

| B.Sc. Biotechnology: Semester-VI<br>BST 601: Analytical Techniques I                     |   |
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| <b>Teaching Scheme</b><br>Lectures: 3 hrs/Week<br>Tutorials: 1 hr/Week<br><br>Credits: 4 | <b>Examination Scheme</b><br>Class Test -12Marks<br>Teachers Assessment - 6Marks<br>Attendance – 12 Marks<br>End Semester Exam – 70 marks |

**Prerequisite:** - BST102 Introduction to Biotechnology, BST151 Biotechnology Lab-I


**Course Objectives:**


- 1 To give basic overview of different types of microscopic techniques.
2. To give complete knowledge of Phase contrast microscopy, Transmission Electron Microscope and Scanning Electron Microscope.
3. To explain the technique of electrophoresis and its various types.
4. To explain the importance of western blotting.
5. To explain and focus on various types of chromatographic techniques.


**Course Outcomes:**

After completing the course, students will be able to:

- CO1: To state the principle and working of various types of Microscopic Techniques i.e. Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope.
- CO2: To understand the concept of phase contrast microscopy.
- CO3: To explain the principle and working mechanism of TEM and SEM.
- CO4: To analyze and distinguish between different types of electrophoretic techniques.
- CO5: To evaluate and outline the concept of western blotting.
- CO6: To explain the principle, application, affinity, mobile phase and stationary phase, types of columns, used in various chromatographic techniques.
- CO7: To explain the concept of Paper Chromatography, Gel filtration Chromatography, ion-exchange chromatography, affinity chromatography, High Performance Liquid Chromatography (Normal phase and reverse phase).

  
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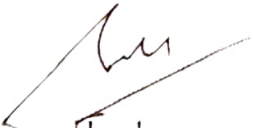
  
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**Detailed syllabus::**

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| <p><b>UNIT-1 Microscopic Techniques</b></p> <p>Microscopic Techniques: History, basic types of light microscopy and their applications in brief; Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope. Phase contrast microscopy: Amplitude and phase objects, wave terminology, positive or dark phase contrast and negative or bright phase contrast microscopy. Electron microscopy: Transmission Electron Microscope and Scanning Electron Microscope, sample preparation for EM, basic concept of confocal microscope</p> |
| <p><b>UNIT-2 Electrophoresis</b></p> <p>Electrophoresis: Principle and types of electrophoresis. Gel electrophoresis: Agarose gel electrophoresis, Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE), Immuno electrophoresis, Capillary or tube gel electrophoresis, isoelectric focusing (IF), Two-dimensional (2D) electrophoresis. Western blotting technique</p>  |
| <p><b>UNIT-3 Chromatographic Techniques</b></p> <p>Chromatographic Techniques: Principle, application, affinity, mobile phase and stationary phase, types of columns, etc. Types of chromatography: Paper Chromatography, Gel filtration Chromatography, ion-exchange chromatography, affinity chromatography, High Performance Liquid Chromatography (Normal phase and reverse phase)</p>   |

**Text and Reference Books:**

1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H.Freeman& Company, San Fransisco, 1982.
2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000.
3. D. Holme& H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998.
4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994.
5. Selected readings from Methods in Enzymology, Academic Press.

  
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