

PBT-907 Plant Molecular Cytogenetics 3 (3-0)

1. **Educational Objectives**

- a. This course will provide knowhow for the basic principles and methodologies both for plant molecular biology and cytogenetics.
- b. It will offers unparalleled options for professional development.
- c. This course will assist in acquisition of background knowledge in fields of genetics, molecular biology, genomics and bioinformatics.

2. **Course Outcomes**

- a. The students will be able to impart this study in applied research.
- b. They will be able to generate useful data.
- c. In the long run, more plant science oriented researchers will be able to bring sustainable crop production for Pakistan.

3. **Course Contents**

- a. Introduction (Lecture 1)
- b. The Nucleotype And Structure Of Chromosomes (Lecture 2, 3)
- c. Cell Division (Lecture 4, 5)
- d. Genetic Control Of Meiosis (Lecture 6)
- e. Mode Of Reproduction In Plants (Lecture 7,8)
- f. Karyotype Analysis (Lecture 9)
- g. Physical Organization Of Repetitive Sequences (Lecture 10)
- h. Chromosomal Localization Of Genes (Lecture 11)
- i. Chromosomal Aberrations – Structural And Numerical Chromosome Changes (Lecture 12, 14)
- j. Chromosomes In The Flow To Simplify Genome Analysis (Lecture 15,16)
- k. Chromosomal Aberrations In Cell And Tissue Culture (Lecture 17)
- l. Current Status Of Transgenic Crops (Lecture 18)
- m. Cytological Basis Of Gene Silencing (Lecture 19,20)
- n. Status Of Transposons In Plant Genomes (Lecture 21-22)

- o. Techniques Involved In Plant Molecular Cytogenetics, C-Banding, Fish, Gish (Lecture 23-25)

Recommended readings Text Books

1. Plant Cytogenetics, Second Edition Published:December 26, 2002 by CRC Press - 488 Pages Author(s):Ram J. Singh, University of Illinois,Urbana, USA
2. H., and Birchler, J. A. (2011). Plant Cytogenetics: Genome Structure and Chromosome Function: Springer New York).
3. **Reference Books**
4. Sobral, B. W. S. (2012). The Impact of Plant Molecular Genetics: Birkhäuser Boston).
5. Sybenga, J. (2012). Cytogenetics in Plant Breeding: Springer Berlin Heidelberg).