

21GPBR311 CROP IMPROVEMENT - I (CEREALS, MILLETS, PULSES AND OILSEEDS)

Hours Per Week :

L	T	P	C
1	-	2	2

Total Hours :

L	T	P
15	-	30

Course Description and Objectives:

This course impart knowledge on various breeding approaches and crop improvement techniques used in the development of varieties / hybrids of various *kharif* crops

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Acquire knowledge on crop improvement technologies of cereals, millets, pulses and oilseeds and advice farmers on selection and use of varieties, hybrids and other types of varieties
2	Able to practice and enable farmers in maintaining purity and uniformity of the improved varieties of cereals, millets, pulses and oilseed crops in his / her own and other farms

SKILLS:

- ✓ *Develop standard procedure to produce certified seed of cereals, millets, pulses and oilseeds crops*
- ✓ *Practice emasculation and pollination techniques*
- ✓ *Handle equipment's used in biotechnology laboratory*



Source:

<http://www.cropco.co.uk/wp-content/uploads/SU-HW-trial-plots-France-2012-low-res-1024x768.jpg>

ACTIVITIES:

- o *Demonstration of Emasculation and hybridization techniques in different crop species*
- o *Detailed study about quality characters of donor parent*
- o *Visit to seed production plots*
- o *Visit to AICRP plots of different field crops*

UNIT - 1

Centers of origin, distribution of species, wild relatives in different cereals, pulses, oilseeds; Plant genetic resources, its utilization and conservation

UNIT - 2

Floral biology; study of genetics of qualitative and quantitative characters

UNIT - 3

Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops

UNIT - 4

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional), biofortification; Electronic data capture and Management of Breeding Data

UNIT - 5

Ideotype concept and climate resilient crop varieties for future. Breeder's equation - Market segmentation, development of Target Product Profiles – Optimizing breeding pipelines, deploying novel genomic and phenomic tools; Rapid generation advancement (speed breeding) – multi-environment testing and data driven decision making for product advancement and recycling for increasing the rate of genetic gain

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS

1. Hybridization techniques and precautions to be taken, floral morphology, selfing, emasculation and crossing techniques in field crops
2. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in rice
3. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Wheat and Barley
4. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Maize and Sorghum
5. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Pearl millet and Finger millet
6. Study of the effect of seed size on germination and seedling vigor
7. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Kodo millet and Proso millet
8. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Chickpea and Pigeonpea
9. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Urdbean and Mungbean

10. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Soyabean and Cowpea
11. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in Groundnut and Castor
12. Floral biology, anthesis, pollination, selfing, emasculation and crossing techniques in and Sesame, Linseed, Sunflower, Mustard, Safflower and Rapeseed
13. Visit to Agricultural Research stations/AICRP projects of crops
14. Sources of donors for different characters in various crops and parentage of released varieties / hybrids of important crops
15. Study of special quality characters in various crops

REFERENCES:

1. Allard, R.W. 1960. *Principles of Plant Breeding*. John Wiley & Sons, New York
2. Phundan Singh. 2006. *Essential of Plant Breeding*. Kalyani Publishers, Ludhiana
3. Poehlman, J.M. and Borthakur, D. 1995. *Breeding of Asian Field Crops*. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi
5. Sharma, J.R. 1994. *Principles and Practices of Plant Breeding*. Tata McGraw-Hill Publishing Co. Ltd., New Delhi
6. Kalloo, G.1994. *Vegetable Breeding*. Panima Educational Book Agency, New Delhi
7. Kumar, N.2006. *Breeding of Horticultural Crops - Principles and Practices*. New India Publishing Agency, New Delhi

