

Syllabus for B.Sc. (Hons) Agriculture Year – III (Sem. V)

Subject Code: 16AS1509

Subject Short Name: GPB 5.3

Subject Name: Crop Improvement (*Kharif* crops) - I

Objective:

1. To provide knowledge about Self-pollinated and cross pollinated *kharif* crops
2. To learn about origin and distribution of *kharif* crops
3. To design breeding objectives of major *kharif* crops
4. To impart information on different crop varieties for *kharif* season

Credits Earned: 2 Credits (1+1)

Course Outcomes: After completion of this course, Students will be able to

- Know the biodiversity pattern in *Kharif* crops.
- Acquire the knowledge about importance of genetic resources in crop improvement of *kharif* crops. Get knowledge regarding strategies for disease management.
- Gain the knowledge of germplasm conservation, utilization and genetics of qualitative and quantitative characters and their inheritance.
- Analyze the breeding procedures and methods, breeding objectives in different *kharif* crops for the development of improved varieties/ hybrids

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
1	0	2	2	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
1	Centres of origin, distribution of species, wild relatives in different cereals, pulses, oilseed, fibers, fodders and cash crops of <i>kharif</i> season	2

2	Centres of origin, distribution of species, wild relatives in different vegetables and horticultural crops of <i>kharif</i> season	2
3	Plant genetic resources, its utilization and conservation,	2
4	Study of genetics of qualitative and quantitative characters	1
5	Important concepts of breeding self-pollinated, cross-pollinated and vegetatively propagated crops	2
6	Breeding approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional)	3
7	Hybrid seed production technology in maize, rice, sorghum, pearl millet and pigeonpea <i>etc.</i>	2
8	Ideotype concept	1
9	Climate Resilient Crop Varieties for future	1
	Total	15

Practical Content:

Unit	Topics	Contact Hours
1	Botany of crops, Floral biology, emasculation and hybridization techniques in different crop species	2
2	Maintenance breeding of different <i>kharif</i> crops	2
3	Handling of germplasm and segregating populations by different methods (Pedigree, Bulk and SSD methods)	4
4	Study of field techniques for seed production and hybrid seed production in <i>kharif</i> crops	2
5	Estimation of heterosis, inbreeding depression and heritability	2
6	Layout of field experiments	2
7	Study of quality characters, donor parents for different characters	2

8	Visit to seed production plots	2
9	Visit to AICRP breeding plots of different crops	2
	Total	20

Reference Books:

- Chopra, V. L. (2001). Breeding Field Crops -I, Oxford & Ibh Publisher, Delhi, India.
- Singh, C. B. and Khare, D. (2001). Genetic Improvement of Field Crops, Scientific Publisher, Rajasthan, India.
- Singh, D. P. (2014). Genetics and Breeding of Pulse Crops, Kalyani Publishers, New Delhi, India.
- Ram, Hari Har (2024). Vegetable Breeding – Principles and Practices (4th Edn.), Kalyani Publishers, New Delhi, India.
- Yadav, R. K. (2023). Practical Manual on Crop Improvement I (*Kharif* crops), Bhavya Books publication, New Delhi, India.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms.

3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory/ field.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.