

SARDAR PATEL UNIVERSITY
Programme: MSC (Genetics)
Semester: III
Syllabus with effect from: June 2010

Paper Code: PS03CGEN03	Total Credits: 4
Title Of Paper: Genetics in Crop Improvement	

Unit	Description in detail	Weightage (%)
1	<p>Introduction to Crop Improvement: Methods for crop breeding Self pollinated crops - pure line theory and pure line method, pedigree method, Bulk population method and Back cross method of crop breeding. Cross pollinated Crops- Theory of selection and response to selection, Mating systems and their consequence Male sterility and its types, Applications of male sterility in crop improvement. Heterosis breeding and Hybrid varieties. Polyploidy and mutation breeding as methods of crop improvement.</p>	25 %
2	<p>Tissue culture for Crop Improvement: Production and uses of haploids - Anther culture, Pollen culture, Chromosome elimination (Bulbosm method), Ovule culture, Detection of haploids, Methods for diploidization of haploids, Uses of haploids and dihaploids in crop improvement. Somatic hybrids – Isolation of protoplast, culture and purification of protoplasts, Viability and plating density of protoplast, Protoplast fusion and somatic hybridization.</p>	25 %
3	<p>Somaclonal variation for Crop Improvement and Transgenic in Crop Improvement - I Definition, Schemes for obtaining somaclonal Variation, Factors influencing somaclonal variation, genetic basis of somaclonal variation, Applications and disadvantages of somaclonal variation. Resistance to biotic stresses- Insect resistance, Virus resistance, Bacterial and fungal disease resistance.</p>	25 %
4	<p>Transgenic in Crop Improvement - II and Molecular markers for Crop Improvement Resistance to abiotic stresses-, Salt resistance, Drought resistance Herbicide resistance Transgenic for quality improvement, Commercial transgenic crops. Non – PCR based approaches- RFLP (Procedure, Construction of RFLP maps, Uses of RFLP) PCR based approaches- Random Amplified Polymorphic DNA (RAPD), DNA Amplification Fingerprinting (DAF), Arbitrarily Primed Polymerase Chain Reaction (AP-PCR), Amplified Fragment Length Polymorphism (AFLP), Simple Sequences Repeat (SSR) and Marker Assisted Selection (MAS).</p>	25 %

Basic Text & Reference Books:

- Principles of plant breeding by Robert W. Allard, Johan Wiley and Sons. ISBN-047023094.
- Plant breeding by Briggs and Knowles, Reinhold Publishing Crop , Newyork.ISBN-0-582-45586-3
- Plant tissue culture: Theory and Practice by S. S. Bhojwani and M. K. Razdan, Springer Publication. ISBN:-0-444-81623-2
- Plant tissue culture manual by K. Lindsey, Springer Publication. ISBN:81-8128-582-4



- Introduction to plant tissue culture by M.K. Razdan, Oxford and IBH Publishing Co. Pvt Ltd, New Delhi. ISBN: 81-204-1571-X
- Experiment in plant tissue culture by John H. Dodds and Lorin W. Robert, Cambridge University Press. ISBN: 0521299659
- Plant propagation by tissue culture by George and Sherington, Exegetics Publisher. ISBN:978-0950932507
- Micropropagation by plant tissue culture by Reinert and Bajaj, Springer Publication, Netherland. ISBN: 978-1-4020-5004-6
- Introduction to plant biotechnology by H. S. Chawla, Oxford and IBH Publishing Co. Pvt Ltd, New Delhi. ISBN:81-204-1549-3
- Fundamentals of genetics by B. D. Singh, Kalyani Publication, New Delhi. ISBN: 81-272-3292-0
- Element of biotechnology by P. K. Gupta, Oxford and IBH Publishing Co. Pvt Ltd, New Delhi. ISBN: 81-7133-481-4
- Genetics by P. K. Gupta, Oxford and IBH Publishing Co. Pvt Ltd, New Delhi. ISBN: 81-7133-842-9
- Practical applications of plant molecular biology by R.J. Henry, Chapman and Hall.ISBN:978-041273201
- Plant propagation by tissue culture (Vol.1&2) by Edwin George, Springer Publication, Netherland. ISBN: 1402050046
- Plant Breeding: Theory and Practice by V.L. Chopra, intercept Ltd. ISBN: 8120403886
- General Plant Breeding by A. R. Dabholkar, Concept Publishing Company. ISBN: 8180692426
- Plant Genotyping: The DNA Fingerprinting of plants by R. J. Henry, CABI Publishing. ISBN: 0857995152
- DNA fingerprinting in plants: Principle, method and application by Kurt Weising, Kirsten Wolf, Hilde Nybom, CRC Press. ISBN: 0849314887.
- Practical manual of plant tissue culture by H. S. Chawla, Oxford and IBH Publishing Co. Pvt Ltd, New Delhi. ISBN: 81-204-1613-9.

