

GANPAT UNIVERSITY									
FACULTY OF AGRICULTURE, ALLIED SCIENCES & TECHNOLOGY									
Programme		B.Sc. (Hons)			Branch/Spec.		Agriculture		
Semester		III			Version		1.1.1.0		
Effective from Academic Year			2026-27		Effective for the batch Admitted in			July 2025	
Subject code		IIIA03POG		Subject Name		Principles of Genetics			
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	40	40	80
Hours	2	0	2	-	4	Practical	20	0	20
Pre-requisites									
Not Applicable									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	To learn the basics of genetics and its theory								
CO2	To learn the probability-based analysis of progeny								
CO3	To learn about the chromosome mapping and its impact								
CO4	To develop understating on inheritance and its transcription								
CO5	To learn the genetics and its character through practical								
Theory Syllabus									
Unit	Content								Hrs
1	Pre and post Mendelian concepts of heredity, Mendelian principles of heredity, Study of model organisms (<i>Drosophila</i> , <i>Arabidopsis</i> , Garden pea, <i>E. coli</i> , and mice), Architecture of chromosomes, chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere, special types of chromosomes,								6
2	Chromosomal theory of inheritance- cell cycle and cell division-mitosis and meiosis. Probability and Chi-square. Types of DNA and RNA, Dominance relationships, Epistatic interactions with example, Introduction and definition of cytology, genetics and cytogenetics and their interrelation.								8
3	Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanism, chromosome mapping, Structural and numerical variations in chromosomes and their implications, Use of haploids, dihaploids and double haploids in Genetics, Mutation, classification, Methods of inducing mutations, mutagenic agents and induction of mutation.								8
4	Qualitative and quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance, Nature, structure and replication of genetic material, Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation.								8
Practical Content-									
<ol style="list-style-type: none"> 1. Study of microscope, 2. Study of cell structure, Mitosis and Meiosis cell division, 3. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, 4. Experiments on epistatic interactions including test cross and back cross, 5. Practice on mitotic and meiotic cell division, 6. Experiments on probability and chi-square test, 7. Determination of linkage and croo-over analysis (through two point test cross data), 8. Study on sex linked inheritance in <i>Drosophila</i>. 9. Study on models on DNA and RNA structures. 									
Reference book									

Note: Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)

L=Lecture, TU=Tutorial, P= Practical/Lab., TW= Term work, DT= Direct Teaching, Lab.= Laboratory work
CE= Continuous Evaluation, SEE= Semester End Examination

1. Fundamentals of Genetics: B. D. Singh
2. Genetics: M. W. Strickberger.
3. Principles of Genetics: Gardner, Simmons and Snustad.
4. Principles of Genetics: Sinnott, Dunn and Dobzhansky

Mapping of CO with PO and PSO

	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	1	1	1	1	2	1	2	1
CO2	1	1	1	2	1	1	1	1	2	1	2	1
CO3	1	1	1	2	1	1	1	1	2	1	2	1
CO4	1	2	1	2	1	1	1	1	2	2	2	1
CO5	1	1	1	2	1	1	1	1	2	1	2	1

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