CURRICULUM

Course Title: Basic Bioanalytical Techniques

Course Code: BIOT 201

Credit Units: 03

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
3	-	-	-	3

Course Objectives:

A comprehensive knowledge of the equipment used in Life sciences and Biotechnology will be offered in the course along with the applications. Additionally, an overview of the instruments used in isolation and separation of molecules will also be provided. This will enable the students to understand all subjects of Biotechnology as these tools and techniques will be used therein. This is a basic foundation course for the undergraduate students of Biotechnology.

Pre-requisites: General

Student Learning Outcomes:

At the end of this course the student will be able to

- Explain the functioning, maintenance and safety aspects of the basic apparatus used in a Biotechnology lab.
- Explain the principles and applications of centrifuge, electrophoresis and chromatography in research and related experiments.
- Utilize the knowledge for the separation of proteins/peptides by selecting appropriate separation techniques.
- Characterize certain functionalities of biomolecules by using spectroscopic techniques.

Course Contents/Syllabus- Theory:

	Weightage (%)
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Module I	10
Key features and applications of autoclave, incubators and shakers; different types of bio-safety cabinets (vertical and horizontal); growth chambers (BOD and CO ₂ chambers); pH meter (calibration, operation and maintenance).	
Module II	20
Centrifugation: Basic principle of sedimentation; types, care and maintenance of centrifuges; preparative centrifugation and its applications: differential centrifugation, density gradient centrifugation.	
Module III	20
Electrophoresis: principles of electrophoresis, support media; agarose gels, polyacrylamide gels, native (buffer) gels, gradient gels; electrophoresis of proteins; SDS-PAGE, isoelectric focusing gel electrophoresis; detection, estimation and recovery of proteins in gels.	
Module IV	25
Chromatography: principle of chromatography; distribution coefficients; components of chromatography; chromatographic performance parameters; modes of chromatography; various types of chromatography and their applications: thin layer chromatography (TLC), basic column chromatography, gel-permeation chromatography, ion exchange and affinity chromatography.	
Module V	25
Spectroscopy: Properties of electromagnetic radiation, interaction with matter; atomic absorption and emission spectroscopy; UV-Vis spectroscopy (principles, instrument, qualitative and quantitative applications) atomic absorption spectroscopy and spectrofluorimetry (principles, instrument and application); Infrared spectroscopy (principles, instrument and application).	

Pedagogy for Course Delivery:

Lectures: 35

Tutorial: 4

Presentation/ Seminar: 4

Class Test: 2

Total: 4

Theory Assessment (L&T):

Components (Drop down)	Mid-term exam	Project	Viva Voce	Attendance	End Term Examination
Weightage (%)	10	10	5	5	70

Text & References:

- Principles and Techniques of Biochemistry and molecular Biology, Edited by Keith Wilson & John Walker, Cambridge Publication, 6th Edition
- Biophysical Chemistry; applications to Biochemistry and Molecular Biology, By David Freifelder, 1982
- Introduction to protein structure, Carl Branden and Tooze, 2nd Edition, Garland Science Publishing, 1998
- Spectrophotometric identification of organic compounds, Robert M. Silverstein and Francis X. Webster, John Wiley and sons, Canada Ltd 1997
- Principles and Practice of Bioanalysis by Richard F. Venn
- Principles of Fermentation Technology, 2nd ed., Oxford/ N.Y.: Pergamon, 1995