

GANPAT UNIVERSITY									
Kantaben Kashiram Institute of Agricultural Sciences and Research									
Programme		B.Sc. (Hons) Agriculture				Branch/Spec		Agriculture	
Semester		III				Version		1.0.0.0	
Effective from Academic Year			2022-23			Effective for the batch Admitted in			July 2021
Subject code		IIIA02FPB		Subject Name		Fundamentals of Plant Breeding			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	-	3	Theory	35	50	85
Hours	2	0	2	-	4	Practical	15	00	15
<b>Objectives of the course:</b>									
CO1: To know about achievements, developments, concepts, nature, principles and role of plant breeding									
CO2: To know about basics of plant breeding methods, its application and possible results									
CO3: To know about mode of reproduction, pollination and apomixes									
CO4: To know about components of genetic variance, heritability and genetic advance in plant breeding									
CO5: To know about genetic crop improvement, development and release of crop variety									
<b>Theory Syllabus</b>									
Unit	Content								Hrs
1	Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes, self-incompatibility and male sterility- genetic consequences, cultivar options.								6
2	Acclimatization and Introduction; Centers of origin/ diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept.								8
3	Domestication, Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes- Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization								8
4	Maintenance of breeding records and data collection; Wide hybridization and prebreeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools- DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and & Farmer's Rights.								8
<b>Practical Content</b>									
1. Plant Breeder's kit.									
2. Study of germplasm of various crops.									
3. Study of floral structure of self-pollinated and cross pollinated crops.									
4. Emasculation and hybridization techniques in self & cross pollinated crops.									
5. Consequences of inbreeding on genetic structure of resulting populations.									
6. Study of male sterility system.									
7. Handling of segregation populations.									

8. Methods of calculating mean, range, variance, standard deviation, heritability.
9. Designs used in plant breeding experiments, analysis of Randomized Block Design.
10. To work out the mode of pollination in a given crop and extent of natural out-crossing. Prediction of performance of double cross hybrids.

**Reference Book**

Principles of Plant Genetics and Breeding, George Acquaah, Wiley-Blackwell.  
Plant Breeding Principles and methods. B. D. Singh. Second edition, Kalyani Publisher  
Fundamentals of Plant Breeding. Phundan Singh. Kalyani Publisher