

<b>LS 536A</b> <span style="margin-left: 150px;"><b>Plant Biotechnology</b></span> <span style="float: right;"><b>2 Credits</b></span> Name of the Faculty: Prof. P.K.Verma*, Dr. B. Chaudhary, Dr. A. Singh		
S.No.	Topic	Faculty Name/ Contact Hours
1.	<b>Plant transformation:</b> Mechanism of <i>Agrobacterium</i> -mediated transformation, binary vectors; other methods, particle bombardment, protoplast transformation, plastid transformation, detection of transgene, identification of integration site, determination of copy number, inheritance of transgene.	AJS /4
2.	<b>Expression systems:</b> Constitutive and inducible expression systems, transactivation systems of plants, mGAL4- UAS/VP16-system, GVG/dex system, tTA/Top10/pTAX /TetON/OFF systems	PKV/3
3.	<b>Mutagenesis in plants:</b> T-DNA/transposon mutagenesis, selection of mutants from random library, promoter/enhancer trap, gene-trap constructs.	PKV/2
4.	<b>Hybrid seed production:</b> Negative selection markers, male sterile and restorer lines, self-incompatibility, hybrid vigor, RILs.	BC/2
5.	<b>Genome editing:</b> Zinc finger nuclease, TALEN, CRISPR technology, selection and application.	PKV/2
6.	<b>Molecular markers:</b> SSR/SSLP, CAPS/deCAPS, application of markers in forward genetics and breeding	BC/2
7.	<b>In vitro propagation:</b> Somatic embryogenesis, clonal multiplication and shoot tip culture, somaclonal variations, organogenesis, embryogenesis, haploid culture.	BC/3
8.	<b>Transgenic crops</b> for improved yield and nutritional quality: Delayed fruit ripening, improved protein and vitamin contents, plant architecture and productivity.	AJS/5
9.	Transgenic crops with improved stress resistance: GM plants with enhanced resistance against biotic and abiotic stresses.	BC/3; AJS/2
10.	Safety and societal concerns with GM crop	PKV/2

**Further Reading:**

1. Genetic transformation of plants by Kirsi Marja Oksman Caldentey
2. Plant Biotechnology; the Genetic Manipulation of plants by Adrian Slater
3. Plant Biotechnology by W G Hopkins
4. Plant cell culture basics by C Evans
5. Plant Biotechnology: current and future applications of genetically modified crops (2006) by N G Halford
6. Handbook of plant cell culture 3 vols by Evans
7. Agribiotechnology and plant tissue culture by Bhojwani
8. Plant cell culture by G Dixons
9. Recent advances in plant biotechnology and its applications by A Kumar and S K Sopory