MB-09
BIOTECHNOLOGY AND GENETIC ENGINEERING OF PLANTS AND MICROBES

Units	Topics
I	**Biotechnology:** Basic concepts, principles and scope. **Plant cell and tissue culture:** General introduction, history, scope, concept of cellular differentiation, totipotency. **Organogenesis and adventive embryogenesis:** Fundamental aspects of morphogenesis: somatic embryogenesis and androgenesis, mechanisms, techniques and utility.
II	**Somatic hybridization:** Protoplast isolation, fusion and culture, hybrid selection and regeneration, possibilities, achievements and limitations of protoplast research. **Applications of plant tissue culture:** Clonal propagation, artificial seed, production of hybrids and somaclones, production of secondary metabolites/ natural products, cryopreservation and germplasm storage.
III	**Recombinant DNA technology:** Gene cloning principles and techniques, construction of genomic/c DNA libraries, choice of vectors, DNA synthesis and sequencing, polymerase chain reaction, DNA fingerprinting.
IV	**Genetic engineering of plants:** Aims, strategies for development of transgenics (with suitable examples), Agrobacterium - the natural genetic engineer, T-DNA and transposon mediated gene tagging, chloroplast transformation and its utility, intellectual property rights, possible ecological risks and ethical concerns. **Microbial genetic manipulation:** Genetic and physical mapping of genes, molecular markers for introgression of useful traits, artifical chromosomes, high throughput sequencing, genome projects, bioinformatics, functional genomics, microarrays, protein profiling and its significance.