Approval: 9th Senate Meeting

Course Name: Analytical Biotechniques

Course Number: BY514

Credit: 3-0-0-3

Prerequisites: - IC 136 - Understanding Biotechnology & its Applications **OR** Consent of Faculty member

Students intended for: B. Tech. 3rd and 4th year, MS/MSc. /M. Tech., Ph.D.

Elective or Core: Core for M. Tech. Biotechnology, Elective for others

Semester: Odd/Even

Course objective:
The course provides in-depth understanding, training and hands on experience of the growing range of new analytical techniques used in the biotechnology sector. This course is suitable for graduates from a chemical or life sciences background. The understanding of this course will enable student to exploit different analytical tools in biotechnology for their research purpose. By successfully accomplishing this course, the student will have a current background on the basic principles of key analytic biotechnologies, and how these technologies allow sensitive and accurate detection, purification, and characterization of biomolecules. There is no formal textbook for the course, and students will receive handouts as reading materials and selected references may also be provided.

Course Structure:

Module I [12 Lectures]
Spectroscopy: Principles and applications of UV-Visible spectroscopy, circular dichroism, fluorescence spectroscopy, mass, and infrared spectroscopy, MALDI-TOF, NMR.

Module II [10 Lectures]
Chromatographic and other separation techniques: Principles and applications of different chromatographic techniques, ultrafiltration, phase-partitioning, Gel electrophoresis, two dimensional gel electrophoresis, blotting techniques.

Module III [12 Lectures]
Imaging Techniques: Principles and applications of bright-field, dark-field and phase contrast microscopy, fluorescence microscopy, confocal microscopy, electron microscopy and atomic force microscopy.

Module IV [8 lectures]
Principles and applications of Surface plasmon resonance, Flow cytometry, Real Time PCR, ELISA

References and textbooks:

- Biophysical Chemistry, Part 2: Techniques for the Study of Biological Structure and Function (Pt. 2) 1st Edition by Charles R. Cantor and Paul Schimmel. ISBN-13: 978-0716711902
- Principles of Fluorescence Spectroscopy by Lakowicz, Joseph R. (3rd Edition) ISBN 978-0-387-46312-4
- Microscopic Techniques in Biotechnology by Michael Hoppert, 2006, ISBN: 978-3-527-60523-1
- Principles and Techniques of Biochemistry and Molecular Biology, by K. Wilson and J. Walker, ISBN-13: 978-0521731676