



जम्मू केन्द्रीय विश्वविद्यालय  
Central University of Jammu  
राया-सुचानी (बगला), जिला: सांबा-181143, जम्मू (जम्मू और कश्मीर), भारत  
Rahya-Suchani (Bagla), District- Samba, 181143, Jammu (Jammu and Kashmir), India

Course Title : Biotechniques

Credit: 4 (L-3, T-0, P-1)

Course Code :

Contact Hrs/Week: (L-3, T-0, P-2)

**Course Outcome (CO)**

To provide students with a basic understanding of common laboratory instruments and their working principles.

**Course Learning Outcomes (CLO):** The students will be able to:

1. Understand the fundamentals of light and electron microscopy, and their application in visualizing cells and subcellular structures.
2. To understand the basics of tissue preservation and sectioning
3. Understand the principle of spectroscopy, cell separation and pH of solution
4. Understand the principle behind the physical methods of separation of compounds
5. Comprehend basics of electrophoresis and its application

**Unit I**

Introduction to light microscopy, types of light microscopes, Bright field, Dark-field, Phase contrast, Fluorescence, Confocal, Scanning and Transmission electron microscopes.

**Unit II**

Introduction to tissue preparation and microtomy, fixation, block preparation. Principle of preservation; Low temperature; Basics of refrigeration, freezing, deep freezing, cryopreservation, lyophilization and chemical preservation

**Unit III**

Principles and application of spectroscopy; principles of absorption spectroscopy, UV-visible spectrophotometer, Principles and application of centrifugations. pH meter.

**Unit IV**

Principle and applications of chromatography. Types of chromatography; paper chromatography, thin layer chromatography, Gel-filtration chromatography, Ion exchange and Affinity chromatography.

**Unit V**

Principle and applications of electrophoresis; Agarose gel electrophoresis, SDS-PAGE, Native PAGE. Blotting techniques; Western, Northern and Southern Blotting. ELISA techniques

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**Lab component**

1. Sectioning and staining
2. Immunohistochemistry
3. Blotting
4. Extraction of DNA
5. Gel electrophoresis

**Suggested readings:**

1. Boyer: Modern Experimental Biochemistry (1993, Benjamin-Cummings,)
2. Avinash Upadhyay, Kakoli Upadhyay, Nirmalendu Nath: Biophysical Chemistry (Principles and Techniques)
3. Plummer: An Introduction to Practical Biochemistry (1989, McGraw Hill)
4. Keith Wilson, and John Walker: Principles and Techniques of Biochemistry and Molecular Biology (2006, Cambridge)

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