



VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

Jnanasagara campus, Ballari.-583105

Semester – IV: Skill Course B2: Methods in plant sciences

Course Title:: Methods in plant sciences	Course Code:24MJBOTC4S
Total Contact Hours: 30 hrs	No. of Credits:02
L:T:P - 1:0:2	Duration of SEE:1 Hrs 30 min
Internal Assessment Marks: 10	Semester End Exam Marks: 40

Course Outcomes (COs):

On completion of this course, the students will be able to:

CO1. To learn principals and operations of microscopes and application in biology

CO2. To learn the techniques of separation of biological samples.

CO3. To understand the techniques of characterization of biomolecules.

CO4. To learn the techniques and principals of chromatography, spectrophotometry, blotting and molecular biology techniques and their advance versions.

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Unit	Description	Hours
1	Microtomy and slide preparation: Fixatives and staining technique. Preparation of whole mounts. Bright-field stains and fluorochromes. Metachromatic staining reaction. Histochemical dyes for the localization of starch, proteins, nucleic acid and lipids. Spectroscopic techniques-Colorimetry, UV-Visible Absorption Spectrophotometry, Infra-Red Spectrophotometry, Mass Spectrophotometry, NMR Spectrophotometry and GCMS, LCMS	10
2	Chromatographic techniques – Principle, Paper chromatography, Thin Layer Chromatography (TLC), Column chromatography and Gas Chromatography. Gas Liquid Chromatography (GLC), High Performance Thin Layer Chromatography (HPTLC), High Performance Liquid Chromatography (HPLC), Ion-Exchange Chromatography, Affinity Chromatography, Autoradiography. Characterization and isolation of proteins, nucleic acids and phytochemicals: Centrifugation, Mass spectrometry; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids; FTIR. Molecular techniques: Southern, Northern, Western & Slot blots. PCR, DNA sequencing. Electrophoresis: AGE, PAGE, SDS-PAGE	10
3	Practicals 1. Study of Blotting techniques: Southern, Northern and Western, DNA fingerprinting, DNA sequencing, PCR through photographs. 2. Demonstration of ELISA 3. To separate nitrogenous bases by paper chromatography. 4. Isolation of chloroplasts by differential centrifugation. 5. To separate chloroplast pigments by column chromatography.	10

	6. To estimate protein concentration through Lowry's methods. 7. To separate proteins using PAGE. 8. To separate DNA (marker) using AGE. 9. Study of different microscopic techniques using photographs/micrographs (freeze fracture, freeze etching, negative staining, positive staining, differential staining, fluorescence and FISH). Preparation of permanent slides (double staining)	
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Text Books for Reference:

- k. Alan peacock H.1966 Elementary Microtechnique Edward Arnold (Pub) Ltd
- l. Reid P.D. and R.F. Pont-Lezica (Eds.). 1992. Tissue Printing: tools for the study of anatomy, histochemistry, and gene expression. Academic Press. New York.
- m. Conn H.J. 1991. Biological stains. Ninth Edition. Sigma Chemical Company, St. Louis. USA.
- n. Prasad & Prasad 2000 Emkay Replications, Delhi. 8. Puru's M.J.et al 1966 Laboratory Techniques in Botany Butter Worths
- o. Patki L.R.1992 An Introduction to MicrotechniqueS.Chand& Company, New Delhi.
- p. Johnson D.A. 1940 Plant Microtechnique. Mac - Graw Hill, New Delhi.
- q. Prasad & Prasad 2000 Emkay Replications, Delhi. 8. Puru's M.J.et al 1966 Laboratory Techniques in Botany Butter Worths
- r. Krishnamrthy K.V. 1988. Methods in Plant Histochemistry. S. Viswanathan (Printers & Publishers) Pvt. Ltd. Madras.

Examination pattern:40 Multiple Choice Questions for 40 Marks (OMR Based)
