SARDAR PATEL UNIVERSITY
Programme: BSC (GENETICS)
Semester: VI
Syllabus with effect from: November 2013

Paper Code: US06CGEN03	**Total Credit: 3**
Title Of Paper: Principles of Genetics and Breeding	

Unit	Description in detail	Weighting (%)
1	**GENETICS AND PLANT BREEDING** Plant breeding: Introduction, History, PB as a technology, Objectives, Activities in plant breeding, Important achievements, potential and opportunities, Centres of origin, Gene pool concept - primary, secondary and tertiary gene pool and gene introgression, Plant genetic resources: Definition and importance, Germplasm collection and conservation. IPGRI, NBPGR, Organisation/Institutes for crop improvement –ICAR, IARI, ICRISAT, CAZRI, ILCA, CICR. Introduction, domestication and acclimatization.	
2	**BREEDING METHODS** Genetic basis of Plant Breeding : Genetic consequences of self and cross fertilization, Heterosis - concept and theories, inbreeding depression. Methods of breeding self-pollinated, cross-pollinated and asexually propagated crops, Hybridization, Comparison between purelines, inbreds and clones, Hybrid varieties: use of CGMS system., Mutation breeding, Quality seed - classes, Seed certification and multiplication, seed purity standards, Cross breeding &Line breeding.	
3	**POPULATION GENETICS** Mendelian Genetics in Population- Genotype and allele frequencies, The Hardy Weinberg principle and its use, Factors affecting changes in allele and genotype frequencies: Selection, Migration, Genetic Drift; Mutation, Rate of mutation, Selection and Nonrandom Mating, Inbreeding, Inbreeding depression	
4	**MARKER ASSISTED SELECTION** Marker: Types of marker-morphological, biochemical, molecular [SCAR,AFLP,SNP,SSCP], Use of molecular markers in breeding, Mapping strategies: NIL(near isogenic line)strategy, Bulk segregant analysis (BSA), Quantitative trait loci (QTL) analaysis, Advantages of marker assisted selection.	

Basic Text & Reference Books:

- Plant Breeding: Principles and Methods- B. D. Singh. 7th Ed, Kalyani Publishers.
- Plant Breeding: Analysis & Exploitation of Variation- Darbeshwar Roy, Narosa Publishers.
- Concept of Genetics & Plant Breeding- P.K. Gupta, Rastogi Publication
- Introduction to Plant Biotechnology-H. S. Chawla.2nd Ed, Oxford & IBH Publishing Co. Pvt. Ltd
- Plant Biotechnology: The Genetic Manipulation of Plants- Adrian Slater, Nigel W. Scott, Mark R. Fowler, Oxford University Press
- Principles of Plant Genetics & Breeding - George Acquaah, Blackwell Publishing
- Agricultural Biotechnology - S.S. Purohit, Jodhpur Scientific Publishers