Syllabus for Bachelor of Agriculture

GENETICS AND PLANT BREEDING

Subject code: **16AS0207**

Subject Name**: Fundamentals of Genetics**

B. Sc. (Hons.) Agri., **First Year (Sem.-II)**

Objective:

To create the awareness among the students about cell division, cell enlargement, mitosis and meiosis processes taken place in the plants.

Credit Earned: 2+1= 3 Credit

Course Outcomes:

After completion of this course, student will be able to:-

1 Know the gene structures and its functions in the plant

2 Know the cytoplasmic inheritance and mutation

Teaching and Evaluation Scheme

Teaching Scheme (hours)		**Credits**	**Theory Marks**			**Practical Marks**		**Total Marks**
Theory	Practical		ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
2	2	3	50	30	20	25	25	150

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Contents:

Unit	Topics	Contact Hours
	Theory	
1.	Introduction to genetics	
2.	Cell division: mitosis and meiosis	
3.	Mendelian principles of heredity	
4.	Study of chromosome structure, multiple alleles, pleiotropism and pseudoalleles and blood group genetics	
5.	Linkage and its estimation, crossing over mechanisms, chromosome mapping	
6.	Sex determination and sex linkage, sex limited and sex influenced traits	
7.	Qualitative and quantitative traits, polygenes and continuous variations, multiple factor hypothesis	
8.	Cytoplasmic inheritance	
9.	Mutation- classification, methods inducing mutation and CIB technique, mutagenic agents and induction of mutation	
10.	Structural and numerical changes in chromosome; nature, structure and replication of genetic material	
11.	Protein synthesis- transcription and translational mechanism of genetic material	
12.	Gene concept- gene structure and functions	
13.	Gene regulation- Lac and Trp operons	

Unit	Topics	Contact Hours
	Practical	
1.	Study of microscope	
2.	Study of cell structure and functions	
3.	Practice on mitotic and meiotic cell division	
4.	Experiments on monohybrid, dihybrid, trihybrid, back cross and test cross	
5.	Chi-square test, epistatic interactions	
6.	Determination of linkage and cross over analysis (through two point test cross and three point test cross data)	

Reference Books:

1. Genetics
   Gupta, P.K. Rastogi Publication
2. Fundamentals of Genetics
   Singh, B. D., Kalyani Publication Ltd., New Delhi
3. Genetics- A conceptual approach
   Benjamin Pierce , MacMillan Learning publication
4. Plant Genetics
   Singh Phundan , Kalyani Publication Ltd., New Delhi

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brainstorming, MOOCs *etc*.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.