4.	Seema Singh, Economics for Engineering Students, IK International Publishing House Pvt. Ltd, 2014, ISBN 8190777041

Sixth Semester

Details of course: - Plant Biotechnology (Department core course-13)

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Plant Biotechnology (BT 302)	3	0	2	Nil

Course Objective:

To provide students with expert information on current and potential future developments in the area of plant biotechnology and to provide information on national and international norms and regulations in biotechnology

Course Outcome:		
I.	Understanding of the basic concepts used in plant biotechnology and tissue culturing	
II.	Knowledge of production means and mass cultivation using tissue culturing	
III.	Analysis of various techniques used in genetical modifications of plant	
IV.	Knowledge of applicability of transgenics in solving various issues faced by humanity	
V.	Learning of regulatory issues and ethical concerns involved in plant genetic engineering	
S. No.	Content	Contact Hours
Unit 1	**Introduction to plant biotechnology and culture techniques:** Historical perspectives, sterilization techniques, nutrient media, role of phytohormones; Callus, cell and protoplast cultures;Micropropagation; Organogenesis and somatic	8

	embryogenesis; Ovule culture; Anther culture; Production of haploids; Protoplast isolation and fusion; Selection systems for somatic hybrids / cybrids; Somaclonal variation; Preservation of germplasm.	
Unit 2	**Formation of Secondary Metabolites in Tissue Culture:** Production of pharmaceuticals by tissue culture; Biotransformation using plant cell cultures; Bioreactor system and models for mass cultivation of plant cells, hairy root culture	8
Unit 3	**Plant Genetic Engineering Techniques:** Gene transfer techniques (vector mediated and vector less gene transfer), transgenic plants, *trans* gene integration and expression, *trans* gene silencing, protein targeting, chloroplast transformation, targeted gene transfer.	9
Unit 4	**Applications of Transgenic Techniques:** Transgenic crops with new traits –herbicide tolerance, insect and disease resistance, pathogen free plants, nutrient quality, post harvest quality traits, fruit ripening, edible vaccines, Molecular farming for therapeutic protein	9
Unit 5	**Regulation of Plant Genetic Engineering:** National Regulatory Mechanism; Public Concerns Related to Plant Genetic Engineering	8
	Total	42

List of Experiments

S.NO.	Experiments
1.	Establishment of standard plant tissue Culture laboratory
2.	Different techniques for the sterilization of culture vessels, media and maintenance of aseptic Condition
3.	To prepare different stock solutions of MS media for plant tissue culture
4.	To prepare 1L of MS media for tissue culturing