

Curriculum Planner
(Department of Botany, Kalindi College)
Dr. Priyanka Verma and Dr. Monika Keisham (ODD 22-23)

Course: BSc (H) Botany

Semester: V

Paper: Analytical techniques in plant sciences (Theory) DSE

Topic	Reference	Approximate (schedule)
Unit 1 Imaging and related techniques (18 lectures) Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy; Use of fluorochromes: (a) Flow cytometry (FACS); (b) Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.	1. Plummer, D.T. (1996). An Introduction to Practical Biochemistry, 3rd edition. New Delhi, Delhi: Tata McGraw-Hill Publishing Co. Ltd.	September, - November, 2022
Unit 2 Cell fractionation (8 lectures) Centrifugation: Differential and density gradient centrifugation, sucrose density gradient, CaCl ₂ gradient, analytical centrifugation, ultracentrifugation, marker enzymes.	2. Ruzin, S.E. (1999). Plant Microtechnique and Microscopy. New York, NY: Oxford University Press.	August, 2022
Unit 3 Radioisotopes (5 lectures) Types of radioisotopes, types of emissions (alpha, beta, gamma radiations), Half-life, Methods of detection and quantification, Use of radioisotopes in biological research, auto-radiography, pulse chase experiment.		September, 2022

Unit 4 Spectrophotometry (5 lectures) Principle and applications of UV and Visible spectrophotometry.		September, 2022
Unit 5 Chromatography (10 lectures) Principle and applications of the following chromatographic techniques: Paper chromatography, Column chromatography, TLC, GLC, HPLC, Ion-exchange chromatography; Molecular sieve chromatography; Affinity chromatography.		October- November, 2022
Unit 6 Characterization of proteins and nucleic acids (14 lectures) Mass spectrometry; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids; Electrophoresis: AGE, PAGE, SDS-PAGE, Blotting techniques: Southern, Northern and Western, DNA fingerprinting, DNA sequencing, PCR and ELISA. (These techniques should cover definition, procedure and applications)		August- September, 2022