5th Semester	RBT5D005	Bio-instrumentation	L-T-P 3-0-0	3 Credits

Module I:

Microscopy: Principle of operation and Instrumentation of Light microscopy (Bright field, Phase-contrast, Fluorescence), Confocal microscopy and Electron Microscopy (Scanning and transmission). 2. Immuno-cytochemistry: Principles, techniques and application.

Module II:

Principles of electrochemical techniques: Electrochemical cells and reactions, potentiometry and voltametry, The pH electrode, ion-selective and gas-sensing electrodes, Clark type oxygen electrode. Biosensors.,Flowcytometry.

Module III:

Ultraviolet-visible absorption spectroscopy: Principle, Instrumentation and application. Fluorescence spectrophotometry: Principle, Instrumentation and application.

Module IV: Elimentary idea about X-ray crystallography, API- Electrospray and MALDI TOF.

Module V:

Centrifugation techniques: Basic principles of sedimentation, Types of centrifuges,2. Chromatographic techniques: Principles of chromatography (Adsorption and Partition chromatography), Planar chromatography (Paper and Thin-layer chromatography), Column chromatography (Gas chromatography, Gel exclusion/permeationchromatography and FPLC, Ion-exchange chromatography, Affinity chromatography, HPLC). 3.Electrophoretic techniques: General principles, support media, electrophoresis of proteins (SDS-PAGE, native gels, gradient gels, isoelectric focusing ,agarose gel electrophoresis

Books:

[1] Physical Biochemistry by David Freifelder.

[2] Practical Biochemistry by Keith Wilson and John Walker.

Digital Learning Resources:

Course Name:	Plant Cells Bioprocessing
Course Link:	https://nptel.ac.in/courses/102/106/102106080/
Course Instructor:	Prof. Smita Srivastava, IIT Madras