



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name: Generic Elective for Hons. Courses (CBCS)						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
IV	32165401	GE :Economic Botany and Biotechnology	4	0	2	6
Teacher/Instructor(s)		Dr. Anita Singh				
Session		2021-22				

Course Objective:

- This paper will help the students to gain knowledge about economically important plants, their life cycle, processing, plant parts used, application of Biotechnology for the production of plant resources and production of new varieties.

Course Learning Outcomes:

- Understanding the morphology, processing and economic values of plant sources of cereals, legumes, spices, oils, rubber, timber and medicines.

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
1	Origin of cultivated plants	1	Concept of centres of origin
		2	Concept of their importance
		3	Vavilov's work
		4	References to Vavilov's work

2	Cereals	1	Wheat - Origin
		2	Wheat – Morphology and uses
3	Legumes	1	General account
		2	Gram
		3	Morphology and uses of Gram
		4	Soybean
		5	Morphology and uses of Soybean
4	Spices	1, 2, 3, 4	General account with special reference to Clove and Black – pepper.
		5,6	Botanical name, family, part used, morphology and uses.
5	Beverages	1,2	General description
		3,4.	Tea : Morphology, processing and uses
6	Oils and Fats	1,2	General description of oil and fats
		3,4	Groundnut : Morphology, processing and uses
7	Fibre yielding plants	1,2	General description of fibre yielding plants
		3,4	Cotton : Botanical name, family, part used, Morphology and uses.
8	Plant Biotechnology	1	Introduction to Plant Biotechnology
9	Tissue-culture Technology	1	Introduction to tissue culture
		2,3,4	Nutrient media, aseptic and culture conditions
		5,6,7	Developmental pathways : Direct and Indirect Organogenesis and Embryogenesis
		8,9	Single cell and Protoplast culture
10	Recombinant Technology	1,2	Molecular techniques : Blotting techniques (Southern, Northern and Western)
		3,4	PCR : Molecular DNA markers (RAPD, RFLP, SNPs)and DNA fingerprinting in plants
		5,6,7,8	Genetic Engineering Techniques : Gene cloning vectors (pUC 18 ,pBR322 ,BAC ,YAC, Ti plasmid); construction of genomic and C-DNA libraries : screening for gene of

			interest by DNA probe hybridization, complementation, Insertion of genes into plant tissues (Agrobacterium mediated, electroporation, micro-projectile bombardment) selection of recombinants by selectable marker and reporter genes (GUS, Luciferase, GFP)
		9,10	Application : Bt cotton, Roundup ready soybean, Golden rice, Flavr – Savr tomato, edible vaccine, industrial enzyme production, Bioreactors
		11	Application : Micropropagation, Androgenesis, Gynogenesis, embryo and endosperm culture, secondary metabolite production, germplasm conservation

EvaluationScheme:

No.	Component	Duration	Marks
1.	InternalAssessment		25
	• ClassTest (10)		
	• Attendance (5)		
2.	• Assignment (10)	3hr	75
	EndSemesterExamination		

Details of the Course		
Unit	Contents	Contact Hours
1, 2, 3 & 4	Origin of cultivated plants Concept of centres of origin, their importance with reference to Vavilov's work. Cereals Wheat – Origin, morphology, uses Legumes General account with special reference to Gram and Soybean Spices General account with special reference to clove and black pepper (Botanical name, family, parts used, morphology and uses)	20
5,6,7	Beverages Tea – Morphology, processing & uses Oils & Fats General description with special reference to Groundnut Fibre yielding plants General description with special reference to Cotton (Botanical name, family, parts used & uses)	12
8 & 9	Introduction to Biotechnology Plant tissue culture Micropropagation : haploid production through androgenesis and gynogenesis ; brief account of embryo and endosperm culture with their applications	10
10	Recombinant DNA Techniques Blotting techniques : Northern, Southern and Western Blotting , DNA Fingerprinting .Molecular DNA markers i.e, RAPD, RFLP, SNPs : DNA Sequencing, PCR and Reverse Transcriptase – PCR. Hybridoma and monoclonal antibodies, ELISA and Immunodetection – Molecular diagnosis of human disease, Human gene therapy.	18
	Total	60

Suggested Books:

Sl.No.	Name of Authors/Books/Publishers	Year of Publication/R eprint
1.	Kochhar, S.L (2011), Economic Botany in the Tropics, MacMillan Publishers India Ltd., New Delhi. 4 th edition	2011
2.	Bhojwani, S.S. and Razdan, M.K., (1996), Plant Tissue Culture : Theory and practice. Elsevier Science Amsterdam. The Netherlands.	1996

3.	Glick,B.R., Pasternak,J.J. (2003) – Molecular Biotechnology – Principles and Applications of recombinant DNA . ASM Press, Washington.	2003
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